



# European Scientific Conference on Applied Infectious Disease Epidemiology

Stockholm Waterfront Congress Centre

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Stockholm, Sweden





The conference is sponsored by ECDC (European Centre of Disease Prevention and Control) and jointly organised by ECDC, EPIET (European Programme for Intervention Epidemiology), EAN (EPIET Alumni Network), TEPHINET EUROPE (Training Programmes in Epidemiology and Public Health Interventions NETWORK)

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# Foreword

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I would like to extend a warm welcome to all delegates of the 7th ESCAIDE conference in Stockholm this year. As usual, we have received far more abstracts than we have slots for presentation and I would like to offer thanks to all authors who submitted an abstract. I am also grateful to all the colleagues who kindly assisted in carrying out almost 1500 peer reviews to assess the submitted work.

I congratulate all those authors that have been chosen to present at ESCAIDE 2013, and to those who did not get their abstract accepted I just say “keep up the good work – there will be an ESCAIDE next year again...”

I and my Colleagues in the Scientific Committee are greatly looking forward to learning more about the methodology and application of epidemiology, microbiology and other related disciplines that will be presented during the conference in support of communicable disease prevention and control.

ESCAIDE serves as a great forum for information exchange and knowledge sharing, and I hope that you will take the opportunity to discuss the current challenges you face in your daily work.

ESCAIDE is also a social event. You will meet old friends, but please also take the opportunity to meet new colleagues – this is both personally rewarding and potentially of professional value. In a global environment, the possibility to rely on trusted colleagues inside or outside the EU in the event of a disease outbreak or emerging infection can make a significant difference to its containment and control.

Another aim of ESCAIDE is to provide a platform for future public health experts from within the FETPs (Field Epidemiology Training Programmes), EPIET (European Programme for Intervention Epidemiology Training) and EUPHEM (European Public Health Microbiology Training Programme) to present their work. We welcome all the fellows to the conference, and anticipate interesting presentations and discussions of your work.

I wish you all an enjoyable, successful and stimulating conference.

**Johan Giesecke**  
Chair, ESCAIDE Scientific Committee



Welcome by  
Chairman of  
ESCAIDE

# Scientific Committee

## Johan Giesecke – ECDC, Chair of ESCAIDE Scientific Committee

Professor Johan Giesecke is Chief Scientist at the ECDC since 2005 and heads the disease programmes of the Centre in the Office of the Chief Scientist. From a background as infectious disease clinician, his research interests include: epidemic modeling, HIV/STIs and late sequelae of acute infections. He has published some 150 scientific papers, has written a textbook on infectious disease epidemiology and co-edited another.



## Lorenzo Pezzoli – President of the EPIET Alumni Network (EAN)

Lorenzo holds a Degree in Veterinary Medicine and a PhD from the University of Turin. Between 2006 and 2008, as an EPIET Fellow (Cohort 12), he was based at the Health Protection Agency Centre for Infections in London. He currently works as an epidemiology consultant for different international organizations in the area of monitoring and evaluation of vaccination activities mainly in low- and middle-income countries. Since 2009 Lorenzo has been the President of the EPIET Alumni Network (EAN), one of the institutions co-organizing ESCAIDE and the EPIET Seminar before that.



## Aftab Jasir – ECDC/EUPHEM

Aftab is an associate professor, expert public health microbiologist and chief scientific coordinator of the European Public Health Microbiology training programme (EUPHEM) at ECDC. In addition to many years professional work as a university teacher and coordinating European projects, Aftab has worked in many public health bodies/organisations (including Lund University hospital, Sweden; HPA, UK and CDC, US). Specialisations include health care associated infections and antibiotic resistance, monitoring and evaluating QA/QC systems, molecular typing, and vaccine and antimicrobial drug development. Aftab is a member of many scientific societies and international advisory boards.



## Ines Steffens – ECDC

Ines is the Editor-in-Chief of Eurosurveillance journal. Ines joined ECDC in 2006 as Managing Editor for Eurosurveillance, and between 2007-2011 set up ECDC's Scientific Communication Section. Before joining ECDC, Ines was Editor-in-Chief for Germany's national epidemiological and public health bulletin, the Epidemiologisches Bulletin at Robert Koch Institute, Berlin, Germany. Ines is a trained internist, with broad clinical experience and expertise in infectious diseases. She holds a masters degree in public health, and has a special interest in communication-related issues.



## Howard Needham – ECDC

Howard is the Scientific Liaison Officer at the ECDC. Since 2008, Howard has been coordinator of the ESCAIDE conference and scientific programme under the ESCAIDE Scientific Committee. Howard has a background in biological sciences and has held policy roles in the UK Government and the European Commission in animal health issues and zoonoses, including notably transmissible spongiform encephalopathies and avian influenza. Howard joined the ECDC as the influenza programme coordinator in 2006, and took up his current position in 2008.



## Andrea Ammon – ECDC

Andrea is the Deputy to the Director and Head of Resource Management and Coordination Unit at the ECDC. Prior to joining ECDC, Andrea served in several roles at the Robert Koch-Institute, in Berlin, Germany, most recently as Head of Department for Infectious Disease Epidemiology. She has published over 90 peer-reviewed journal articles related to her work.



## Panayotis T. Tassios – University of Athens, Greece (ESCMID representative)

Panayotis is Assistant Professor in Molecular Microbiology at the National & Kapodistrian University of Athens, Greece. His research focuses on the molecular typing of bacterial strains and their antimicrobial drug resistance mechanisms, to assist epidemiological investigations and infection control. He is also active in lifelong teaching, on his scientific interests as well as on scientific writing, aided by his experience as Associate Editor of several journals. Panayotis represents the European Society of Clinical Microbiology and Infectious Diseases (ESCMID) on the Scientific Committee.



## Mira Kojouharova – NCIPD, Bulgaria (AF Representative)

Mira is the Deputy Director of the National Centre of Infectious and Parasitic Diseases (NCIPD) in Sofia, Bulgaria, and Head of the Epidemiology and Communicable Disease Surveillance Department. Mira holds a professorship, and leads research and teaching in the field of post-graduate education in epidemiology, surveillance and control of communicable diseases and practical work related to the surveillance of communicable diseases in Bulgaria. Mira's research interests are particularly focused on influenza and acute respiratory diseases in adults and children, poliomyelitis and viral hepatitis. Mira is an ECDC Advisory Forum (AF) member, and represents the AF in the ESCAIDE Scientific Committee.



## Arnold Bosman – ECDC

Arnold is a Public Health Specialist, trained in The Netherlands, focused on providing specialised training in Intervention Epidemiology to public health professionals. He is a member of the EPIET Scientific Conference committee. Currently he is a manager of Public Health Training at ECDC aiming to establish an effective network of training in applied public health (e.g. epidemiology, public health microbiology) in order to strengthen the work force in the EU.



**Thea Kølsen Fischer – SSI (NMFP representative)**

Thea is a public health virologist heading the Virology Surveillance and Research Unit at the Statens Serum Institut (SSI) and an associate Professor at the University of Copenhagen (Dept. Int Health). Thea specialised in epidemiology and laboratory outbreak management while completing the Epidemiology Intelligence Service (EIS) training program (2003-2005) at CDC, and has been involved in population-based studies of high-incidence viruses such as rotavirus and HIV in Africa and Asia. She holds a medical research doctoral degree (DMSc) within public health virology (combining epidemiology, molecular profiling and vaccinology). Thea represents the ECDC National Microbiology Focal points (NMFP) in the ESCAIDE Scientific Committee.



**Andrew Amato-Gauci – ECDC**

Andrew is deputy head of the Surveillance and Response Support Unit and Head of Surveillance at ECDC. Andrew was formally National Director of Public Health, then National Director of Primary Health Care and Head of the Department of Public Health and Epidemiology of the University of Malta Medical School. Also prior to joining ECDC, he had extensive experience working in the international public health field with UNAIDS, WHO, the World Bank, UNICEF and UNDP, mainly focusing on working on HIV/AIDS/STI issues in Eastern Europe and Central Asia.



**Andreas Jansen – ECDC**

Andreas is a medical doctor who worked as an infectious disease clinician and HIV specialist in Germany. From 2005-2006 he was a FETP fellow at the Robert Koch Institute in Berlin, and he joined ECDC in 2009. He is currently the Head of the Scientific Advice Coordination Section at ECDC, responsible for scientific advice procedures and methodologies, and for evidence-based public health.



**Katharina Alpers – RKI, Germany (TEPHINET representative)**

Katharina is the Coordinator for German PAE (Postgraduate Training for Applied Epidemiology (PAE) German Field Epidemiology Training Programme, FETP) and is based at the Robert Koch-Institute (RKI) in Berlin. She is also the representative of the European Programmes to the TEPHINET advisory board (Training Programs in Epidemiology and Public Health Interventions Network), a global network of field epidemiology training programs. Katharina represents TEPHINET in the ESCAIDE Scientific Committee.



**Yvan J Hutin – ECDC/EPIET**

Yvan is the Chief Coordinator of the European Programme for Intervention Epidemiology Training (EPIET). After an MD and a residency in hepato-gastroenterology, he joined the Epidemic Intelligence Service (EIS) of the United States' Centers for Disease Control and Prevention (CDC). As part of his public health career, he worked in Burkina Faso, Uganda and at the World Health Organization in Geneva, India and China. His areas of expertise include epidemiology and prevention of viral hepatitis and Field Epidemiology Training Programmes (FETPs).



**Paolo Fortunato D'Ancona – ISS, Italy (ETSF representative)**

Paolo is a Doctor and Communicable disease epidemiologist at the National Centre for Epidemiology, Surveillance and Health Promotion at the Istituto Superiore di Sanita, Italy. Among several activities, he leads the Italian Network on the surveillance of Antimicrobial resistance, and is project leader for the VENICE II project that support vaccine programmes in the EU. Paolo is also training site supervisor for the EPIET programme at Istituto Superiore di Sanita, and is Chair of the EPIET Training Site Forum (ETSF). Paolo represents the ETSF in the ESCAIDE Scientific Committee.



**Frank Van Loock – European Commission**

Frank is a policy officer in the Health Threats Unit (C3) within DG SANCO at the European Commission. Frank has a long standing interest and involvement in communicable disease prevention. He was one of the founders of the EPIET training programme, and remains professionally engaged in policies and activities to address EU health threats, preparedness and health security.



**Marc Struelens – ECDC**

Marc is the Chief Microbiologist at ECDC. He is former President of the European Society of Clinical Microbiology and Infectious Diseases, and Professor of Medical Microbiology at the Faculty of Medicine of the Université Libre de Bruxelles (ULB) in Belgium. Marc has authored over 200 peer-reviewed articles and 20 book chapters across many disciplines, including molecular epidemiology, control of nosocomial infections, and antimicrobial resistance. He has served as editor of several international scientific journals, been a member of several national and international advisory boards, European Union (EU)-supported research and public health networks, and has served as consultant to the WHO and EU.



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164. **Yvan Hutin**, Sweden
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## Keynote Speaker Biography

### Keynote Address: No time to lose: of infectious diseases, science, politics and institutions

**Professor Peter Piot, London School of Hygiene and Tropical Medicine, UK**

Peter Piot MD PhD is the Director of the London School of Hygiene & Tropical Medicine, and Professor of Global Health. In 2009-2010 he was the Director of the Institute for Global Health at Imperial College, London. He was the founding Executive Director of UNAIDS and Under Secretary-General of the United Nations from 1995 until 2008, and was an Associate Director of the Global Programme on AIDS of WHO. Under his leadership UNAIDS became the chief advocate for worldwide action against AIDS, also spear heading UN reform by bringing together 10 UN system organizations.

Professor Piot co-discovered the Ebola virus in Zaire in 1976, and led research on AIDS, women's health, and public health in Africa. He was a professor of microbiology, and of public health at the Institute of Tropical Medicine, Antwerp, the Free University of Brussels, and the University of Nairobi, was a Senior Fellow at the University of Washington, a Scholar in Residence at the Ford Foundation, a Senior Fellow at the Bill and Melinda Gates Foundation, and held the chair "Knowledge against poverty" at the College de France in Paris.

He is a member of the Institute of Medicine of the US National Academy of Sciences, of the Académie Nationale de Médecine of France, and of the Royal Academy of Medicine of his native Belgium, and a fellow of the Academy of Medical Sciences, UK, and the Royal College of Physicians. In 2008-11, he was the President of the King Baudouin Foundation and was knighted as a baron in 1995. He has published over 500 scientific articles and 16 books, including his memoir "No time to lose". In 2013 he was the laureate of the Hideyo Noguchi Africa Prize for Medical Research.



The Scientific Committee warmly thank everyone who participated in the reviewing of the abstracts submitted for ESCAIDE 2013

# Plenary Speaker Biographies

## Plenary Session B: Phylogenomics for public health: unravelling disease transmission

**Dr. Rene Sjøgren Hendriksen,**  
Danish Technical University, Copenhagen, Denmark



In 1993, Dr. Rene Hendriksen was employed at the National Veterinary Institute as laboratory technologist. In 1999, the Institute was appointed as WHO Collaborating Centre and his duties and responsibility were transferred to building up laboratory capacity in relation to the WHO Global Food-borne Infections Network (WHO GFN). In 2006, the Institute was additionally appointed as European Union Reference Laboratory (EURL) in antimicrobial resistance for which he is daily responsible. He has facilitated and conducted more than 25 international laboratory training courses for more than 500 scientists from more than 50 countries; primarily in Southeast and central Asia, China, Eastern Africa, the Middle East, and Europe. He is also responsible for conducting national and international (WHO/EURL) proficiency test programs (External Quality Assurance Systems).

In 2010, he defended his PhD thesis "Global epidemiology of non-typhoidal Salmonella infections in humans". Currently, he works as senior scientist at the Technical University of Denmark, National Food Institute (DTU Food), Division of Bacterial Genomics and Epidemiology, Research Group of Bacterial Genomics and Antimicrobial Resistance and acts as deputy for the reference centres. He represents the Institute in the WHO Global Foodborne Infections Network (WHO GFN) and the WHO Advisory Group on Integrated Surveillance of Antimicrobial Resistance (AGISAR) network. Additionally, he chairs the working group for proficiency testing of the Global Microbial Identifier initiative. Dr. Rene Hendriksen is INFOSAN and ECDC focal. His main focus is research in global epidemiology, surveillance, antimicrobial resistance, and population structure of mainly foodborne pathogens. Dr. Rene Hendriksen is author of 57 peer-reviewed published and accepted articles in international refereed journals.

**Jaime Martinez Urtaza, ECDC, Stockholm, Sweden**



A specialist in the study of the population dynamics of human pathogenic bacteria in natural settings. One of his primary activities has been directed toward understanding the contamination process of human pathogens in the environmental. In particular, his first research studies were focussed on the study of the cycle of Salmonella spp. outside the host by identifying the environmental drivers promoting the presence and survival of this pathogen in aquatic systems as a critical stage to understanding the transmission of salmonellosis.

Most recently, Jaime has centred most of his research interest toward studying marine bacteria of the genus Vibrio. *V. vulnificus*, *V. cholerae* and *V. parahaemolyticus*. Using *V. parahaemolyticus* as a biological model, he has applied a set of molecular tools to investigate the population structure and ecological role of this organism in coastal habitats and the ocean. With the use of these techniques, he has tracked the dissemination of the main pathogenic clones of Vibrio around the globe and has been able to identify the oceanographic and ecological changes associated with long-distant propagation of Vibrio populations and the emergence of diseases.

**Hajo Grundmann, University Medical Centre  
Groningen, The Netherlands**



Hajo Grundmann, born in 1955, studied Sinology, Nursing and Human Medicine at the Universities of Bochum and Freiburg, Germany. He specialised in Clinical Tropical Medicine, Medical Microbiology and Hygiene & Environmental Medicine and received his PhD at the University of Freiburg, Germany and an MSc in Epidemiology of Communicable Diseases at the London School of Hygiene. Hajo worked clinically as a medical doctor at university hospitals in Freiburg, Berlin, and Nottingham and carried out extensive field studies in Taiwan, Venezuela and Tanzania. For eight years, he was the Project Leader of the European Antimicrobial Resistance Surveillance System (EARSS) funded by the European Commission and the Dutch Ministry of Health at the Dutch National Institute for Public Health and the Environment (RIVM). Currently, he is the Chair for Infectious Diseases Epidemiology at the University of Groningen where he also holds his clinical appointment. Hajo is also Special Professor at the University of Nottingham, UK and Co-Lead for the 3rd Challenge on Patient Safety of WHO's Global Alliance on Patient Safety. He is scientific advisor to ReAct – Action on antibiotic resistance. His major research interests are the molecular evolution, epidemiology, population dynamics and health impact of emerging antimicrobial resistance and health care associated infections.

## Plenary Session D: The epidemiology of HIV/AIDS, chlamydia, gonorrhoea, syphilis and co has undergone considerable changes in the past decades

**Professor Kevin A. Fenton MD, PhD, FFPH National  
Director for Health and Wellbeing, Public Health  
England, United Kingdom**



Professor Kevin Fenton, MD, PhD, FFPH, is the Public Health England National Director for Health and Wellbeing. In this role he oversees PHE's national prevention programmes including screening for cancer and other conditions, health checks, national health marketing campaigns, public mental health, and a range of wellbeing programmes for infants, youths, adults and older adults. The Health and Wellbeing Directorate also leads PHE's Health Equity portfolio with a range of programmes and activities focused on addressing the social determinants of health, and promoting settings-based approaches to health improvement.

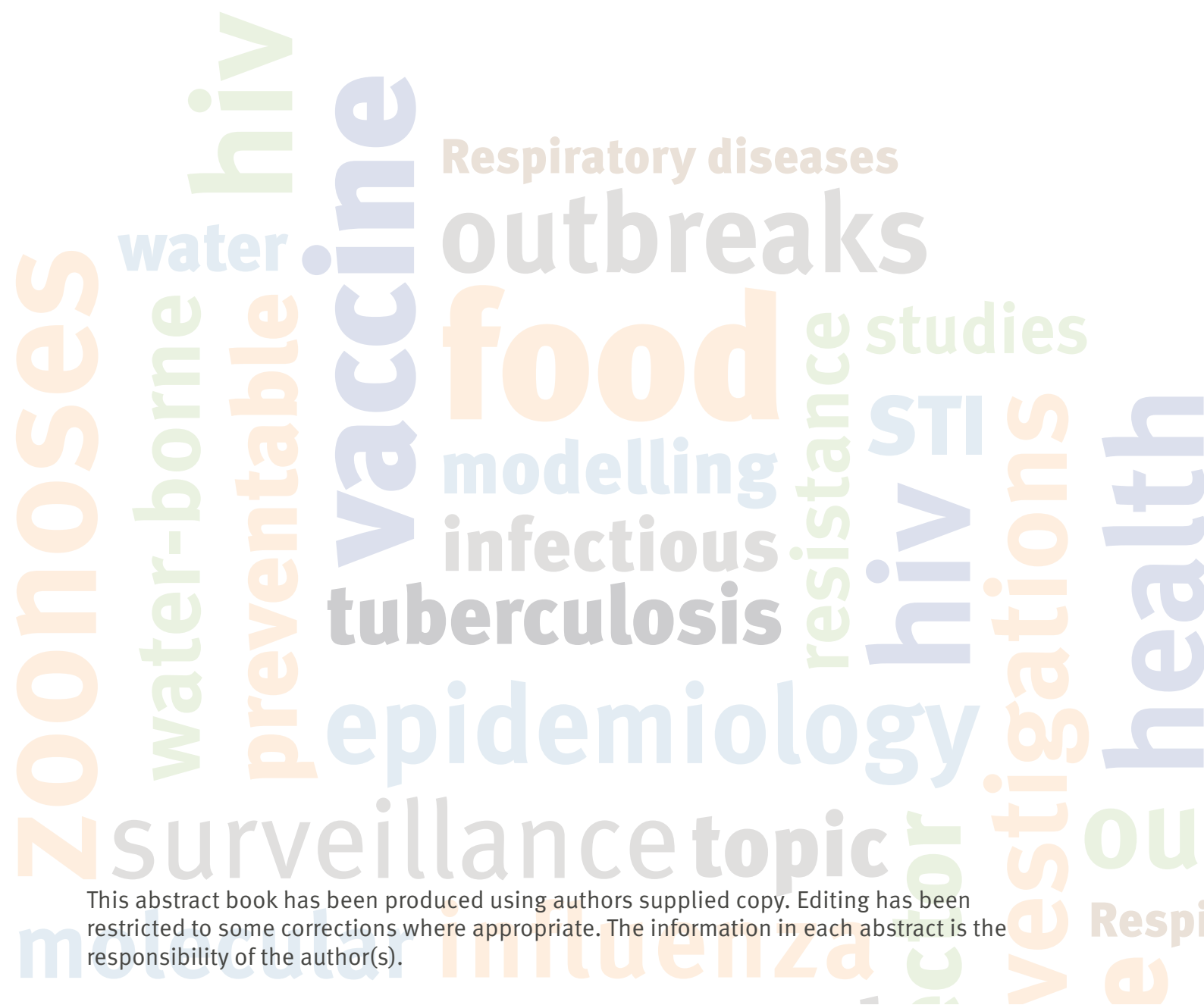
Professor Fenton was previously the director of the National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention (NCHHSTP), Centers for Disease Control and Prevention (CDC), a position he held for seven years from November 2005. He also served as chief of CDC's National Syphilis Elimination Effort and has worked in research, epidemiology, and the prevention of HIV and other STDs since 1995. Previously he was the director of the HIV and STI Department at the United Kingdom's Health Protection Agency.

Kevin attended medical school in Jamaica, obtained his master's in public health at the London School of Hygiene and Tropical Medicine, and PhD in Infectious Disease Epidemiology at the University College London. He has authored or co-authored more than 250 peer-reviewed scientific articles and policy reports. He is a speaker in great demand and speaks Spanish and French.

## Plenary Session Abstracts

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10	Keynote Address	09.15 – 10.30	Tues 5
10	Plenary Session B	15.20 – 16.35	Tues 5
11	Plenary Session C	09.00 – 10.30	Wed 6
12	Plenary Session D	09.00 – 10.15	Thur 7



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# Plenary Session Abstracts

**Keynote Address** 09.15 – 10.30 **Tues 5**

**No time to lose: of infectious diseases, science, politics and institutions**

Presented by:

Professor Peter Piot

Affiliation:

1 London School of Hygiene and Tropical Medicine, UK

**Abstract**

Based on Professor Piot's experience as scientist, epidemiologist, clinician and founding executive director of UNAIDS, he will review how the interplay between scientific evidence, societal processes, services on the ground, sectors beyond health and politics, ultimately determine health outcomes.

The biggest obstacles for effective action to secure people's health are not the lack of scientific evidence or technology, but societal, institutional and political resistance. Precious time is lost because of these highly damaging forms of resistance. Lessons for infectious disease control in Europe will be discussed.

**Plenary Session B** 15.20 – 16.35 **Tues 5**

**Plenary Session B: Phylogenomics for public health: unravelling disease transmission**

**Collateral damage of disaster relief: Introduction of pandemic cholera in Haiti**

Presented by:

Rene Hendriksen

Affiliation:

WHO Collaborating Centre for Antimicrobial Resistance in Food borne Pathogens and European Union Reference Laboratory for Antimicrobial Resistance, Technical University of Denmark, National Food Institute, Kgs. Lyngby, Denmark

**Abstract**

**Objective:** Cholera continues to be an important cause of human infections, and outbreaks are often observed after natural disasters, such as the one following the 2010 earthquake in Haiti. This disaster destroyed the already fragile infrastructure and required international assistance in the form of food, water, and aid workers. Once the cholera outbreak was confirmed, rumours spread that the disease was brought to Haiti by a battalion of Nepalese soldiers serving as United Nations peacekeepers. Since the first case was detected, more than 1/2 mill cases have been recorded including more than 7000 deaths generating one of the largest cholera epidemics in the world.

We determined the genetic diversity of the most contemporary *Vibrio cholerae* strains from Nepal and compared these data to the available genomes of the isolates related to the 2010 outbreak in Haiti.

**Method:** We used whole-genome sequence typing (WGST), variable number tandem repeats, and antimicrobial susceptibility testing to characterize 24 recent *V. cholerae* isolates from Nepal and evaluate the suggested epidemiological link with the Haitian outbreak. The isolates were obtained from 30th July to 1st November 2010 from five different districts in Nepal. We compared the 24 genomes to 10 previously sequenced *V. cholerae* isolates, including three from the Haitian outbreak.

**Results:** WGST showed that all 24 *V. cholerae* isolates from Nepal belonged to a single monophyletic group that also contained isolates from Bangladesh and Haiti. The Nepalese isolates were divided into four closely related clusters. One cluster contained three Nepalese isolates and three Haitian isolates that were almost identical, with only 1- or 2-bp differences. Those results are consistent with Nepal as the origin of the Haitian outbreak.

**Conclusion:** The threat of cholera is still lurking in Haiti. Today, *V. cholerae* is persistent in Haiti but at least the Haitians know what they are up against! The incident highlights how rapidly infectious diseases might be transmitted globally through international travel and how public health officials need advanced molecular tools along with standard epidemiological analyses to quickly determine the sources of outbreaks – especially during natural disasters. The global community needs to act according to lessons learned from this incident, for instance by introducing screening of aid working and peacekeepers originating from disease hot spots or by extensively survey infectious diseases in disaster areas, at mass gatherings or refugee camps with similar inadequate or missing sanitation infrastructure.

## When global trade hits climate change; transoceanic *Vibrio parahaemolyticus* outbreak in Spain

### Presented by:

Jaime Martínez Urtaza

### Affiliation:

ECDC, Stockholm, Sweden

### Abstract

The sudden emergence of infections caused by human pathogenic *Vibrio* in non-endemic areas has been a recurrent process in recent decades. Identifying the origin and sources of infections in areas recently affected by these diseases has remained elusive. Two major mechanisms have been suggested as major driving forces for disease dissemination: the transport of ballast waters by cargo ships and the emergence of new pathogenic variants driven by favorable environmental conditions. Using *V. parahaemolyticus* as a model, we have analyzed retrospectively the major outbreaks caused by this bacterium around the world, identifying the main genetic groups associated with infections in different areas and investigating the oceanographic and ecological conditions occurring concomitantly with the emergence of reported infections. We have been able to show that the emergence of *Vibrio* epidemics are related to oceanographic anomalies characterized by the incursion of atypical warm waters with the corresponding disruption of local oceanographic and ecological conditions. Occurrence of these ocean anomalies could be linked to outbreaks in the Western Pacific Waters of the USA, Spain, Chile and Alaska, providing a novel vision of the role of oceanic transportation as mechanisms for long distance dispersion of marine human pathogenic bacteria involved in disease emergence. During the summer of 2012, *V. parahaemolyticus* outbreaks caused by serotypes O4:K12 and O4:K untypable occurred in both the Atlantic Coast of the United States and Spain. These strains were first identified in the PNW and caused large US outbreaks in 1997 and 2006 linked to consumption of Pacific shellfish, but have not caused illness or been isolated outside of the PNW until now. The initial arrival, overall environmental distribution, and mechanism for the introduction of this strain to the Atlantic Coasts of the United States and Spain are unknown. However, importation and storage of live contaminated bivalve shellfish in local waters is the most likely mechanism of introduction

## Healthcare driven antimicrobial resistance globalisation: network phylogenomics of antimicrobial-resistant clones

### Presented by:

Hajo Grundmann

### Affiliation:

Groningen University-RIVM, The Netherlands

### Abstract

Opportunistic bacterial pathogens are frequent colonisers of healthy human beings, and as members of human as well as other mammalian microbiotic consortia they are truly cosmopolitan. They are also indiscriminately exposed to antibiotic compounds during any systemic antinfecive treatment and emergence of antibiotic resistance is the inevitable result of collateral selection of resistant clones. As a consequence of high density antibiotic use in health care, antibiotic resistant clones of cosmopolitan opportunistic bacterial pathogens (COBPs) have become the main scourge for severely impaired patients who frequently require hospitalisation. Contemporaneous ecological constraints that act at different levels of the health care cascade naturally create hierarchically distributed networks which favour the abundance of successful clones that become disseminated by a core group of patients through few highly connected health care institutions that are central to national health care networks. These results fuel the discussion about network stability and the differential resilience of national health systems to a rapid dissemination of hospital-acquired antibiotic resistant COBPs. Phylogenomic approaches and network analyses reveal symmetries reminiscent of powerlaw dynamics in the maintenance and spread of antimicrobials resistance at local, regional and national levels.

Plenary Session C 09.00 – 10.30 Wed 6

146 Plenary Session C – Late Breaker Abstracts

The Late breaker Abstracts can be found on the page shown above.

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# Plenary Session Abstracts

## Plenary Session D 09.00 – 10.15 Thur 7

Plenary Session D: The epidemiology of HIV/AIDS, chlamydia, gonorrhoea, syphilis and co has undergone considerable changes in the past decades

### Public Health issues and HIV

**Presented by:**

Professor Kevin Fenton

**Affiliation:**

Public Health England, UK

**Abstract**

The global HIV pandemic remains severe, pervasive although recent signs of progress are encouraging, there is still some distance to go to ensure that national leadership and responses are optimised, communities are mobilised and engaged, effective tools are commissioned, delivered and scaled, and robust monitoring and evaluation systems in place to track our progress. Public health refers to all organized measures (whether public or private) to prevent disease, promote health, and prolong life among the population as a whole. In this presentation we examine recent advances in the response to the global HIV epidemic highlighting three key issues requiring intensive public health leadership and focus in today's epidemic (1) Epidemic heterogeneity – the assessment and monitoring of the health of communities and populations at risk to identify health problems and priorities (2) Modernising national responses – the formulation of public policies designed to solve identified local and national health problems and priorities (3) Delivering greater health impact – to assure that all populations have access to appropriate and cost-effective care, including health promotion and disease prevention services. A critical review of the state of the response in globally will be used to highlight key opportunities for public health leadership.

## Parallel Session Abstracts

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- 14** Parallel Session 1 – Food and water-borne diseases
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- 21 Parallel Sessions 4 – 6 13.40 – 15.00 Tues 5**
- 21** Parallel Session 4 – Vaccine preventable diseases
- 24** Parallel Session 5 – Outbreaks (1)
- 26** Parallel Session 6 – Surveillance systems
- 29 Parallel Sessions 7 – 9 10.50 – 12.30 Wed 6**
- 29** Parallel Session 7 – Influenza
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- 34** Parallel Session 9 – Vector-borne diseases
- 36 Parallel Sessions 10 – 12 14.50 – 16.30 Wed 6**
- 36** Parallel Session 10 – International health
- 39** Parallel Session 11 – TB and other respiratory diseases (excluding influenza)
- 41** Parallel Session 12 – Public Health microbiology and molecular epidemiology
- 43 Parallel Sessions 13 – 15 16.50 – 18.30 Wed 6**
- 43** Parallel Session 13 – Vaccine coverage
- 46** Parallel Session 14 – Epidemiology and microbiology driving public health policy
- 48** Parallel Session 15 – Zoonoses
- 51 Parallel Sessions 16 – 18 13.15 – 15.15 Thur 7**
- 51** Parallel Session 16 – Vaccine effectiveness
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# Parallel Session Abstracts

Parallel Sessions 1 – 3 11.00 – 12.40 Tues 5

## Parallel Session 1 – Food and water-borne diseases

### A large outbreak of *Salmonella* Agona PT40 and other GI pathogens associated with raw curry leaves in North East England

Kirsty Foster <sup>(1)</sup>, Jonathan Lawler <sup>(1)</sup>, Alison Waldram <sup>(1)</sup>, Russell Gorton <sup>(1)</sup>

(1) Public Health England, United Kingdom

#### BACKGROUND:

Following a 3 day food festival, 592 people reported gastro-intestinal illness to environmental and health protection teams in North East England.

#### METHODS:

A multi-agency outbreak control team including health protection, environmental health, specialist laboratory and epidemiology teams was convened to investigate the source of outbreak and implement control measures. Epidemiological and extended microbiological investigations were completed alongside the traditional inspection of preparation techniques, details of foods served and supply chains of implicated ingredients.

#### RESULTS:

A total of 592 people reported illness associated with the event; 413 directly reported to environmental health. Cases were young adults (50% aged between 20 – 39), with a roughly equal ratio of M:F. Symptoms were predominantly diarrhoea and abdominal pain, with a median duration of 11 days and 7 days respectively. Epidemiological investigations found that 89% of cases had eaten food from a single stall, several foods from this stall had strong associations with illness, the strongest was an accompaniment served with main meals (RR = 4.39, 95% CI 3.73 – 5.17). Microbiological investigations identified a new strain of *Salmonella* Agona (phage type 40) in stool samples and from a batch of curry leaves used at the event. Molecular testing of stool samples, undertaken due to a finding relatively low numbers of *Salmonella* cases, found entero-aggregative *E.coli* and *Shigella*.

#### CONCLUSIONS:

This was a large multi-pathogen outbreak involving a strain of *Salmonella* Agona that had not been detected before in human or food samples in the UK. Evidence from the investigation demonstrated contamination of curry leaves with the same strain of *Salmonella*. We will report details of the investigation, control activities and subsequent work with food handlers and wider agencies.

PRESENTED BY: Kirsty Foster

Keywords: *Salmonella*, outbreak, epidemiology, food microbiology

ESCAIDE REFERENCE NUMBER: 20131679

### High attack rate of gastrointestinal illness among 1100 swimmers in an open water event in the River Thames, London October 2012

Victoria Hall <sup>(1) (2)</sup>, Addis Taye <sup>(1)</sup>, Barry Walsh <sup>(1)</sup>, Helen Maguire <sup>(1) (3)</sup>, Jayshree Dave <sup>(1)</sup>, Amanda Wright <sup>(1)</sup>, Charlotte Anderson <sup>(1)</sup>, Paul Crook <sup>(1) (4)</sup>

(1) Public Health England, (2) UK Field Epidemiology Programme (EPIET associated), (3) European Programme for Intervention Epidemiology Training (EPIET), United Kingdom, (4) Field Epidemiology Services (Victoria)

#### BACKGROUND:

Open water swimming is increasingly popular, with events often organised in water not considered safe for bathing. Limited evidence exists on the associated health risks. We investigated gastrointestinal illness reported among 1100 swimmers in an event in the River Thames, to describe the outbreak and identify risk factors.

#### METHODS:

We conducted a retrospective cohort study. Our case definition was swimmers with any following symptom: diarrhoea, vomiting, abdominal cramp lasting >48 hours, nausea lasting >48 hours, with onset within nine days after the event. Information on symptoms, demographics, behaviours during and following the swim and open-water swimming experience was collected using an online survey. We tested associations between exposures and illness using robust Poisson regression, generating adjusted Relative Risks (aRR). We followed-up microbiological results for cases tested.

#### RESULTS:

Survey response rate was 636 (61%), and attack rate 53%. Median incubation-period was 34-hours and median symptom duration four days. Five of the 42 cases who underwent microbiological testing received a diagnosis: four *Giardia* and one *Cryptosporidia*. Swimmers wearing wetsuits (aRR 6.96 (95% CI 1.04-46.72)) and swallowing water while swimming (aRR 1.42 (95% CI 1.03-1.97)) were more likely to become ill. Recent swimming in another river event (aRR 0.78 (95% CI 0.67-0.92)) and being aged over 40-years (aRR 0.83 (95% CI 0.70-0.98)) were protective. Self-reported open-water swimming ability, awareness of infection risks and post-race hygiene were not significantly associated with illness.

#### CONCLUSIONS:

With high risk of illness following this event, action to reduce risk in future events is required. We recommend Public Health England (PHE) and organisers raise awareness among swimmers of the risk and pragmatic precautions, such as hand-hygiene and wetsuit-washing. Further studies should develop the evidence-base for interventions.

PRESENTED BY: Victoria Hall

Keywords: Outbreak, gastrointestinal illness, open-water swimming

ESCAIDE REFERENCE NUMBER: 20131621



## Large multi-pathogen gastroenteritis outbreak caused by drinking water from contaminated neighborhood fountains -- Erzurum City, Turkey, December 2012

Figen Sezen <sup>(1)</sup>, Enver Aval <sup>(2)</sup>, Tuncay Agkurt <sup>(2)</sup>, Senol Yilmaz <sup>(1)</sup>, Fehminaz Temel <sup>(1)</sup>, Revasiye Gulesen <sup>(1)</sup>, Gulay Korukluoglu <sup>(1)</sup>, M.Bahadir Sucakli <sup>(1)</sup>, M.Ali Torunoglu <sup>(1)</sup>, Bao-Ping Zhu <sup>(3)</sup>

(1) Public Health Institute Turkey, (2) Erzurum Provincial Health Directorate, Turkey  
(3) World Health Organisation, Turkey

### BACKGROUND:

On 21 December 2012, a sharp increase in gastroenteritis patients was reported in Erzurum City, Turkey. We investigated to identify the cause and mode of transmission, and to implement evidence-based control and prevention measures.

### METHODS:

We defined a probable case as onset of diarrhea ( $\geq 3$  episodes/day) or vomiting plus fever or nausea or abdominal pain during 19-27 December, 2012 in a Erzurum City resident. In a case-control investigation we compared exposure histories between 95 probable case-persons randomly selected from 11 neighborhood with highest attack rates, and 95 asymptomatic neighborhood control-persons. We compared the number of hospital visits with gastroenteritis-associated ICD-10 codes (A09, R11, or K52) during 19-27 December in 2012 (outbreak period) and 2011 to estimate the impact of the outbreak. We used bacterial culture and Real-time multiplex PCR to identify pathogens in clinical specimens, and the Membrane Filtration method to assess the quality of water in implicated neighborhood fountains.

### RESULTS:

Of case-patients, 76% (72/95) used neighborhood fountain water as source of drinking water, compared with 31% (29/95) of control-persons (OR=6.4, 95% CI=3.0-13); 18% (17/95) of case-patients compared with 49% (47/95) of control-patients used municipal tap-water (OR=0.22, 95% CI=0.11-0.43); 8.4% (8/95) of case-patients compared with 32% (30/95) of control-patients used bottled water (OR=0.20, 95% CI=0.086-0.46). The 8 stool specimens yielded *Shigella sonnei* (2 specimens), astrovirus and norovirus (1), astrovirus and rotavirus (1), and astrovirus (1). Water samples from untreated fountains had highly elevated total coliform (38-300/100ml) and *Escherichia coli* (22-198/100ml). In total, 1461 excess gastrointestinal illnesses occurred during this outbreak.

### CONCLUSIONS:

Drinking contaminated fountain water caused this large multi-pathogen outbreak. We recommended closure of the untreated fountains, and use of municipal tap water as drinking water.

PRESENTED BY: Figen Sezen

**Keywords: Water-Borne, Outbreaks, Gastroenteritis, Case-Control studies.**

ESCAIDE REFERENCE NUMBER: 201315

## Characteristics of waterborne outbreaks notified in four Nordic countries, 1992-2012

Bernardo Guzman Herrador <sup>(1)</sup>, Anneli Carlander <sup>(2)</sup>, Steen Ethelberg <sup>(3)</sup>, Markku Kuusi <sup>(4)</sup>, Vidar Lund <sup>(1)</sup>, Margareta Löfdahl <sup>(2)</sup>, Emily MacDonald <sup>(1)</sup>, Caroline Schönning <sup>(2)</sup>, Linda Trönnberg <sup>(2)</sup>, Line Vold <sup>(1)</sup>, Karin Nygard <sup>(1)</sup>

(1) Norwegian Institute of Public Health, Norway, (2) Swedish Institute for Communicable Disease Control, Sweden, (3) Statens Serum Institut, (4) National Institute for Health and Welfare, Finland

### BACKGROUND:

Denmark, Finland, Norway and Sweden have national surveillance systems in place to collect the occurrence, characteristics, contributing factors and etiology of waterborne outbreaks (WBO). We describe all information available on WBO notified between 1992 and 2012 in these countries to gain knowledge of the scope and burden of WBO in the Nordic region.

### METHODS:

Information on WBO already collected at national level through the national outbreak surveillance systems was supplemented and validated with the help of the local and regional authorities responsible for each outbreak investigation. The additional information was collected at the national level through a web-based questionnaire.

### RESULTS:

A total of 220 WBO affecting around 114,300 individuals were notified in the four Nordic countries in the study period. Of these, 135 (61%) affected less than 50 people. Most of these were linked to single household supplies. All four countries have also reported outbreaks that include more than 1,000 people (18/220; 8%), including two with more than 20,000 people. Overall, the most frequent contributing factors notified were pollution of the water source (50%) and failure in the water distribution system (16%). Norovirus and *Campylobacter* were the pathogens most frequently involved, causing 60 and 56 outbreaks respectively. Eleven outbreaks were caused by parasites (*Giardia* and/or *Cryptosporidium*), these were involved in the largest two outbreaks reported.

### CONCLUSIONS:

Although most of the WBO notified in the study period are small outbreaks linked to single household supplies, a number of large outbreaks have occurred in the last years. Our results highlight the need for increased awareness, proper barriers and non-complacency regarding maintenance of water supply and distribution systems in the Nordic region.

PRESENTED BY: Bernardo Guzman Herrador

**Keywords: Waterborne infection outbreak surveillance**  
ESCAIDE REFERENCE NUMBER: 20131631

## Collaborative development of criteria to consider when declaring the end of a food-borne illness outbreak

Kristyn Franklin <sup>(1)</sup>, Celine Gossner <sup>(2)</sup>, Birgitta de Jong <sup>(2)</sup>, Christine Gardhouse <sup>(1)</sup>, Andrea Currie <sup>(1)</sup>

(1) Outbreak Management Division, Centre for Food-borne, Environmental and Zoonotic Infectious Diseases (CFEZID), Public Health Agency of Canada (PHAC), Canada, (2) ECDC

### BACKGROUND:

Multi-jurisdictional outbreaks associated with widely distributed food products are becoming more frequent. Declaring the end of food-borne illness outbreaks is a key investigative step and informs public messaging. Traditional criteria used to declare the end of an outbreak are not applicable to food-borne illness outbreaks and to our knowledge there are no publically documented criteria to guide this decision. Our objective was to establish criteria to consider when deciding to declare the end of a multi-jurisdictional food-borne illness outbreak.

### METHODS:

The criteria were developed through iterative consultations with partners in Canada, Europe and the United States, were informed by publicly available outbreak protocols, guidelines and best practices and validated using several recent outbreak investigations within these countries/regions.

### RESULTS:

Prior to declaring an outbreak over, the number of cases of the outbreak strain must (1) return to baseline and (2) remain there for a sufficient period of time to ensure all outbreak cases that are likely to occur have been reported. Factors to consider when determining return to baseline include: the existence, sensitivity and specificity of surveillance, the availability of standardized typing methods and possible increases in endemic illness due to the outbreak strain. Factors to consider when determining the period of time spent at baseline include: delay between illness onset and report to public health; the incubation period and severity of the disease; whether or not the source was identified; the shelf-life of the vehicle of infection and; what public health interventions were implemented.

### CONCLUSIONS:

These criteria will be evaluated and refined prospectively to provide a consistent and transparent framework for determining when to declare the end of a multi-jurisdictional food-borne illness outbreak.

PRESENTED BY: Kristyn Franklin

**Keywords:** Food-borne diseases, disease outbreaks, guideline, communicable diseases, public health

ESCAIDE REFERENCE NUMBER: 20131733

## Parallel Session 2 – Surveillance

### Incidence and factors predicting *Bordetella* parapertussis diagnosis among patients referred to general practitioners, Poland, 2009-2011

Rysard Tomialoic <sup>(1)</sup>, Iwona Paradowska-Stankiewicz <sup>(1) (2)</sup>, Aleksandra Zasada <sup>(1) (2)</sup>, Pawel Stefanoff <sup>(1)</sup>, Malgorzata Sadkowska-Todys <sup>(1) (2)</sup>

(1) National Institute of Public Health, Warsaw Poland, (2) National Institute of Hygiene, Warsaw, Poland

### BACKGROUND:

*Bordetella* parapertussis the second cause of whooping cough, with reported increase in incidence in some countries. Poland does not routinely diagnose nor conduct surveillance for parapertussis. We estimated parapertussis incidence and determined predictors of parapertussis diagnosis in Polish population.

### METHODS:

Between July 2009 and April 2011, we conducted a prospective cohort study among patients attending 78 general practices (158,863 persons). We included patients aged  $\geq 3$  years, with cough lasting 2-15 weeks, ensured informed consent, interviewed patients, and collected a nasopharyngeal swab. We confirmed cases by detection of bacterial DNA in real-time PCR. We estimated parapertussis rates by dividing the number of cases by the person-time of observation. We assessed predictors of PCR-confirmed parapertussis by comparing cases with patients testing negative. Using logistic regression, we calculated odds ratios (ORs) and 95% confidence intervals (95%CI).

### RESULTS:

We identified 78 cases among 1,231 patients meeting inclusion criteria. Incidence rate: 39 per 100,000 person-years, 95%CI [31-49], with highest rates 140 (95%CI[74-239]) among children 3-5 years of age and the lowest – 24 (95%CI[13-40]) among persons aged 20-39 years of age. Factors associated with parapertussis positive diagnosis were age 3-5 years (OR 3.2, 95%CI: 1.7-6.2), being male aged 3-5 years (5.4, 2.4-12), close contact with patients with persisting cough (2.4; 1.0-5.4) for women (not living alone) aged over 40 years.

### CONCLUSIONS:

Our results suggest that laboratory diagnosis could be prioritized for children in the preschool age and older adults, especially women, with prolonged cough. In the absence of an effective vaccine, postexposure prophylaxis for close contacts of parapertussis cases could be an adequate preventative measure.

PRESENTED BY: Rysard Tomialoic

**Keywords:** *Bordetella* parapertussis, whooping cough, incidence, epidemiologic determinants

ESCAIDE REFERENCE NUMBER: 20131583

## Importation of tuberculosis from outside the European Union and European Economic Area, 2007-2011.

Csaba Ködmön <sup>(1)</sup>, Vahur Hollo <sup>(1)</sup> Phillip Zucs <sup>(1)</sup>

(1) ECDC, Sweden

### BACKGROUND:

The majority of 1.4 million migrants registered annually in Europe move from high tuberculosis (TB) burden countries outside the European Union (EU) and European Economic Area (EEA) to low TB burden EU/EEA countries where they may pose a challenge to TB programmes. Quantifying and geographically characterising the problem may help to better target prevention and control.

### METHODS:

TB surveillance data collected in 29 EU/EEA countries from 2007 to 2011 were analysed. Place of birth outside EU/EEA borders or non-EU/EEA citizenship were used as proxies for importation of TB.

### RESULTS:

Of 394869 TB cases notified in the EU/EEA from 2007 to 2011, 63635 (16.1%) were known to come from non-EU/EEA countries, their proportion increasing from 13.7% in 2007 to 21.1% in 2011. The majority originated from Asia (44.2%), Africa (35.7%) and non EU/EEA countries in the WHO European Region (13.8%). The United Kingdom, Germany and Italy reported the highest numbers of such cases (27086, 8 311 and 6 944, respectively) while the highest contribution to the overall TB caseload was observed in Norway (82.2%), Sweden (78.4%) and Malta (75.0%). Multidrug-resistant (MDR) TB accounted for 2.9% (953 of 32633) of cases from non-EU/EEA countries that were tested for drug susceptibility. Of 953 MDR TB cases 470 (49.3%) were tested for 2nd-line anti-TB drugs, of which 10.6% were extensively drug-resistant.

### CONCLUSIONS:

Presumable importation of TB from outside the EU/EEA accounts for 16% of cases notified in EU/EEA countries with very few of them being MDR. Presumable importation is increasing, however, and clearly affects some EU/EEA countries more than others. Some smaller countries may be able to reduce their TB numbers by focusing their prevention and control on non-EU/EEA migrants.

PRESENTED BY: Csaba Ködmön

**Keywords:** Tuberculosis, European Union, surveillance, migration, foreign origin, non-EU countries

ESCAIDE REFERENCE NUMBER: 20131651

## The changing epidemiology of pertussis: was there an incidence increase in Denmark between 2010 and 2012?

Julita Gil Cuesta <sup>(1)(2)</sup>, Kåre Mølbak <sup>(3)</sup>, Tine Dalby <sup>(4)</sup>, Jens Nielsen <sup>(5)</sup>, Marianne Voldstedlund <sup>(5)</sup>, Peter Andersen <sup>(5)</sup>, Palle Valentiner-Branth <sup>(5)</sup>

(1) Statens Serum Institut, (2) European Programme for Intervention Epidemiology Training (EPIET), European Centre for Disease Prevention and Control (ECDC), Stockholm, Sweden, (3) Statens Serum Institut, (4) Statens Serum Institut, Department of Diagnostics and Infection Control, Copenhagen, Denmark, (5) Statens Serum Institut, Department of Infectious Diseases Epidemiology, Copenhagen, Denmark

### BACKGROUND:

Several European countries are experiencing changes in pertussis epidemiology. In 2010, a serological test was introduced for laboratory-diagnosis of pertussis in Denmark. Notifications increased from 7/100,000 in 2010 to 18/100,000 in 2012. In October 2012, national news was released on the incidence increase. It is not completely understood to what extent improved diagnostic methods and increased awareness contributed to these changes. The objective of the study was to assess whether the notifications increase was related to an increase in the number of requested tests.

### METHODS:

We retrospectively analyzed the results of pertussis testing from the Danish Microbiology Databases between 2010-2012. We compared the total number and number of positive tests stratified by diagnostic method, year, age group and requesting physician. We used a Poisson regression model with over dispersion to calculate the factors associated with the number of positive tests. We computed incidence rate ratios (IRR) and 95% confidence intervals.

### RESULTS:

The overall number of requested tests increased from 3,995 in 2010 to 8,488 in 2012; PCR and serology doubled, whereas culture increased 17%. Between 2010 and 2012 the incidence increased 66% (IRR 1.66; 95%CI 1.35-2.05) when adjusted for number of requested tests, method, year, quarter, age, national news on the increase and requesting physician. When taking out the number of requested tests, the incidence increased 87% (IRR 1.87; 95%CI 1.46-2.38). This 21% difference in incidence increase can be attributed to the higher number of tests requested.

### CONCLUSIONS:

There was an overall incidence increase in Denmark in 2012. This increase could only partly be explained by the higher number of requested tests. We recommend the use of microbiological databases including negative results to improve our understanding of surveillance outputs

PRESENTED BY: Julita Gil Cuesta

**Keywords:** Bordetella Pertussis, Public Health Surveillance, Incidence, Diagnostic Tests.

ESCAIDE REFERENCE NUMBER: 20131696

## Identifying recently acquired HIV infections among newly diagnosed men who have sex with men in The Netherlands

Jussi Sane<sup>(1)</sup>, Titia Heijman<sup>(2)</sup>, Boris Hogema<sup>(3)</sup>, Maarten Koot<sup>(3)</sup>, Maaïke van Veen<sup>(4)</sup>, Hannelore Götz<sup>(5)</sup>, Han Fennema<sup>(1)</sup>, Eline Op de Coul<sup>(6)</sup>

(1) National Institute for Public Health and the Environment (RIVM), Bilthoven, The Netherlands, European Programme for Intervention Epidemiology Training (EPIET), ECDC Sweden, (2) Amsterdam Public Health Service, Cluster of Infectious Diseases, Dept of Research and STI outpatient clinic, Amsterdam, The Netherlands, (3) Sanquin Blood Supply, Virus Diagnostic Services, Amsterdam, The Netherlands, (4) Public Health Service Amsterdam, The Netherlands, (5) Dept of Infectious Disease Control, Municipal Public Health Service Rotterdam-Rijnmond, Rotterdam, The Netherlands, (6) Unit of Epidemiology and Surveillance, RIVM, Centre for Infectious Disease Control, The Netherlands

### BACKGROUND:

The number of newly diagnosed HIV infections among men who have sex with men (MSM) has gradually increased in The Netherlands during the past decade. The current surveillance system cannot differentiate recent HIV infections (<6 months) from established (≥6 months) infections. We determined the proportion of recent HIV infections (RI) and estimated HIV incidence using Recent Infection Testing Algorithm (RITA) among newly HIV-diagnosed MSM.

### METHODS:

Plasma samples collected from newly HIV-diagnosed MSM during 2009-2011 at the STI clinics in Amsterdam and Rotterdam were tested for RI with the Architect HIV Ag/Ab Combo immunoassay. Samples were classified as recent if the anti-HIV avidity index (AI) was ≤0.80. Data on viral load, CD4 count and previous HIV testing were incorporated in the RITA algorithm to minimize false recent infections. HIV incidence and 95% confidence intervals (CI) were estimated. Logistic regression was used to identify factors associated with RI.

### RESULTS:

Of the 251 samples tested for RI, 83 were classified as recent by the AI; of these, five cases were reclassified as non-recent based on CD4 counts (n=2), viral load (n=2), and history of HIV infection (n=1). Hence, 78/251 (31%) infections were determined as recent on RITA. Proportions of RIs in 2009, 2010 and 2011 were 32%, 28% and 33%, respectively (no significant trend). The estimated combined HIV incidence was 3.27% per year (95% CI 2.46-4.1). The only factor associated with RI in the multivariable model was being tested for HIV ≥3 times in the past (aOR=7.4; 95% CI: 2.0-27.8).

### CONCLUSIONS:

The proportion of RIs was comparable to similar studies in Europe. Implementation of RITA for routine surveillance in The Netherlands to assess trends in RIs over time should be considered.

PRESENTED BY: Jussi Sane

Keywords: HIV, MSM, recent infection, RITA, incidence

ESCAIDE REFERENCE NUMBER: 20131563

## Evaluation of Malaria surveillance system in Oyo State, Southwestern Nigeria January 2013

Elizabeth Adedire<sup>(1)</sup>, Olabode Ladipo<sup>(2)</sup>, Ike-Oluwapo Ajayi<sup>(3)</sup>, Funmilayo Fawole<sup>(3)</sup>, Olufemi Ajumobi<sup>(1)</sup>, Magbagbeola Dairo<sup>(3)</sup>, Olubisi Fabode<sup>(2)</sup>, Ndadilnasiya Waziri<sup>(3)</sup>

(1) Nigerian Field Epidemiology and Laboratory Training Programme, Nigeria, (2) State malaria control programme, Oyo State Ministry of Health, Oyo State, Nigeria, (3) University of Ibadan Oyo state Nigeria

### BACKGROUND:

Nigeria accounts for one-fourth of malaria morbidity in sub-Saharan Africa; Oyo State is holoendemic for malaria and is one of the seven states in Nigeria targeted for malaria control by the United States President Malaria initiative (PMI). In 1998, malaria surveillance system was set up to support prevention, treatment and control efforts. We evaluated the surveillance system in Oyo State to assess its attributes and performance in line with set objectives.

### METHODS:

We used the updated Centres for Disease Control guidelines for evaluating surveillance systems (2001). We quantitatively and qualitatively assessed the surveillance system's key attributes. We administered semi-structured questionnaire to all 33 Local Government Area (LGA) Malaria focal persons and interviewed seven key informants (KI) at state level. We reviewed surveillance data from January 2008-December 2012.

### RESULTS:

Case definition and tools are simple and acceptable to stakeholders. Data flow from the LGA to the state level is clearly defined but feedback is irregular. Data quality is poor and is collected mainly from public health facilities. Late reporting was observed in 17 of 33 LGA (51.5%). Of the 7 KI, 5 (71%) agreed the system collects relevant data for the description of the epidemiological situation. Partner agencies provide 95.3% of system's operating resources. There has been decreasing trend in malaria morbidity, the prevalence of malaria reduced by half in 2012 compared to 2010 (465,116 cases versus 273,094 cases).

### CONCLUSIONS:

The system is simple, acceptable and useful, but not representative and not timely. There is a need to direct efforts at capturing excluded private health facilities in the surveillance system. There is a need for supportive supervision for data quality assurance to improve feedback to reporting sites and timeliness.

PRESENTED BY: Elizabeth Adedire

Keywords: Evaluation, Malaria surveillance, Nigeria.

ESCAIDE REFERENCE NUMBER: 20131626

## Parallel Session 3 – Antimicrobial resistance and healthcare-associated infections

### Hospital-Acquired Influenza Infections in Germany, Based On Notification Data from Seasons 2002/03 to 2012/13

Ute Rexroth <sup>(1)</sup>, Silke Buda <sup>(1)</sup>, Annicka Reuss <sup>(1)</sup>

(1) Robert Koch Institut, Berlin, Germany, (2) Postgraduate Training for Applied Epidemiology (PAE, German FETP) and European Programme for Intervention Epidemiology Training (EPIET), Germany

#### BACKGROUND:

Nosocomial infections are of growing Public Health concern. However, information on hospital-acquired influenza is scarce. We aimed to determine the proportion of hospital-acquired influenza infections among all notified influenza-associated hospitalisations and to identify factors associated with hospital-acquired influenza in order to improve hospital infection control.

#### METHODS:

Among all laboratory-confirmed hospitalised influenza cases notified to German health authorities (7/2002-6/2013) we considered infections “definitely” hospital-acquired if disease onset was between day four of hospitalisation and discharge (specific definition) and “possibly” hospital-acquired if symptoms started between admission and less than four days after discharge (sensitive definition) – based on the incubation period of influenza (range 1-4 days). We investigated the association of sex, age, influenza vaccination, outbreak-association and season with “definitely” hospital-acquired compared to hospitalised community-acquired influenza using multivariable logistic regression.

#### RESULTS:

Dates of symptom onset and hospitalisation were available in 32% (10,609/32,854) of all hospitalised influenza notifications. Of these, 3% (282/10,609) were “definitely” and 32% (3,427/10,609) “possibly” hospital-acquired. The season-specific proportion of “definitely” hospital-acquired influenza ranged between 0.8% (2006/07) and 4.3% (2004/05). More cases with “definitely” hospital-acquired influenza were female (62% versus 53%,  $p=0.002$ ), outbreak-associated (17% versus 7%,  $p<0.001$ ), vaccinated (7% versus 3%,  $p<0.001$ ) and older (median age: 47 versus 14 years,  $p<0.001$ ), compared to hospitalised cases with community-acquired influenza. In the final multivariable model female sex (aOR=1.4 [95%CI]:1.1–1.9,  $p=0.008$ ), outbreak-relation (aOR=2.7 [95%CI]:1.9–3.8,  $p<0.001$ ) and increasing age (per year aOR=1.02 [95%CI]:1.01–1.02,  $p<0.001$ ) remained significantly associated with “definitely” hospital-acquired influenza.

#### CONCLUSIONS:

A considerable proportion of hospitalised influenza infections in Germany is hospital-acquired. Stronger implementation of hospital infection control measures (i.e. influenza vaccination of medical staff) might prevent nosocomial influenza in hospitalised patients, especially among elderly and female patients.

PRESENTED BY: Ute Rexroth

**Keywords:** Influenza, nosocomial infections, transmission, epidemiology,

ESCAIDE REFERENCE NUMBER: 20131514

### Predictors of First line Anti-retroviral Therapy (ART) Failure among HIV infected adults, Andhra Pradesh, India, 2008-2011

Ramesh Allam <sup>(1)</sup>, Manoj Murhekar <sup>(2)</sup>, Tarun Bhatnagar <sup>(2)</sup>, Chengappa Kechamada <sup>(1)(2)</sup>

(1) SHARE India, India, (2) National Institute of Epidemiology, India

#### BACKGROUND:

ART reduces morbidity and mortality among People Living with AIDS (PLHA). However considerable proportions of PLHA fail ART. Detection of ART failure in India is primarily through CD4 count enumeration. In order to better inform the national program regarding early detection of treatment failure, we analysed the follow-up data of PLHA initiated on ART to estimate treatment failure.

#### METHODS:

We identified the cohort of PLHA aged  $\geq 15$  years, initiated on ART during 1January-31December 2008 at two ART centres in Hyderabad. The cohort was followed retrospectively until treatment failure (defined as one or more of the following: fall in CD4 count to pre-therapy or 50% fall from the on-treatment peak value or persistent CD4 levels below 100 cells/mm<sup>3</sup> six months after ART initiation) or through the end of study on Dec 31, 2011. We used the Kaplan-Meier estimation method to estimate treatment success and Cox proportional hazard model to identify predictors of treatment failure.

#### RESULTS:

The 1,055 PLHA included in the analysis contributed to 3,447 person years of follow-up and 322 (9.3/100 person-years) failed treatment. The mean duration of treatment success was 42.97 months (95% Confidence Interval (CI): 41.75-44.19). Most of the treatment failures (206/322, 66%) occurred during 36-48 months on treatment. Male patients [Hazard Ratio (HR)-1.62, CI: 1.2 7-2.04], patients with history of tuberculosis (AHR-1.41, CI: 1.04-1.93), and baseline CD4 count  $< 100$  cells (AHR-1.65, CI:1.23-2.19) were more likely to fail treatment.

#### CONCLUSIONS:

For early detection of treatment failure, the national programme could consider (1) implementing targeted virological testing for PLHA who are on ART for  $> 2$  years and (2) regular six monthly immunological monitoring for PLHA with history of tuberculosis and lower CD4 count at ART initiation.

PRESENTED BY: Ramesh Allam

**Keywords:** First Line ART, treatment failure, Resource limited setting, Immunological failure

ESCAIDE REFERENCE NUMBER: 20131257

## High morbidity and mortality among patients with KPC-2 *K. pneumoniae* during a hospital outbreak in Germany, 2010-2012

Tanja Ducomble<sup>(1) (2)</sup>, Arne C. Rodloff<sup>(3)</sup>, Christophe Luebbert<sup>(4)</sup>, Tim Eckmanns<sup>(1)</sup>

(1) Robert Koch Institute, Germany, (2) ECDC, Sweden (3) Institute for Medical Microbiology and Epidemiology of Infectious Diseases, University Hospital of Leipzig, Leipzig, Germany, (4) Division of Infectious Diseases and Tropical Medicine, Clinic of Gastroenterology and Rheumatology, University Hospital of Leipzig, Germany

### BACKGROUND:

In 2011, the national reference laboratory detected KPC-2 *Klebsiella pneumoniae* in 56 of the received isolates, in Germany. During a hospital outbreak, we investigated patients with KPC to describe the impact of infection on length of stay (LOS) and death.

### METHODS:

We investigated patients in whom KPC was isolated between 28 June 2010 and 31 July 2012. We defined a KPC infection as isolation with clinical manifestation and colonization as isolation without clinical manifestation. We abstracted patient records to describe age, sex, anamnesis and calculated proportions of infection and death. We compared infections with colonizations in terms of LOS using the Wilcoxon rank sum test, and of risk to die using relative risk (RR) and 95% confidence intervals (CI).

### RESULTS:

Of 72 patients in whom KPC was isolated (median age: 61 years; 24% transplantations and 29% malignancies; strain identity was in 88% confirmed and confirmed by pulse field gel electrophoresis), 35 (49%) developed infectious manifestations (n=61). Median LOS until detection were similar between infections and colonizations (24 versus 21 days,  $p=0.346$ ) while patients with infection stayed longer after detection (median LOS: 27 versus 20 days,  $p=0.05$ ). Of the 72 patients, 34 (47%) died, 14 of 19 (74%) with pneumonia and 9 of 16 (56%) with sepsis. The age and sex-adjusted relative risk to die was higher among patients infected (RR: 1.8, 95% CI 1.1-3.0) than among colonized.

### CONCLUSIONS:

During this episode, KPC affected severely ill patients. Clinical infection doubled the risk to die and new cases steadily occurred until April 2013. Detection of a single case of KPC should lead to strong and rapid screening and infection control measures in order to prevent prolonged outbreaks and their consequences.

PRESENTED BY: Tanja Ducomble

**Keywords:** KPC, outbreak, nosocomial, healthcare-associated, morbidity, mortality

ESCAIDE REFERENCE NUMBER: 20131717

## What about meticillin sensitive *S. aureus*? A national epidemiological investigation of strain type, antimicrobial susceptibility and toxin production

Donald Bunyan<sup>(1)</sup>, Julie Wilson<sup>(1)</sup>, David Henderson<sup>(1)</sup>, Mags McFadden<sup>(2)</sup>, Camilla Wiuff<sup>(1)</sup>, Alistair Leanord<sup>(1)</sup>

(1) Health Protection Scotland, United Kingdom, (2) Information Services Division, National Services Scotland, United Kingdom

### BACKGROUND:

The Scottish *S. aureus* bacteraemia incidence rate for the period April 2005 to June 2012 showed a significant downward trend (estimated as a reduction of 7.5% per year). This downward trend was due to the reduction in episodes of meticillin resistant *S. aureus* (MRSA). This has not been seen in meticillin sensitive *S. aureus* (MSSA) and mirrors the findings for the whole of the UK and many countries in Europe. Various infection control interventions were introduced over this period of time (e.g. hand hygiene campaign, MRSA screening). This study investigated potential reasons as to why MRSA bacteraemia rates are decreasing but MSSA rates are not.

### METHODS:

MRSA strain type, antimicrobial susceptibility and toxin production data were analysed from mid 1999 and MSSA from 2003 to end of 2011 to identify any significant changes to trends.

### RESULTS:

The distribution of MSSA strain types was very diverse and there were no predominant circulating strains. No distinct upward or downward trend, for any strain types, was observed over the period. There was no apparent seasonal variation. As expected during the time period, EMRSA-15 was the pre-dominant strain among MRSA circulating in Scotland while EMRSA-16 was the second most common strain in Scotland (although the latter has been in decline since 2006). Some seasonal variation was noted with the strains. In terms of antimicrobial susceptibility / toxin production there were no significant differences.

### CONCLUSIONS:

The molecular characterisation and susceptibility analysis of the Scottish MRSA and MSSA strains did not explain why MSSA rates are not decreasing. Further work, perhaps at a local level, is required to elucidate the reasons as to why MSSA rates are not decreasing.

PRESENTED BY: Donald Bunyan

**Keywords:** Methicillin-Resistant *Staphylococcus aureus*; Drug Resistance, Microbial; Bacteraemia; *Staphylococcus aureus*

ESCAIDE REFERENCE NUMBER: 20131661

### Monitoring antibiotic consumption in hospitals: results from the French nationwide network "ATB-RAISIN" in 2011

Catherine Dumartin <sup>(1)</sup>, Anne-Marie Rogues <sup>(2)</sup>, Muriel Péfau <sup>(3)</sup>, Atb Raisin <sup>(3)</sup>

(1) CCLIN Sud-Ouest, France, (2) U657 INSERM, France, (3) CCLIN-InVS, France

#### BACKGROUND:

Antibiotic consumption in France is among the highest in Europe according to ESAC-Net data. French programmes to preserve antibiotic efficacy put an emphasis on surveillance in hospitals to assess the impact of the recommended measures to improve antibiotic use. ATB-RAISIN surveillance network was set up to describe antibiotic consumption at hospital and at ward level and to promote analysis of consumption data against antimicrobial resistance rates.

#### METHODS:

Data retrospectively collected for the year 2011, by voluntary hospitals were: hospital type; number of patient-days (PD); antibiotic consumption for inpatients (AB for systemic use (class J01 of WHO ATC-DDD system), rifampicin and oral imidazole derivatives), expressed in number of defined daily doses (DDD) per 1000 PD; number of susceptible strains for some bacteria/antibiotic combinations.

#### RESULTS:

In the 1262 participating hospitals, accounting for 60% of PD, antibiotic use (pooled mean) was 372 DDD/1 000 PD; co-amoxiclav accounted for 31%, amoxicillin: 17% ofloxacin: 5% and ceftriaxone: 5%. Median consumption ranged from 52 DDD/1 000 PD in psychiatric hospitals to 653 in military hospitals and differed according to clinical wards from 58 DDD/1 000 PD in psychiatric wards to 1 580 in intensive care units. Median rates of meticillin-resistant *Staphylococcus aureus* and of cefotaxime-resistant *Escherichia coli* were 0.36 and 0.28 / 1000 PD respectively.

#### CONCLUSIONS:

This multicentre survey provided detailed information on antibiotic use and resistance in a large sample of hospitals. Its findings underscore 1) the feasibility and relevance of data collection at ward level to foster consumption analysis; 2) the usefulness of a nationwide surveillance network, allowing relevant comparisons. Antibiotic use did not seem higher in French hospitals than in Scandinavian countries. However, high use of ceftriaxone calls for further studies.

PRESENTED BY: Catherine Dumartin

**Keywords:** Antibiotic use, hospitals, antimicrobial drug resistance, surveillance network

ESCAIDE REFERENCE NUMBER: 20131817

## Parallel Sessions 4 – 6 13.40 – 15.00 Tues 5

### Parallel Session 4 – Vaccine preventable diseases

#### Decreased hospitalisations due to pneumococcal pneumonia in children in two regions of Spain (Madrid and Catalonia) following the introduction of the 13-valent pneumococcal conjugate vaccine (PCV13)

Antons Mozalevskis <sup>(1)</sup>, Giovanna Ciaravino <sup>(1)</sup>, Maria José Sagrado <sup>(1)(2)</sup>, María Victoria Martínez de Aragón <sup>(1)</sup>

(1) Instituto de Salud Carlos III (ISCIII), Madrid, Spain, (2) Spanish Field Epidemiology Training Programme (PEAC)

#### BACKGROUND:

In Spain, the heptavalent pneumococcal conjugate vaccine (PCV7) was introduced in 2001 and was replaced by the 13-valent PCV13 in 2010. Only the Autonomous Region of Madrid included the vaccine in the childhood vaccination programme (CVP) (2006–2012). In the absence of national-wide surveillance of the pneumococcal disease, we assessed the impact of different vaccination policies on the burden of pneumococcal pneumonia.

#### METHODS:

We obtained all hospitalisations due to pneumococcal pneumonia in children below 5 years old from 2002–2011 in two Spanish regions: Madrid and Catalonia. We compared hospitalisation rates in both regions during three periods: (A) 2002–2006 before Madrid included the PCV7 vaccine in the schedule, (B) 2007–2009 after its inclusion and (C) 2010–2011 after its replacement by PCV13. We calculated rate ratios (RR) using Poisson regression models.

#### RESULTS:

Overall, 3,337 hospitalisations met the selected criteria. The hospitalisation rates among 0–4 year olds did not decrease between periods B and A, neither in Madrid (RR=1.33; 95%CI 1.19-1.50) nor in Catalonia (RR=0.99; 95%CI 0.90-1.10). Comparing period C with B, the hospitalisation rates decreased by 57% (RR=0.43; 95%CI: 0.25-0.74) and 60% (RR=0.40; 95%CI: 0.33-0.47) among <1 and 1–4 year olds in Madrid, and by 26% (RR=0.74; 95%CI: 0.46-1.22) and 29% (RR=0.71; 95%CI: 0.62-0.82) in Catalonia, respectively.

#### CONCLUSIONS:

Vaccination with PCV7 did not reduce hospitalisation rates due to pneumococcal pneumonia among children under 5 years old. However, the introduction of PCV13 may have resulted in a decrease of hospitalisations in Madrid, but also in Catalonia, where the vaccine was administered privately. Further evaluations are required (including cost-effectiveness studies) to inform the potential inclusion of PCV13 in the CVP all over Spain.

PRESENTED BY: Antons Mozalevskis

**Keywords:** Pneumococcal Infections, 13-valent pneumococcal vaccine, Hospitalisation, Pneumonia, Spain

ESCAIDE REFERENCE NUMBER: 20131470

## Impact of different vaccination strategies on the age-specific incidence of varicella in Spain, 2007-2012

Giovanna Ciaravino <sup>(1)(2)</sup>, Maria José Sagrado <sup>(1)(3)</sup>, Josefa Masa <sup>(1)</sup>, Maria Victoria Martínez de Aragón <sup>(1)</sup>

(1) Instituto de Salud Carlos III (ISCIII), Madrid, Spain, (2) ECDC, Sweden, (3) Spanish Field Epidemiology Training Programme (PEAC)

### BACKGROUND:

Spain included varicella vaccination for 10-14 years adolescents (scheme-A) since 2005. During 2006-2008, 4 out of 19 Regions introduced also a universal vaccination programme for toddlers (scheme-B). Since 2007, a national recommendation was issued to collect information on age of reported cases. We assessed the impact of vaccination schemes on varicella incidence at national level and on the age-specific incidence in the 6 regions that provided information on age during 2007-2012.

### METHODS:

We calculated the varicella incidence trends by vaccination scheme at national level and the age-specific incidence trends by scheme for 6 regions (4 following scheme-A and 2 scheme-B), during 2007-2012. Incidence included cases notified to the National Surveillance Network and the population provided by the National Statistics. Trends were calculated using Poisson regression models.

### RESULTS:

At national level 814,700 cases were notified. We found an annual incidence decrease of 5% (95%CI:3-8%) and 32% (95%CI:25-38%) in regions under scheme A and B, respectively. Information on age was available for 413,004 cases. In the 4 regions under scheme-A, trends decreased significantly in age-groups 0-4, 10-14, 15-24 and 25-34 years of a mean annual rate of 8%, 7%, 10% and 6%, respectively (p-value<0.01). In the 2 regions under scheme-B, incidence trends decreased in all age-groups, with annual mean reductions of between 23% and 47% (p-value<0.001).

### CONCLUSIONS:

Our results indicate an incidence reduction in all age-groups in regions under the universal vaccination programme for toddlers. The unexpected incidence decrease observed in Regions vaccinating only adolescents, particularly the reduction in the age-group 0-4 years, suggests supplementary immunization activities not covered by the public sector. We recommend assessing vaccination coverage by regions to further understand the impact of varicella vaccination in Spain.

PRESENTED BY: Giovanna Ciaravino

**Keywords:** Varicella zoster virus, vaccination strategies, age-specific incidence, Spain

ESCAIDE REFERENCE NUMBER: 20131569

## Hospital visit as a risk factor for measles transmission: Sanliurfa Province, Turkey, 2012-2013

Serap Cetin Coban <sup>(1)</sup>, Selmur Topal <sup>(1)</sup>, Muarrem Oncul <sup>(2)</sup>, Fehminaz Temel <sup>(1)</sup>, Levent Akin <sup>(3)</sup>, Bao-Ping Zhu <sup>(4)</sup>, Aslihan Coskun <sup>(1)</sup>, Gulay Korukluoglu <sup>(1)</sup>, M.Bahadir Sucakli <sup>(1)</sup>, Mehmet Ali Torunoglu <sup>(1)</sup>

(1) Public Health Institution of Turkey, Turkey, (2) Sanliurfa provincial health directorate, Turkey, (3) Hacettepe University Faculty of Medicine, Turkey, (4) World Health Organisation, Turkey

### BACKGROUND:

During December 2012—June 2013, 6594 confirmed measles cases have been reported in Turkey. We investigated in Sanliurfa Province, where the case counts were among the highest, to assess risk factors for measles infection and to recommend evidence-based prevention and control measures.

### METHODS:

We defined a confirmed case as onset during 1 December—10 April 2013 of maculopapular rash plus serum positivity of measles-specific IgM in a Turkey citizen born after 20 April 1998 (aged <15 years) who resided in the central district of Sanliurfa Province at time of study. We identified measles cases from the National Measles Surveillance System database. In a case-control study, we compared exposure history of 193 case-patients and 193 randomly selected asymptomatic neighborhood control-persons, matched by age groups (0-11 month, 1-14 years). We estimated the vaccine effectiveness (VE) based on vaccination history of the cases and controls (VE=1-OR). Risk factors were assessed using logistic regression.

### RESULTS:

Of the case infants (aged 0-11 month), 58% (37/64) visited a healthcare facility during one-month prior to rash onset; in comparison, 26% (15/57) of the control-infants visited a healthcare facility (OR<sub>adj</sub>=3.7, 95% CI=1.7-8.2). Of children aged 1-14 years 39% (50/128) of case-children visited a healthcare facility during one-month prior to rash onset; in comparison, 13.5% (18/133) of control-children (OR<sub>adj</sub>=4.8, 95% CI=2.2-10.6) visited a healthcare facility; 40% (39/98) of the case-children had completed ≥1 dose of measles vaccination by 12 months of age, compared with 85% (93/110) of control-children (VE=86%, 95% CI=70%-93%).

### CONCLUSIONS:

Healthcare facilities played a significant role in measles transmission. The measles vaccine as administered appeared to be adequately effective. We recommend cohorting febrile and rash patients in healthcare settings, and strengthening measles vaccination programme.

PRESENTED BY: Serap Cetin Coban

**Keywords:** Measles, measles vaccine, case-control study, hospital infection

ESCAIDE REFERENCE NUMBER: 20131604



## Measles cases in Germany 2007-11 – a comparison of outpatient health insurance claims data with mandatory notification data

Anja Takla <sup>(1)</sup>, Ole Wichmann <sup>(2)</sup>, Horsten Rieck <sup>(3)</sup>, Dorle Matysiak-Klose <sup>(4)</sup>

(1) Immunization Unit, Robert Koch Institute, Germany, (2) (Department for Infectious Disease Epidemiology, Robert Koch Institute, Germany, (3) Robert Koch Institute, Germany

### BACKGROUND:

Germany has committed to the goal of eliminating measles by 2015. Mandatory notification of measles has been included in the routine surveillance system since 2001, but passive surveillance is often prone to underreporting. To assess potential measles underreporting in Germany, we utilized health insurance claims data as an alternative data source to compare measles incidence.

### METHODS:

Data of nationwide outpatient physicians' refund claims to the statutory health insurances were analysed. We assessed measles-related International Classifications of Diseases codes (B05.0-9) between 2007 and 2011. The data was compared to nationwide measles cases from mandatory notification in the routine surveillance system.

### RESULTS:

A total of 8,653 outpatient measles cases (median age: 15 years) were claimed by physicians compared to 3,364 reported cases (median: 11 years). Mean annual incidence 2007-11 was 27.5/1,000,000 (insurance data) and 9.1/1,000,000 (surveillance data), respectively, indicating a 3-fold difference. Incidence was highest among <10 year-olds (118.3/1,000,000 vs. 46.4/1,000,000; 2.5-fold difference), followed by 10-19 year-olds (59.9 vs. 34.7; 1.7-fold). Incidences decreased with age but showed increasing discrepancies between claimed and reported cases (20-29 year-olds: 3.3-fold; 30-39 year-olds: 4.8-fold; 40-49 year-olds: 9.4-fold). Between 2007 and 2011, 173 measles-associated pneumonia cases and 678 otitis media cases were claimed in comparison to 21 pneumonia and 44 otitis media cases from mandatory notification.

### CONCLUSIONS:

Both data sources demonstrated that Germany has so far clearly missed the goal of elimination, especially among population-groups aged <20 years. Health insurance claims data suggested considerable underreporting in the routine surveillance system, but this data requires further validation. Especially non-paediatric physicians need to be (re) informed about their reporting duty. Potential underreporting must be taken into consideration when evaluating the success of measles elimination.

PRESENTED BY: Anja Takla

**Keywords:** Measles, surveillance, health services research, Germany, incidence, elimination

ESCAIDE REFERENCE NUMBER: 20131670

## Lack of vaccination for hepatitis A among European travel-related cases to all-inclusive resorts in Egypt- observations from a multi-state outbreak (on behalf of the International Outbreak Investigation Team)

Jussi Sane <sup>(1)(2)</sup>, Emily MacDonald <sup>(3)</sup>, Line Vold <sup>(3)</sup>, Celine Gossner <sup>(4)</sup>, Ettore Severi <sup>(4)</sup>

(1) ECDC, Sweden (2) National Institute for Public Health and the Environment (RIVM), Bilthoven, The Netherlands; (3) Norwegian Institute of Public Health, Norway

### BACKGROUND:

On 15 April 2013, the Norwegian Institute of Public Health reported through EPIS-FWD an increase in hepatitis A virus (HAV) infection among tourists returning from Egypt since 1 January 2013. Following alert, several EU-EFTA countries reported cases. We studied vaccination status and reasons for non-vaccination among patients to identify target areas for improving HAV vaccine recommendations.

### METHODS:

We defined a case as a symptomatic HAV IgM-positive person, with travel history to Egypt and symptoms onset after 1 November 2012. Cases with sequences unlike the outbreak strain were excluded. Responding cases were interviewed using a questionnaire developed by the international outbreak investigation team.

### RESULTS:

As of 5 July, 14 EU-EFTA countries reported 107 cases returning from Egypt. Twenty genotyped cases, from six countries, shared identical RNA sequences. We interviewed 35 cases (median age 35, range 17-62) from 12 countries. Twenty-eight/34 cases (82%) stayed at all-inclusive hotels or resorts. Symptoms onset ranged from 8 December 2012 to 1 April 2013; 25/35 of cases (71%) were hospitalized. None were vaccinated. The most common reasons for not being vaccinated were not knowing HAV vaccination was recommended for Egypt (20/35, 57%) and not perceiving a high risk of infection at a resort (15/33, 46%). In 3/4 cases who sought medical advice before travelling, vaccination was not recommended.

### CONCLUSIONS:

Most interviewed cases did not seek medical advice and were not aware of the standing vaccination recommendation or did not perceive a high risk of infection at a resort. Vaccine was not recommended in most cases when advice was sought. Public health authorities should reinforce the importance of vaccination prior to visiting HAV-endemic areas to travellers, travel agencies and medical professionals.

PRESENTED BY: Jussi Sane

**Keywords:** Hepatitis A, Outbreak, Vaccination, Travel, Egypt  
ESCAIDE REFERENCE NUMBER: 20131578

## Parallel Session 5 – Outbreaks (1)

### Tower Defense: A Legionella pneumophila Outbreak in Summer 2012 in the Southwest of Germany

Florian Burckhardt, André Brion<sup>(1)</sup>, Jeanette Lahm<sup>(2)</sup>, Manfred Vogt<sup>(3)</sup>, Christian Lück<sup>(3)</sup>

(1) Landesuntersuchungsamt Rheinland Pfalz, Germany, (2) Regional Health Department Südwestpfalz, Germany, (3) Institute for Medical Microbiology and Hygiene, University of Dresden, Germany

#### BACKGROUND:

Germany has mandatory notification for Legionella. Despite a large outbreak in South Germany in 2010 with 65 cases and 4 deaths, there is no registry of cooling towers. On 14.7. 2012 one case of Legionella was reported from the local health department (LHD) of Zweibrücken to the State Health Agency with nine more cases following until 31.7.. A software bug prevented these cases to show up in our electronic reports and the LHD notified us by phone on 31.7. of a Legionella clustering.

#### METHODS:

We confirmed the outbreak originating from a point source by plotting home and working addresses of cases using Googleearth and Quantum-GIS and systematically excluding alternative explanations. Local GPs were asked to look for signs of Legionellosis and take urine samples. Human isolates and urine-samples were sent to the Reference Laboratory for Legionella (RLL) in Dresden for genetic and antigenic typing. The outbreak investigation team conducted a visit on 22.8. to identify possible environmental sources.

#### RESULTS:

Between 14.7. and 23.8. 20 cases were reported with symptoms (no deaths) starting from 28.6.-12.8.. All home or working addresses clustered within a 3km radius which contained the sewage plant and two large manufacturers one of which had a cooling tower mounted on a rooftop. The tower was shut down and shot dosed by the LHD. Our environmental laboratory isolated Legionella sp. from the cooling tower which the RLL could match to patients' isolates as the highly virulent serogroup 1, "Allentown/France", sequence type 82.

#### CONCLUSIONS:

We shut down the point source in time before any deaths had occurred. We recommend a mandatory cooling tower registry to allow LHD to shut down suspected towers in case of legionella cluster detection.

PRESENTED BY: Florian Burckhardt

**Keywords:** Legionella pneumophila, GIS, outbreak, Germany, Allentown/France, googleearth

ESCAIDE REFERENCE NUMBER: 20131688

### A water-borne outbreak of norovirus in a town in Denmark, December 2012

Frédérique Dorléans<sup>(1)</sup>, Steen Ethelberg<sup>(1)</sup>, Lieke van Alphen<sup>(1)(2)</sup>, Jannik Fonager<sup>(1)(2)</sup>, Marianne Adelhardt<sup>(3)</sup>, Kåre Mølbak<sup>(1)</sup>, Sofie Gillesberg Lassen<sup>(1)</sup>

(1) Statens Serum Institut, Copenhagen, Denmark, (2) WHO Measles and Rubella Reference Laboratory, Statens Serum Institut, Copenhagen, Denmark, (3) Danish Health and Medicines Authority, Denmark

#### BACKGROUND:

During the night of 11 December 2012, in Kalundborg (North Zealand, Denmark), pressure decreased in the water supply system. On 13 December, an increase in gastrointestinal illness in the water distribution area alerted the authorities of a possible water contamination. On 15 December, water analysis showed that indicator bacteria exceeded the acceptable threshold. We investigated to confirm the source and estimate the magnitude of the suspected outbreak.

#### METHODS:

On 19 December, we distributed questionnaires to a cohort of 368 households supplied with suspected water. We asked about gastrointestinal symptoms, including date, time of onset and tap water consumption. Cases were defined as individuals with at least one of the following symptoms starting on 12 December or thereafter: diarrhea, vomiting, abdominal pain, nausea. We described the outbreak by time, place and person, calculated attack rates (AR), relative risks (RR) and 95% confidence intervals (CI). We investigated the environment and tested stools and water specimens for pathogens.

#### RESULTS:

A total of 254 persons from 145 households participated (response rate:43%), identifying 183 cases (AR:72%) that clustered downstream of the pipeline. Earliest cases occurred on 12 December, number of cases peaked on 13 December (48% of cases) and the outbreak subsided in 8 days. Drinking tap water was associated with illness (RR:5.5;CI:2–20). Environmental investigation found that sewage had leaked above a broken pipeline in the area where the pressure had dropped. Norovirus was identified in water and stools.

#### CONCLUSIONS:

All evidence indicated drinking water contaminated with norovirus as the source of the outbreak. Public health authorities issued a boil water notice and water consumption ban from 15 December 2012 to 23 January 2013 when indicator bacteria decreased to normal levels.

PRESENTED BY: Frédérique Dorléans

**Keywords:** Waterborne outbreak Gastrointestinal illness Retrospective cohort study Water pressure decrease Norovirus infection

ESCAIDE REFERENCE NO: 20131539

## Field clinic exposure to calves with diarrhoea associated with *Cryptosporidium parvum* infection in a cohort of veterinary students in Sweden in 2013

Pete Kinross<sup>(1)</sup>, Jessica Beser<sup>(2)</sup>, Karin Troell<sup>(3)</sup>, Charlotte Silverlås<sup>(3)</sup>, Camilla Björkman<sup>(4)</sup>, Johan Lindh<sup>(5)</sup>, Margareta Löfdahl<sup>(5)</sup>

(1) ECDC, Sweden (2) Smittskyddsinstitutet (SMI), Sweden (3) Statens Veterinärmedicinska Anstalt (SVA), Sweden, (4) Sveriges lantbruksuniversitet (SLU), Sweden, (5) Swedish Institute for Communicable Disease Control, Sweden

### BACKGROUND:

In March 2013, a veterinary student with gastrointestinal symptoms tested positive for *Cryptosporidium*; four classmates reported similar symptoms. We initiated an outbreak investigation to identify possible infection source(s) and risk factors for symptomatic *Cryptosporidium* infection.

### METHODS:

We performed active case finding among the affected university's students and staff, and reviewed Sweden's *Cryptosporidium* notifications. 'Probable' cases were university persons reporting diarrhoea between 21 January and 14 April 2013. *Cryptosporidium* microscopy was used to 'confirm' cases and test calf faecal specimens. Positive specimens were PCR subtyped. Following hypothesis-generating telephone interviews and site visits, an online questionnaire was sent to the cohort of 82 fourth year students for analysis of risk factors for infection.

### RESULTS:

Sixty-four students returned questionnaires (79%), identifying seven probable and seven confirmed cases; five were GP60 subtype IIA16G1R1b, two were IIA24G1. All 14 cases attended the university field clinic before symptom onset (14/37 attendees, 33%). Eleven cases visited at least one of four farms where students recalled seeing calves with diarrhoea. *C. parvum* subtype IIA16G1R1b was identified in calves at one of these. Entering pens of calves with diarrhoea (6 cases, RR:7.6; 95%CI:1.7-33.5), eating in clinic cars (12 cases, RR:9.1; 1.3-65.8), and drinking farm tap water (3 cases, RR:4.4; 2.0-9.7) were associated with being a case. Washing hands at least twice per farm visit (0 cases; p=0.03), and using additional hand sanitisers (6 cases, RR:0.41; 0.16-1.08) were protective.

### CONCLUSIONS:

Results point to direct and indirect infection from infected calves on farms as this outbreak's likely cause. To reduce infection risks, we recommend frequent hand-washing using proper technique, particularly pre-eating, and dissuasion from drinking farm tap water and eating in clinic cars to minimise possible exposure to fomites.

PRESENTED BY: Pete Kinross

**Keywords:** Veterinary; Universities; Cryptosporidiosis; disease outbreaks, infectious; *Cryptosporidium parvum*; cattle.

ESCAIDE REFERENCE NO: 20131655

## A large outbreak of enterotoxigenic *Escherichia coli* (ETEC) infection in Norway, 2012: a reminder to consider uncommon pathogens in outbreaks involving imported products

Emily MacDonald<sup>(1)</sup>, Karin Møller<sup>(2)</sup>, Astrid Louise Wester<sup>(3)</sup>, Ulf Dahle<sup>(4)</sup>, Nils O. Hermansen<sup>(5)</sup>, Pål A. Jennum<sup>(6)</sup>, Lars Thoresen<sup>(5)</sup>, Line Vold<sup>(6)</sup>

(1) Norwegian Institute of Public Health, Norway, (2) Municipality of Ringerike, Norway, (3) Oslo University Hospital, Ullevål, Norway, (4) Bærum Hospital, Vestre Viken Hospital Trust, Norway (5) Ringerike Hospital, Vestre Viken Hospital Trust, Norway

### BACKGROUND:

In December 2012, a Municipal Health Officer in southeastern Norway reported an outbreak of gastroenteritis following a Christmas buffet served December 4-9 to ~1,100 hotel guests. Local, regional and national authorities initiated an investigation in order to determine the extent of the outbreak and identify possible sources of infection.

### METHODS:

We conducted a cohort investigation among approximately 650 buffet attendees, using a standardized web-based questionnaire. A case was defined as a person with diarrhoea or vomiting for three or more days after attending the buffet. We calculated attack rates (AR) and used multivariable logistic regression analysis to calculate adjusted odds ratios (aOR) with 95% confidence intervals (CI). We asked cases to submit stool samples, which were analysed for common intestinal pathogens. Food and environmental samples were analysed by routine microbiological protocols and hotel kitchen staff were interviewed regarding the preparation of suspected buffet items.

### RESULTS:

From 433 respondents (response rate 65%), we identified 214 probable cases (AR 59%). Illness was associated with consumption of scrambled eggs (aOR 9.07 [95% CI 5.20 – 15.84]). Fresh chives, imported from a country where ETEC is endemic, were added to the eggs after cooking. These chives were unavailable for testing. Routine microbiological analyses were inconclusive, but *E. coli* O:78 (ETEC) was identified in 40 stool samples, after common pathogens were excluded.

### CONCLUSIONS:

This is the first outbreak caused by ETEC in Norway, following which the Norwegian Food Safety Authority recommended that imported fresh herbs should be heat-treated prior to use in commercial kitchens. ETEC should be considered as a possible etiology in outbreaks of gastroenteritis when common intestinal pathogens are not found, particularly when imported products are implicated.

PRESENTED BY: Emily MacDonald

**Keywords:** Disease outbreaks, Enterotoxigenic *Escherichia coli*, Diarrhoea, Foodborne diseases, Norway

ESCAIDE REFERENCE NO: 20131639

## Food-borne Hepatitis A outbreak associated with bakery products in Lower Saxony, Germany, 2012

Manuela Harries<sup>(1)</sup>, Masyar Monazahian<sup>(2)</sup>, Jürgen Wenzel<sup>(3)</sup>, Martina Weber<sup>(4)(5)</sup>, Joachim Ehlers<sup>(4)</sup>, Johannes Dreesman<sup>(2)</sup>, Elke Mertens<sup>(2)</sup>

(1) Niedersächsisches Landesgesundheitsamt, Germany, (2) Governmental Institute of public health of Lower Saxony, Hannover, Germany (3) Institute of Medical Microbiology and Hygiene University of Regensburg, Germany, (4) Lower Saxony State Office for Consumer Protection and Food Safety (LAVES), Germany, (5) Institute for Fish and Fishery Products, Cuxhaven, Germany

### BACKGROUND:

On 31/10/2012, local health departments detected an increase of Hepatitis A (HA) cases in Heidekreis/Verden districts. We investigated to identify the vehicle of infection.

### METHODS:

We actively searched for cases defined as persons with confirmed HA virus infection and onset between 15/10/12 and 11/11/12 residing in/visiting Heidekreis/Verden districts. We defined secondary cases as persons who developed symptoms after 11/11/12 and who shared a household with initial cases. We analysed surveillance data by time, place and person and compared cases and controls (recruited by random digit dialling from the cases' neighbourhoods) in terms of exposures using odds ratios (OR) and confidence intervals (CI). We assessed relatedness of human and environmental specimens using phylogenetic methods.

### RESULTS:

We identified 79 primary and 6 secondary cases (median age: 43 years, range 5-78; 55% males). The outbreak started on 16/10/2012, peaked on 29/10/2012 and ended 26/12/2012. 77 cases were citizens of Heidekreis/Verden, 8 were visitors. 82% of 50 cases and 60% of 52 controls had eaten bakery X pastries (OR= 3.1; 95%CI: 1.1 – 8.7). Among bakery X customers, cases were more likely to have eaten sweet pastries (OR= 6.0; 95%CI: 1.4 – 35). 6 of 7 human isolates and all 3 bakery X surface isolates had identical sequences. One human isolate belonged to a bakery employee with chronic bowel disease who developed jaundice on 01/10/2012. She had packed and sold products during her infectious phase without involvement in preparation.

### CONCLUSIONS:

Epidemiological and laboratory findings suggested that the bakery X employee contaminated products while packing and selling. Future risk assessment should determine whether food handlers with chronic bowel disease could be more at risk to contaminate food and would benefit from HA immunization.

PRESENTED BY: Manuela Harries

**Keywords:** Hepatitis A, Foodborne Diseases, Disease Outbreaks, Food Safety, Germany

ESCAIDE REFERENCE NO: 20131468

## Parallel Session 6 – Surveillance systems

### Establishment of prospective mortality and morbidity surveillance in a humanitarian emergency in Tissi, Chad, 2013

Maximilian Gertler<sup>(1)</sup>, Mathias Kennes<sup>(2)</sup>, Alexis Bahati<sup>(4)</sup>, Cristina Mach Cestero<sup>(3)</sup>, Annick Lenglet<sup>(3)</sup>

(1) Robert Koch-Institut, Germany, (2) Médecins Sans Frontières, Germany, (3) Médecins Sans Frontières, Amsterdam, The Netherlands, (4) Médecins Sans Frontières, The Democratic Republic of Congo

### BACKGROUND:

Since April 2013, Médecins sans Frontières (MSF) provides emergency medical care for an estimated 50,000 displaced persons (refugees and returnees) from Darfur (Sudan) in the sub-prefecture of Tissi, south-eastern Chad. In May 2013, MSF initiated community-based morbidity and mortality surveillance in Amdoukum town (approximately 10,000 persons) to assess the health status of the affected populations and target medical interventions.

### METHODS:

From week 22, we established surveillance for priority infectious diseases and malnutrition in Amdoukum health post. Seven outreach workers (ORWs) were trained to refer persons with fever, watery diarrhoea and jaundice, screen for malnutrition and register deaths in the community. We calculated crude-mortality-rates (CMR: deaths/10,000/day), under-five-mortality-rates (U5MR) and measured the proportion of malnutrition (moderate plus severe acute malnutrition) in children <5 years. We estimated population denominators for the returnee subpopulation by shelter density in GPS-mapped areas and ORW population counts and compared the results.

### RESULTS:

In weeks 22 through 24, CMR was 0.13, 0.27 and 0.13 respectively; U5MR was 0.34, 0.67 and 0.32 respectively. ORWs referred 70 persons for watery diarrhoea and measured 13 % malnutrition in 835 screened children (weeks 23-24). Population estimates by ORWs and the shelter-density method differed by 7.5 % (4,540 vs. 4,200 persons). Continued mobility of populations and security problems challenged data collection, supervision, and training of the ORWs.

### CONCLUSIONS:

Our established surveillance in Amdoukum provided vital information on the health status of the population. Mortality rates were below emergency thresholds, but probably deaths were underreported. High malnutrition rates led MSF to advocate for distributions, continue nutritional screening and strengthen feeding programmes. ORWs need enhanced supervision to improve reporting and the health interventions should continue while the humanitarian context remains unpredictable and fragile.

PRESENTED BY: Maximilian Gertler

**Keywords:** Humanitarian surveillance mortality outreach work implementation epidemiology

ESCAIDE REFERENCE NO: 20131708

## Structured evaluation of the Swedish influenza surveillance provided a solid basis for deciding on changes

Malin Kark<sup>(1)</sup>, H el ene Englund<sup>(1)</sup>, Marie Rapp<sup>(1)</sup>

(1) Smittskyddsinstitutet, Sweden

### BACKGROUND:

In Sweden, several surveillance systems are used to monitor influenza. However, knowledge on whether these systems fulfil surveillance objectives and deliver information that stakeholders need, was scarce. We therefore performed a comprehensive evaluation of the influenza surveillance, in order to identify gaps and overlaps to make the surveillance more efficient and useful.

### METHODS:

Surveillance objectives for influenza were formulated and confirmed throughout the Swedish Institute of Communicable Disease. Eighteen representatives of government agencies, media and health care were interviewed by telephone about their usage of influenza information. Surveillance objectives were prioritized accordingly on a three-tiered scale. Fifteen surveillance systems were evaluated regarding flexibility, data quality, representativeness and costs. Finally, objectives and surveillance systems were compared and the different systems ranked based on objective fulfilment and system attributes.

### RESULTS:

Eight surveillance objectives were formulated, where three were given high priority and one low priority. Stakeholders mainly valued information about predicted start and peak of the season, geographical distribution and severity of cases. They used the information for making recommendations, plan their work and inform the public. Viral characterization was found to be indispensable while several systems, mainly those delivering population-based information, overlapped several of the goals. Information from school absence among children was found to be redundant. We recommended seven systems to be used for surveillance of influenza in Sweden, starting season 2013/2014.

### CONCLUSIONS:

The structured evaluation showed that the number of surveillance systems can be decreased without affecting the quality of data collected and provided a firm basis for decision making. Next step will be to use the same method of evaluation for other diseases under surveillance.

PRESENTED BY: Malin Kark

**Keywords:** Evaluation, Influenza, Needs assessment, Surveillance objectives, Surveillance systems, Sweden

ESCAIDE REFERENCE NO: 20131287

## Evaluation of a community-based surveillance system of influenza-like illness in Sweden 2011/2012

Moa Rehn<sup>(1)</sup>, AnnaSara Carnahan<sup>(2)</sup>, Hanna Merk<sup>(1)</sup>, Sharon K uhlmann-Berenzon<sup>(2)</sup>, Ilias Galanis<sup>(2)</sup>, Annika Linde<sup>(2)</sup>, Olof Nyr en<sup>(3)</sup>

(1) Smittskyddsinstitutet, Sweden, (2) The Swedish Institute for Communicable Disease Control, Sweden, (3) Department of Medical Epidemiology and Biostatistics, Karolinska Institutet, Sweden

### BACKGROUND:

Influensakoll is the Swedish adaptation of the European Influenzanet, a community-based system with self-recruited volunteers submitting weekly on-line reports about their health in the preceding week. During the 2011-2012 influenza season, Influensakoll ran concurrently with two existing surveillance systems: laboratory reports from routine diagnostics; and Sjukrapport, a previously evaluated community-based surveillance system based on an actively recruited representative sample of the population who spontaneously reported disease onsets in real-time via telephone/Internet. We evaluated to what extent Influensakoll participants represented the Swedish population and studied the agreement of disease occurrence data generated by the surveillance systems.

### METHODS:

Age, sex, and education distributions of Influensakoll participants were compared to the general Swedish population using chi-square test. For the community-based systems, the weekly incidence proportions (%) of influenza-like illness (ILI), based on episodes in the past seven days, were calculated and smoothed using a two week moving average. We performed cross-correlation analyses of these surveillance data and of weekly data from laboratory reports, collected between weeks 49/2011-20/2012.

### RESULTS:

Women, highly educated people, and those aged 40-64 years were overrepresented among Influensakoll participants. Smoothed weekly incidence proportions of ILI ranged between 0.6-4.4% in Influensakoll and 0.8-2.8% in Sjukrapport, with a larger week-to-week variation in Influensakoll. Cross-correlation analysis showed a maximum correlation of  $r=0.70$  ( $p$ -value  $<0.05$ ) between the community-based systems when no lag was applied. Both community-based systems correlated significantly with laboratory report data without any lag (Influensakoll  $r=0.66$ ; Sjukrapport  $r=0.63$ , both  $p$ -value  $<0.05$ ).

### CONCLUSIONS:

Despite the self-recruited sample, resulting in poor reflection of the Swedish populations' demography, Influensakoll offered reasonable representation of the temporal ILI pattern in the community during the 2011-2012 influenza season and could be useful for following ILI trends.

PRESENTED BY: Moa Rehn

**Keywords:** Population surveillance Evaluation surveillance Influenza, human Internet

ESCAIDE REFERENCE NO: 20131600

## Measles Surveillance System in Denmark 2005-2012 – Room for Improvement?

Lieke van Alphen <sup>(1)</sup>, Jannik Fonager <sup>(1) (2)</sup>, Lisbet Krause Knudsen <sup>(1) (3)</sup>, Mick Mulders <sup>(4)</sup>, Thea Kølsten Fischer <sup>(4)</sup>

(1) Department of Microbiology and Infection Control, Statens Serum Institut, Copenhagen, Denmark, (2) WHO Measles and Rubella Reference Laboratory, (3) Department of Infectious Diseases Epidemiology, (4) World Health Organization, Expanded Programme on Immunization, Geneva, Switzerland

### BACKGROUND:

Measles is a highly contagious disease and vaccination coverage in Denmark is not sufficient (87% in 2011) to prevent outbreaks. Sensitive surveillance and complete and timely reporting are key elements in measles control. The objective of this evaluation was to map the routes of reporting and to assess completeness and timeliness of the national surveillance system.

### METHODS:

The surveillance system was assessed by calculating measles surveillance system performance indicators listed by WHO and CDC. The proportion of laboratory-confirmed cases, the source and the timeliness of sampling, notifications and lab results were calculated for all measles cases from 2005-2012. The reporting structure in the Danish measles surveillance system was mapped.

### RESULTS:

In Denmark, 130 (91.5%) out of 142 notified measles cases were laboratory-confirmed between 2005 and 2012. The source of infection was known in 67 (47.3%) cases. Sampling occurred after a median of 5 working days after symptom onset (quartile range 4-7.3 days). Paper notifications, sent by regular mail, were received after a median of 13 working days (quartile range 10-20.5 days). Overall 90.8% of cases were lab confirmed within 7 days. Cases were reported monthly by both the epidemiological department and the reference laboratory to ECDC and WHO, respectively.

### CONCLUSIONS:

The reporting of cases in the measles surveillance system in Denmark is complete and timely lab results are available. However, notifications frequently arrive too late for adequate public health actions. Electronic or phone notifications could improve public health response and intervention of transmission. The monthly international double-reporting is very time consuming and a common epi and lab data-entry platform could be developed, which would result in more efficient/user friendly reporting for member states.

PRESENTED BY: Lieke van Alphen

Keywords: Surveillance Measles Disease notification  
ESCAIDE REFERENCE NO: 20131691

## Evaluation of an enhanced communicable diseases surveillance system implemented for UEFA European Football Championship (EURO 2012) in Poland

Aleksandra Polkowska <sup>(1)</sup>, Malgorzata Sadkowska-Todys <sup>(2)</sup>, Andrzej Zielinski <sup>(2)</sup>, Marion Muehlen <sup>(3)</sup>, Lara Payne Hallström <sup>(3)</sup>

(1) National Institute for Health and Welfare (THL), Poland, (2) National Institute of Public Health – National Institute of Hygiene, Poland, (3) ECDC, Sweden

### BACKGROUND:

For the final round of the EURO 2012, Poland implemented an enhanced surveillance system for infectious diseases. We evaluated this system in terms of simplicity, flexibility, acceptability, representativeness and timeliness.

### METHODS:

To assess timeliness, representativeness and simplicity, we reviewed reference documents and reports of the routine and enhanced surveillance systems. We assessed acceptability and simplicity using structured phone interviews with representatives of 19 District Sanitary Stations. To assess flexibility we examined how the system adapted to modified reporting frequency, data requirements, new electronic reporting format and staffing.

### RESULTS:

Review of documents indicated that the time interval of notification from District Sanitary Stations to the National Institute of Public Health (NIPH) was shorter (weekly vs. bi-weekly; daily vs. weekly) as per the requirement. NIPH analysed data daily and the enhanced system covered the domestic population and visitors, with no population systematically excluded. All respondents from District Sanitary Stations (n=19) considered the structure and data flow simple and 16 of them agreed to enhance surveillance during future mass gatherings. The system adapted to the increased reporting frequency with no additional staff through a nineteen hours roster of NIPH staff.

### CONCLUSIONS:

Enhanced surveillance in Poland during EURO 2012 was timely, representative, simple, flexible, and well accepted. This successful experience created a model that will be replicated for future mass gatherings in Poland.

PRESENTED BY: Aleksandra Polkowska

Keywords: Mass gathering, enhanced surveillance, evaluation, Poland  
ESCAIDE REFERENCE NO: 20131441

## Parallel Sessions 7 – 9 10.50 – 12.30 Wed 6

### Parallel Session 7 – Influenza

#### GrippeWeb: Internet-based syndromic monitoring of acute respiratory illness in Germany – influenza season 2012/13

Christophe Bayer<sup>(1)</sup>, Cornelius Remschmidt<sup>(1)</sup>, Matthias an der Heiden<sup>(1)</sup>, Kristin Tolksdorf<sup>(1)</sup>, Herzhoff Michael<sup>(1)</sup>, Silke Buda<sup>(1)</sup>, Walter Haas<sup>(1)</sup>, Udo Buchholz<sup>(1)</sup>

(1) Robert Koch Institute, Germany

##### BACKGROUND:

In spring 2011, GrippeWeb was launched as a population accessible, internet-based syndromic monitoring system for acute respiratory infections (ARI) and influenza-like illness (ILI). Participants are requested to fill in a weekly questionnaire on incident respiratory illness of the previous week. GrippeWeb complements the German sentinel surveillance system for influenza (“Arbeitsgemeinschaft Influenza” (AGI)), which is based on primary care physicians collecting data on patients presenting with ARI. The objective of the investigation was to measure incidences of ARI and influenza-like illness (ILI) based on GrippeWeb data and to assess their validity.

##### METHODS:

We calculated weekly ARI/ILI incidences for weeks 40/2012 to week 20/2013 among the total number of reporting participants in the respective week. We correlated weekly GrippeWeb based ARI and medically attended ARI (MAARI) incidences with weekly AGI MAARI incidences and compared these measures by calculating ratios. Weekly GrippeWeb ILI incidences were correlated with the number of positive influenza samples of the same week obtained by the AGI.

##### RESULTS:

In total GrippeWeb received 138 271 reports during the analysed period. ARI (ILI) incidences ranged between 4.2% (0.9%) and 10.4% (4.3%) and peaked in week 5/2013. The trend of weekly GrippeWeb ARI and MAARI incidences correlated highly with that of weekly AGI MAARI incidences (Pearson  $r = 0.86$   $p < 0.001$ ;  $r = 0.91$ ,  $p < 0.001$ ). GrippeWeb ARI (MAARI) incidences differed by a factor of 3.8-10.1 (0.6-1.4) from AGI MAARI incidences. The weekly GrippeWeb ILI incidences correlated significantly with the weekly number of positive influenza samples ( $r = 0.60$ ,  $p < 0.001$ ).

##### CONCLUSIONS:

GrippeWeb provided valid data for monitoring the influenza season on population level. The concordance between GrippeWeb MAARI and AGI MAARI data suggests that both systems collect independently valid data.

PRESENTED BY: Christophe Bayer

Keywords: Surveillance, influenza, internet, incidence studies

ESCAIDE REFERENCE NUMBER: 20131709

#### Severe influenza morbidity and mortality monitoring in Scotland – comparison of time trend, clinical severity and influenza strain over the last 3 years

Arlene Reynolds<sup>(1)</sup>, Beatrix von Wissmann<sup>(2)</sup>, Louise Primrose-Shaw<sup>(2)</sup>, Rory Gunson<sup>(2)</sup>, Alasdair MacLean<sup>(2)</sup>, Jim McMenamin<sup>(1)</sup>

(1) Health Protection Scotland, United Kingdom, (2) West of Scotland Virology Lab, United Kingdom

##### BACKGROUND:

Severe acute respiratory illness (SARI) due to laboratory confirmed influenza requiring intensive care unit (ICU) management is a key component of influenza surveillance in Scotland. It provides important information on the impact of influenza each season, informs management of pressures on hospital intensive care whilst allowing refinement of public health policy

##### METHODS:

Information on SARI cases requiring ICU management and deaths are reported to Health Protection Scotland each season. Information provided includes patient demographics, onset date, clinical presentation, virology and outcome (including cause of death). Characteristics of these cases were compared over three influenza seasons to identify differences in time trends, causative strain(s) and severity.

##### RESULTS:

The number of reports received in 2012/13 ( $n=128$ ) was substantially higher than in 2011/12 ( $n=17$ ) but lower than in 2010/11 ( $n=177$ ). A distinctive bimodal pattern was seen in the weekly number of SARI cases requiring ICU with peaks in weeks 52 and 7 (peak influenza A/H3N2 and influenza B activity, respectively). Predominant influenza strain(s) varied: 2010/11 – influenza A H1N1 2009 (90%); 2011/12 – influenza A H3N2 (65%); and 2012/13 – influenza A H3N2 (47.5%) and influenza B (28.7%). Case fatality rates (CFR) were high (35.6%, 23.5% and 28.7%, respectively for 2010/11-2012/13) but remained stable overall ( $p > 0.05$ ). The majority of SARI deaths in the last three seasons were due to influenza A (63-80%).

##### CONCLUSIONS:

Despite ICU management, the CFR of SARI cases was high in all three seasons, even in the atypical late season of 2011/12. Mortality was associated with infection with influenza A viruses but did vary by influenza strain. These results highlight the importance of SARI surveillance in monitoring the impact of influenza each season.

PRESENTED BY: Beatrix von Wissman

Keywords: Influenza, severity, intensive care, impact

ESCAIDE REFERENCE NUMBER: 20131809

## Early risk assessment of human influenza epidemics

RS René Snacken <sup>(1)</sup>, Julien Beauté <sup>(1)</sup>, Eeva Broberg <sup>(1)</sup>, Angus Nicoll <sup>(1)</sup>

(1) ECDC, Sweden

### BACKGROUND:

According to WHO recommendations, early risk assessments in influenza seasons and pandemics should describe influenza activity in first affected areas, identify particular features indicating specific actions, and highlight areas of uncertainty. ECDC first developed an early influenza risk assessment (EIRA) in 2009 and has published one every season since, based on a standard approach which we would like to share and discuss here.

### METHODS:

Sources of data for the EIRA include: routine indicators from the European Influenza Surveillance Network; European projects on vaccine effectiveness, vaccine safety and all-cause mortality; WHO epidemiological updates; rapid communications in peer-reviewed journals; epidemic intelligence; and responses to a questionnaire sent to first affected countries. All data, conclusions and recommendations are reviewed by a panel of international experts.

### RESULTS:

After the 2009 pandemic, ECDC released three EIRA between seven and 11 weeks after the start of increased seasonal influenza activity. Key findings have varied. Serological studies performed in Norway in early January 2011 suggested a possible dominance of A(H3N2) viruses which was confirmed in the following months. In 2011, low vaccine effectiveness in well-vaccinated patients in nursing homes in Spain led to a vigorous anti-viral treatment policy. In 2013, early vaccine effectiveness and safety studies demonstrated the usefulness of continuing vaccination.

### CONCLUSIONS:

The EIRA developed and published by ECDC is now an annually recurring feature informing clinical and public health preparedness in countries not yet affected by increased influenza activity. As the collection of questionnaires and review process have taken too long, lack of timeliness remains an issue compromising the usefulness of this EIRA. Further studies are needed to assess its true impact at country level.

PRESENTED BY: RS René Snacken

**Keywords: Influenza, Surveillance, Risk Assessment**  
ESCAIDE REFERENCE NUMBER: 20131488

## Effectiveness of the 2012/13 trivalent live and inactivated influenza vaccines in children and adolescents in Saxony-Anhalt, Germany

Carina Helmeke <sup>(1)</sup>, Lutz Graefe <sup>(1)</sup>, Hanns-Martin Irmscher <sup>(1)</sup>, Hanna Oppermann <sup>(1)</sup>

(1) State Agency for Consumer Protection of Saxony-Anhalt, Germany

### BACKGROUND:

Since the influenza season 2012/13 a nasal live attenuated trivalent influenza vaccine is available in Germany, which is approved for children aged 2-17 years. We estimated the effectiveness of live attenuated and inactivated trivalent influenza vaccines (VE) in preventing laboratory-confirmed cases among children and adolescents during the influenza season 2012/13 in Saxony-Anhalt.

### METHODS:

From week 40/2012 to 19/2013, sentinel paediatricians systematically swabbed ARI (acute respiratory illness) patients for testing of influenza viruses by polymerase chain reaction. We excluded patients with unknown vaccination status or vaccinated less than 14 days before diagnosis. We compared influenza cases and influenza-negative controls. Among children aged 2-17 years, we calculated overall VE and vaccine type specific VE against laboratory-confirmed influenza, stratified by age group (2-6; 7-17 years). We used multivariable logistic regression to adjust VE estimates for age group, sex and month of illness.

### RESULTS:

We included 834 ARI patients (mean age 7.3 years, 53% males) in our analysis. Of 347 (42%) influenza positive specimens, 61 (18%) were positive for A(H1N1)pdm09, 112 (32%) for A(H3) and 174 (50%) for influenza B virus. The adjusted overall VE including both age groups was 38% (95% CI: 0.8-61%). The adjusted VE for inactivated vaccines was 37% (95% CI: -35-70%) and for live vaccines 84% (95% CI: 45-95%). VE for live vaccine was higher in 2-6-year-old children (90%, 95% CI: 20-99) than in children aged 7-17 years (74%, 95% CI: -32-95).

### CONCLUSIONS:

Our study suggests a high preventive effect of the 2012/13 live attenuated influenza vaccine especially among young children, which could not be reached by inactivated vaccines. We recommend continuation of VE monitoring in children and the use of live attenuated influenza vaccines in children.

PRESENTED BY: Carina Helmeke

**Keywords: Influenza, Human; Influenza Vaccines; Respiratory Tract Infections; Case-Control Studies; prevention & control; surveillance**  
ESCAIDE REFERENCE NUMBER: 20131520



## Influenza vaccine effectiveness estimates from the I-MOVE multicentre case-control study in Europe, 2012-13: moderate vaccine effectiveness for all circulating types and subtypes

Esther Kissling <sup>(1)</sup>, Marta Valenciano <sup>(2)</sup>, Udo Buchholz <sup>(2)</sup>, Amparo Larrauri <sup>(3)</sup>, Baltazar Nunes <sup>(4)</sup>, Justyna Rogalska <sup>(5)</sup>, Daniela Pitigoi <sup>(6)</sup>, Iwona Paradowska-Stankiewicz <sup>(7)</sup>, Jean Marie Cohen <sup>(8)</sup>, Annick Reuss <sup>(2)</sup>, Silvia Jimenez-Jorge <sup>(3)</sup>, Ausenda Machado <sup>(4)</sup>, Joan O'Donnell <sup>(5)</sup>, Emilia Lupulescu <sup>(6)</sup>, Malgorzata Lipke <sup>(7)</sup>, Isabelle Daviaud <sup>(8)</sup>, Alain Moren <sup>(3)</sup>

(1) EpiConcept, France, (2) Robert Koch Institute, Berlin, Germany, (3) National Centre for Epidemiology, Instituto de Salud Carlos III, Spain, (4) Instituto Nacional de Saúde Dr Ricardo Jorge, Lisbon, Portugal, (5) Health Protection Surveillance Centre, Dublin, Ireland, (6) Cantacuzino Institute, National Institute of Research – Development for Microbiology and Immunology, Bucharest, Romania, (7) National Institute of Public Health-National Institute of Hygiene, Warsaw, Poland, (8) GROG/Open Rome, Paris

### BACKGROUND:

In the fifth season of I-MOVE (Influenza Monitoring Vaccine Effectiveness in Europe), we undertook a multicentre case-control study (MCCS) based on sentinel practitioner surveillance networks in seven European Union (EU) Member States to measure 2012/13 influenza vaccine effectiveness against medically-attended influenza-like illness (ILI) laboratory-confirmed as influenza. The season was characterised by substantial co-circulation of influenza B, A(H1N1)pdm09 and A(H3N2) viruses.

### METHODS:

Practitioners systematically selected ILI patients to swab within eight days of symptom onset. We compared influenza-positive by type/subtype to influenza-negative patients among those who met the EU ILI case definition. We conducted a complete case analysis using logistic regression with study as fixed effect and calculated adjusted vaccine effectiveness (AVE), controlling for potential confounders (age, sex, onset week and presence of chronic conditions). We calculated AVE by type/subtype and age-group.

### RESULTS:

We included 5993 patients, with 1937 influenza B, 1068 A(H1N1)pdm09 and 732 A(H3N2) cases. AVE was 49.3% (95%CI 32.1-62.1) against influenza B, 51.2% (95%CI 29.3-66.3) against A(H1N1)pdm09 and 42.1% (95%CI 14.8-60.7) against A(H3N2). AVE against all influenza was 28.9% (95%CI -15.1-56.1) among those aged 0-14 years, 58.6% (95%CI 41.5-70.8) among those 15-59 years and 52.4% (95%CI 23.8-70.3) among those 60 years and older. AVE for influenza B was 22.3% (95%CI -37.0-55.9) for 0-14 year olds, 64.0% (95%CI 42.2-77.6%) for 15-59 year olds and 40.7% (95%CI -2.2-65.6) for those aged 60 and older.

### CONCLUSIONS:

Our results suggest low to moderate AVE against influenza B, A(H1N1)pdm09 and A(H3N2), between 42-51%. Estimates are lowest in younger age groups. In this season with many co-circulating viruses, the high sample size enabled stratified AVE by type/subtype. The low estimates indicate seasonal influenza vaccines should be improved to achieve acceptable protection levels.

PRESENTED BY: Esther Kissling

**Keywords:** Influenza, Influenza vaccine, prevention & control, multicentre studies, case control studies

ESCAIDE REFERENCE NUMBER: 20131785

## Parallel Session 8 – Outbreaks (2)

### The investigation of a Nordic outbreak of hepatitis A associated with frozen strawberries

Sofie Gillesberg Lassen <sup>(1)</sup>, Bolette Søborg <sup>(1)</sup>, Sofie Elisabeth Midgley <sup>(1)</sup>, Anneke Steens <sup>(2)</sup>, Michael Edelstein <sup>(3)(4)</sup>, Ruska Rimhanen-Finne <sup>(5)</sup>, Line Vold <sup>(2)</sup>, Margareta Löfdahl <sup>(3)</sup>, Mia Kontio <sup>(5)</sup>, Kathrine Stene-Johansen <sup>(2)(6)</sup>, Lena Sundqvist <sup>(3)</sup>, Tenna Jensen <sup>(7)</sup>, Hanna Lundström <sup>(8)</sup>, Laila Jensvoll <sup>(9)</sup>, Magnus Simonsson <sup>(10)</sup>, Linda Verhoef <sup>(10)</sup>, Harry Vennema <sup>(10)</sup>, Hanne Thang Vestergaard <sup>(1)</sup>, Steen Ethelberg <sup>(3)</sup>

(1) Statens Serum Institut, Copenhagen, Denmark (2) Norwegian Institute of Public Health, Oslo, Norway, (3) Swedish Institute for Communicable Disease Control, Stockholm, (4) ECDC, Sweden, (5) Department of Infectious Disease Surveillance and Control, National Institute for Health and Welfare, Helsinki, Finland, (6) Department of Virology, (7) The Danish Veterinary and Food Administration, Copenhagen, Denmark, (8) Finnish Food Safety Authority, Helsinki, Finland, (9) Norwegian Food Safety Authority, Oslo, Norway, (10) Swedish National Food Agency, Stockholm, 10 1National Institute for Public Health and the Environment (RIVM), Bilthoven, the Netherlands

### BACKGROUND:

On 1 March 2013, Denmark notified an increase in patients with domestically acquired hepatitis A virus (HAV) infection; Finland, Norway and Sweden subsequently reported increases. We investigated to describe the outbreak, identify the source and stop transmission.

### METHODS:

Probable cases were symptomatic domestically infected HAV IgM-positive persons from Denmark, Finland, Norway or Sweden with disease onset after 30 September 2012. Confirmed cases were PCR-positive with one of two closely related HAV sequences. Using harmonized methods, in each country, we conducted case-control studies to estimate odds ratios (OR), matched OR (MOR) and 95% confidence intervals (CI) using conditional logistic regression. We analyzed the product distribution using case purchase information. We analyzed the outbreak sequences' phylogeny by comparing to HAVNET database strains.

### RESULTS:

By 30 August 2013 (latest onset: 14 August), 43 probable and 68 confirmed cases (68 female, age: 2-76 years) were identified in Denmark (69), Finland (15), Norway (7) and Sweden (20). Cases were more likely to have eaten frozen berries than controls (MOR-Denmark: 13; 95%CI 2.8-55, MOR-Norway: 2.7; 95%CI: 0.5-16, OR-Sweden: 6.7; 95%CI: 0.7-70), especially frozen strawberries (MOR-Denmark: 16; 95%CI 3.6-69, MOR-Norway: 7.4; 95%CI: 0.8-64, OR-Sweden: 24; 95%CI 1.9-1,200). An analysis including confirmed cases from all countries confirmed this (adjusted MOR-Strawberries: 11; 95%CI 1.9-70). Product distribution analysis pointed at frozen strawberries from North Africa. Phylogeny comparisons showed association with strains isolated in travelers infected in Egypt.

### CONCLUSIONS:

Epidemiological investigations and product distribution analysis identified frozen strawberries as the outbreak vehicle. Investigations continue to identify the source of contamination and the berries' origin. On 30 May 2013, one supermarket chain in Denmark, Norway and Sweden voluntarily recalled frozen strawberries from Egypt and Morocco packed in Belgium.

PRESENTED BY: Sofie Gillesberg Lassen

**Keywords:** Infectious Disease Outbreaks, Hepatitis A, Communicable Disease Control, Case Control Studies, Food-borne Diseases

ESCAIDE REFERENCE NUMBER: 20131707

## Norovirus outbreak after the Christmas reception in NIPH associated with catering food consumption, Poland, 2012

Sylwia Kamińska<sup>(1)</sup>, Malgorzata Sadkowska-Todys<sup>(1)</sup>, Żaneta Kruszewska<sup>(2)</sup>

(1) National Institute of Public Health – National Institute of Hygiene, Poland, (2) District Sanitary Station, Warsaw, Poland

### BACKGROUND:

The District Sanitary-Station in Warsaw and NIPH investigated an outbreak of gastroenteritis after the Christmas reception on 19/12/2012 among employees of NIPH. We aimed to identify possible vehicles and sources of infection.

### METHODS:

We conducted a retrospective cohort study among employees consuming food items served at the reception. A case was an employee with diarrhoea/vomiting having consumed food items from the catering menu. Stool specimens from symptomatic persons were tested for gastroenteritis pathogens. We collected information on consumed food/drinks from the reception via an email questionnaire. We calculated menu-specific attack rates (ARs) and relative risks (RRs) using univariable and binomial regression analyses. Environmental health officers inspected the catering firm kitchen.

### RESULTS:

Overall 239 employees answered the questionnaire. A total of 192 attendees consumed items from the catering menu, of which 97 (50.5%) fulfilled the case definition. Cases occurred on 19/12, peaked on 20/12 and ended on 22/12. Multivariable analysis showed that four food items were associated with illness: vegetable salad (RR: 1.66; 95% CI: 1.25-2.2), salmon with crab mousse (RR: 1.61; 95% CI: 1.35-1.92), stewed fish with vegetables (RR: 1.53; 95% CI: 1.21-1.93), carp in aspic (RR: 1.17; 95% CI: 1.17-1.17). The first three above listed contained frozen carrot. Eating any of items containing carrot was a significant risk factor (RR: 4.65; 95% CI: 2.31-9.36) and explained 93% of cases. Norovirus was detected in 3/4 specimens. No food or environmental specimen were tested.

### CONCLUSIONS:

Food items with frozen carrot were the probable outbreak vehicles. Carrot may have been contaminated before or during the preparation of meals. To avoid future outbreaks, regular hygiene training for kitchen staff, appropriate products storage and heat treatment are required.

PRESENTED BY: Sylwia Kamińska

**Keywords:** Gastroenteritis, foodborne disease, disease outbreaks, Poland

ESCAIDE REFERENCE NUMBER: 20131640

## Risk factors for and symptomatology of Legionnaires' disease – the Edinburgh experience

Fatim Lakha<sup>(1)</sup>, Alison Smith-Palmer<sup>(2)</sup>, Andrew Massie<sup>(1)</sup>, Caroll Brown<sup>(1)</sup>, Janet Stevenson<sup>(1)</sup>, Martin Donaghy<sup>(2)</sup>, Alison McCallum<sup>(1)</sup>

(1) NHS Lothian, United Kingdom, (2) Health Protection Scotland, United Kingdom

### BACKGROUND:

During May/June 2012 NHS Lothian experienced Scotland's largest outbreak of Legionnaires' disease comprising 55 confirmed and 36 probable and possible cases. Epidemiological and meteorological evidence suggested that a common exposure occurred in the SW area of Edinburgh, emanating from a cluster of cooling towers. A case control study was undertaken to further identify the characteristics and risk factors associated with Legionnaires' disease.

### METHODS:

Cases included those with confirmed or suspected Legionnaires' disease resident in NHS Lothian. Fatalities were excluded. Controls were matched on their link to the SW area (resident, worker or visitor) with a 2:1 ratio. Data was collected in August via a telephone administered questionnaire, written consent was obtained prior to interview.

### RESULTS:

65 cases and 202 controls were eligible for participation, 56% and 42% respectively took part. The predominant symptomatology of cases was malaise (95%), fatigue (95%), fever (84%) and confusion (68%). Confusion was a striking feature of this outbreak; many patients had little memory of that period of their life. As with previous studies being male, older, a smoker and having an underlying condition increased the likelihood of contracting Legionnaires' disease. In addition, unemployed or retired people had an increased risk compared to the employed and those who worked outdoors had a greater risk than indoors workers. There was also an increased risk associated with living in an area of greater deprivation.

### CONCLUSIONS:

This study confirms previously reported risk factors for Legionnaires' disease. It suggests that neurological symptoms are frequent in Legionnaires' disease and highlights the risks associated with deprivation.

PRESENTED BY: Fatim Lakha

**Keywords:** Legionnaires', disease Legionellosis Case-control study Risk factors Deprivation

ESCAIDE REFERENCE NUMBER: 20131633

## Human cutaneous anthrax outbreak in Georgia, 2012

Archil Navdarashvili <sup>(1)</sup>

(1) National Center for Disease Control and Public Health, South Caucasus Field Epidemiology and Laboratory Training Program, Georgia

### BACKGROUND:

Georgia's National Center for Disease Control (NCDC) registered increased human cutaneous anthrax in 2011–2012 (81, 142 respectively) compared to 2009–2010 (42, 29, respectively). During the same time period reported livestock anthrax cases increased from 12 to 25. We investigated to confirm outbreak, identify risk factors and recommend control measures.

### METHODS:

We conducted a 1:2 matched case-control study in two adjacent regions with highest incidence, Kvemo Kartli [KK] and Kakheti [Ka]. Cases were identified by disease surveillance and confirmed by PCR or culture. Two controls, matched by residence (within 250m) and gender were recruited. Multivariate conditional logistic regression was used to analyze data.

### RESULTS:

In 2012 reported 4-fold increase in human anthrax cases compared to the average annual number from 2000 to 2010. Significant increase in cases reported from KK and Ka regions. We interviewed 70 cases and 140 controls. Case-patients were 18–72 years of age (median 40), 87% male; 79% from KK region. 24% contacted sick animal (OR=9.7; 95%CI 2.0-47), 77% raised animals (OR=6.1; 95%CI 2.1-18), 50% contacted animal products (OR=3.4; 95%CI 1.5-7.9). Buying meat from butcher shop was protective (OR=0.3; 95%CI 0.12-0.75). 33% of case-patients reported soil-contact, but that was not associated with disease.

### CONCLUSIONS:

Significant increase in two adjacent regions indicates an existence of local outbreak. Human anthrax can be prevented by minimizing contact with sick livestock and their products and controlling anthrax in livestock. We recommended use of personal protective equipment when contacting sick animals, enforcement of regulations to prevent slaughtering and sale of meat from sick animals, targeted public education and vaccination of animals against anthrax. Vaccination of animals against anthrax in KK and KA was conducted in autumn 2012.

PRESENTED BY: Archil Navdarashvili

**Keywords:** Cutaneous anthrax, case-control study, outbreak, Georgia  
ESCAIDE REFERENCE NUMBER: 20131790

## Large multistate outbreak of norovirus gastroenteritis associated with frozen strawberries, East Germany, 2012

Helen Bernard <sup>(1)</sup>, Mirko Faber <sup>(1)</sup>, Hendrik Wilking <sup>(1)</sup>, Sebastian Haller <sup>(1)(2)</sup>, Michael Höhle <sup>(1)</sup>, Annika Schielke <sup>(1)</sup>, Tanja Ducomble <sup>(1)</sup>, Claudia Siffczyk <sup>(1)</sup>, Sophie-Susann Merbecks <sup>(1)</sup>, Osamah Hamouda <sup>(1)</sup>, Klaus Stark <sup>(1)</sup>, Dirk Werber <sup>(1)</sup>

(1) Robert Koch-Institute, Berlin, Germany, (2) Postgraduate Training for Applied Epidemiology, European Programme for Intervention Epidemiology Training (EPIET), (3) State Health Authority Brandenburg, Germany, (4) State Health Authority Saxony, Germany

### BACKGROUND:

On 27/09/12, the federal state of Brandenburg informed the Robert Koch-Institute about several outbreaks of gastroenteritis in schools and child-care facilities, amassing to at least 500 cases. The Robert Koch-Institute informed food safety authorities and public health authorities of the other 15 federal states, requested information on similar outbreaks, and initiated an outbreak investigation to identify the vehicle of infection and prevent further cases. Norovirus was identified as the causative agent.

### METHODS:

Cases had diarrhoea or vomiting from 19 September through 7 October 2012, did not test positive for any pathogen other than norovirus, and attended an affected institution (one with external food supply and which registered  $\leq 10$  cases in that period). We conducted two case-control studies and two surveys in secondary schools in three of the affected federal states. Product trace-back investigations were performed by the Task Force on Food and Feed Safety.

### RESULTS:

Overall, 390 institutions in 5 federal states were ascertained with ~11,000 patients of gastroenteritis, the majority were children in schools and nurseries. All studies identified strawberries, contained in various dishes, as the most likely vehicle in this outbreak, with odds ratios ranging from 2.6 to 45.4. Strong epidemiological evidence was available within a week after outbreak detection. The strawberry-containing dishes had been prepared in regional kitchens of a large catering company, and were consistently served two days prior to the respective outbreak peaks. Trace-back investigations revealed that the strawberries were imported frozen from mainland China.

### CONCLUSIONS:

This largest food-borne outbreak in Germany exemplifies infection risks in the era of global food trade and underlines the importance of timely surveillance of local outbreaks and the role of epidemiological outbreak investigations for food safety.

PRESENTED BY: Dirk Werber

**Keywords:** Norovirus, Foodborne Diseases, Disease Outbreaks, Public Health Surveillance

ESCAIDE REFERENCE NUMBER: 20131587

## Parallel Session 9 – Vector-borne diseases

### West Nile virus disease, Greece, 2012: third consecutive year of local transmission

Danaï Pervanidou <sup>(1)</sup>, Marios Detsis <sup>(1)</sup>, Kostas Danis <sup>(1)</sup>, <sup>(2)</sup>, Kassiani Mellou <sup>(1)</sup>, Evaggelia Papanikolaou <sup>(1)</sup>, Irene Terzaki <sup>(1)</sup>, Agoritsa Baka <sup>(1)</sup>, Lambrini Veneti <sup>(1)</sup>, Anita Vakali <sup>(1)</sup>, Georgios Dougas <sup>(1)</sup>, Constantina Politis <sup>(1)</sup>, Kostas Stamoulis <sup>(3)</sup>, Anthi Kandili <sup>(4)</sup>, Andreas Mentis <sup>(5)</sup>, Sotirios Tsiodras <sup>(6)</sup>, Theano Georgakopoulou <sup>(1)</sup>, Anna Papa <sup>(6)</sup>, Athanasios Tsakris <sup>(7)</sup>, Christos Hadjichristodoulou <sup>(6)</sup>

(1) Hellenic Centre for Disease Control and Prevention, Greece, (2) ECDC, Sweden (3) Hellenic National Blood Centre, Greece, (4) Infectious Disease Hospital, Thessaloniki, Greece, (5) Hellenic Pasteur Institute, Greece, (6) School of Medicine, University of Athens, Greece, (7) Medical Faculty, University of Thessaloniki, Greece, (7) School of Medicine, University of Thessaly

#### BACKGROUND:

In 2010, the first outbreak of West Nile virus (WNV) infections was recorded in Greece, the largest reported in Europe since 1996. In the consecutive years, large outbreaks continued to occur. We investigated the 2012 outbreak to determine its extent and identify risk factors for severe disease.

#### METHODS:

We interviewed cases and treating physicians and recorded suspected place of exposure, clinical and laboratory findings, co-morbidities and disease outcome. We used the EU-case definition for laboratory confirmed and probable cases. We estimated case fatality (CF) of neuro-invasive disease (WNNND) and adjusted risk ratios (aRR) for fatal outcome using binomial regression models. PCR-positive samples were sequenced.

#### RESULTS:

In 2012, 161 cases were recorded, of which 109 with WNNND, 18 fatal (CF=16.5%); 58 WNNND cases occurred in 8 previously unaffected districts. Two main outbreak epicentres were identified: the urban southern suburbs of Athens in July and the newly affected rural areas in East Macedonia-Thrace in August and September. The CF in the two epicentres was 7% (n=2) and 9% (n=4), respectively, whereas outside the epicentres the CF was 34% (n=12). Age >74 years (aRR=7.0, 95%CI: 2.2-22) and chronic renal failure (aRR=4.5, 95%CI: 2.7-7.5) independently predicted death. Sequences from three PCR-positive samples were WNV lineage 2, with high genetic similarity to the 2010 strain.

#### CONCLUSIONS:

The occurrence of human cases in three consecutive years and in newly affected areas suggests that WNV is established in Greece and expanding. Higher CF outside the two epicentres might reflect insufficient physicians' awareness and under-diagnosis of WNV disease. Raising awareness among physicians and susceptible populations (the elderly and those with co-morbidities) throughout Greece is critical for disease prevention and control.

PRESENTED BY: Danaï Pervanidou

Keywords: West Nile virus, arbovirus, outbreak, vector-borne disease, Greece.

ESCAIDE REFERENCE NUMBER: 20131731

### First outbreak of dengue in Madeira, Portugal, October 2012-March 2013: a call for an integrated response strategy on invasive mosquito-borne diseases in Europe

Benedetto Simone <sup>(1)</sup>, Joana Gomes Dias <sup>(2)</sup>, Bertrand Sudre <sup>(1)</sup>, Ana Clara Silva <sup>(3)</sup>, Ana Nunes <sup>(3)</sup>, Paula Vasconcelos <sup>(4)</sup>, Herve Zeller <sup>(1)</sup>, Josep Jansa <sup>(1)</sup>

(1) Field Epidemiology Services (Victoria), Public Health England, United Kingdom, (2) ECDC, Sweden, (3) Institute for Health Administration and Social Affairs, Autonomous Region of Madeira (RAM), Portugal, (4) Directorate-General of Health (DGS), Ministry of Health, Lisbon, Portugal

#### BACKGROUND:

In October 2012, the Autonomous Region of Madeira (RAM), Portugal, reported 18 laboratory-confirmed cases of dengue and 191 probable cases within two weeks. The Regional health authorities, the Portuguese Directorate-General of Health and the European Centre for Disease Prevention and Control conducted a risk assessment and investigated the outbreak.

#### METHODS:

A dengue probable case was defined as a resident/visitor in RAM with acute onset of fever and at least two among: headache, retro-orbital pain, myalgia, arthralgia, exanthema, haemorrhagic manifestations and/or leukopenia. RAM implemented a new surveillance system to detect cases early, provide medical assistance and collect epidemiological information to guide vector control. We calculated attack rates (ARs) using 2011 census data as denominator.

#### RESULTS:

Between 26/09-03/03/2013, when the outbreak was considered controlled by the Portuguese authorities, 2,168 cases were reported (AR 78.0/10,000). The outbreak peaked during week 43/2012, with 395 cases. Females were more affected than males (AR 86.5/10,000 and 68.6/10,000, respectively). The most affected age group was between 10-14 years old for both men (AR 196.0/10,000) and women (AR 210.0/10,000). 55 (2.5%) cases were hospitalised. No severe cases were reported. Funchal, the capital, reported the highest AR (149.3/10,000). Maps of cases by place of residence identified the areas with the higher ARs.

#### CONCLUSIONS:

Timely knowledge of localisation of areas with higher ARs guided targeted control measures for reduction of breeding sites and mosquito population in the affected areas. This first sustained dengue outbreak in the European Union calls for the development of integrated response strategies for invasive diseases transmitted by mosquitos.

PRESENTED BY: Benedetto Simone

Keywords: Infectious diseases, emerging; dengue; outbreaks; Madeira island; Europe.

ESCAIDE REFERENCE NUMBER: 20131324

## Prevalence and risk factors of Lyme borreliosis seropositivity: Results from a representative survey of adults in Germany

Hendrik Wilking <sup>(1)</sup>, Volker Fingerle <sup>(2)</sup>, Christiane Klier <sup>(2)</sup>, Michael Thamm <sup>(1)</sup>, Klaus Stark <sup>(1)</sup>

(1) Robert Koch Institute, Berlin, Germany, (2) German National Reference Centre for Borrelia, Germany

### BACKGROUND:

Lyme borreliosis (LB), the most frequent tick-borne disease in the northern hemisphere, is a multi-systemic disease caused by *Borrelia burgdorferi sensu lato* (Bb). Our objectives were to conduct a representative seroepidemiological survey among adults in Germany to assess the seroprevalence of LB in different geographical regions and to identify potential risk factors for seropositivity.

### METHODS:

Sera from a nationwide representative survey for adults (DEGS) (2008-2011) were analysed for the presence of anti-Bb IgG by ELISA and reactive sera were subjected to Western Blot analysis. Data collected by interview were used to evaluate associated factors. Statistical analyses used sampling weights and accounted for the cluster structure of the survey design.

### RESULTS:

Out of 6,945 individuals 741 (9.4%) were seropositive. Seroprevalence in men (13.0%; 95%-confidence interval (95%-CI): 11.4-14.8%) was twice as high as in women (5.8%; 95%-CI: 4.9-6.7%). Seropositivity increased from 6.0% in the 18-29-year-old to 20.0% in the 70-79 age-group. Seropositivity was linked to residence in rural areas and living in Southern Germany.

### CONCLUSIONS:

LB is endemic in whole Germany; however seropositivity is not equivalent with clinical manifestation and may not fully reflect the real disease burden. The seroprevalences in the different age-groups reflect the cumulative incidence proportion. The results in combination with previous data from children show that the force of infection is high in children and elderly which points to risks of infection in recreational behaviour, rather than working situations. A birth cohort effect may also play a role. Identified risk factors are useful for targeted campaigns. Furthermore, the knowledge on seroprevalence in the population is a basic requirement to adjust pre-test probabilities in context of clinical diagnoses.

PRESENTED BY: Hendrik Wilking

**Keywords:** Lyme Disease, *Borrelia burgdorferi*, Seroepidemiologic Studies, Cross-Sectional Studies, Tick-Borne Diseases

ESCAIDE REFERENCE NUMBER: 20131591

## Hantavirus infections in southwest Germany, 2012. A case-control study to assess disease knowledge and use of preventive measures

Ides Boone <sup>(1)(2)</sup>, Christiane Wagner-Wiening <sup>(2)</sup>, Iris Zoellner <sup>(2)</sup>, Guenter Pfaff <sup>(2)</sup>

(1) ECDC, Sweden, (2) Baden-Württemberg State Health Office, Germany

### BACKGROUND:

In 2012, the German Federal State of Baden-Wuerttemberg reported a hantavirus outbreak with 1683 cases, requiring an evaluation of the use of preventive measures. Preventive measures focus on avoiding contact with the reservoir host, the bank vole. We conducted a case-control study to assess whether the level of disease knowledge and use of preventive measures was associated with disease.

### METHODS:

Cases were residents of Baden-Wuerttemberg 18 years or older, with laboratory-confirmed hantavirus disease notified between 21-06-2012 and 21-09-2012. Because the study aimed to address the adherence to existing recommendations in the affected areas, we selected neighbourhood controls from local telephone directories. Cases and controls were interviewed by telephone using a standard questionnaire. Demographics, knowledge on hantavirus infection, exposures and use of preventive measures in the four weeks before disease onset (cases) or before interview (controls) were analysed. We calculated odds ratios (OR) and 95% confidence intervals (95%CI) by multiple logistic regression.

### RESULTS:

Of 361 cases reported, 205 were interviewed (median age 47 years, 71% male). Of 428 selected controls, 174 were interviewed (median age 56, 59% male). Cases were less likely to report knowledge on hantavirus prior to their disease (OR=0.5; 95%CI 0.3-0.8), ventilate rooms before cleaning (OR=0.4; 95%CI 0.2-0.9) or wear dust masks (OR=0.1; 95%CI 0.01-0.8). Cases were more likely to have visited unused utility rooms (OR=4.7; 95%CI 2.0-11.3).

### CONCLUSIONS:

Differences in the level of disease knowledge confirm the need to improve the communication on the disease and preventive measures. Knowledge of existing recommendations that target cleaning activities and wearing protective equipment seem to decrease the likelihood of developing hantavirus disease. To increase the evidence for recommended measures, further effectiveness studies are required.

PRESENTED BY: Ides Boone

**Keywords:** Hantavirus, Puumala virus, preventive measures, risk factors, Germany

ESCAIDE REFERENCE NUMBER: 20131729

## Active case detection to prevent re-establishment of malaria, Greece, 2012

Danai Pervanidou<sup>(1)</sup>, Maria Tseroni<sup>(2)</sup>, Marios Detsis<sup>(3)</sup>, Sotirios Tsiodras<sup>(4)</sup>, Iro Evlampidou<sup>(5)</sup>, Kostas Danis<sup>(1)(4)</sup>, Irene Terzaki<sup>(5)</sup>, Evaggelia Papanikolaou<sup>(5)</sup>, Andriani Marka<sup>(7)</sup>, Kassiani Mellou<sup>(6)</sup>, Martha Dionysopoulou<sup>(6)</sup>, Antonia Legaki<sup>(8)</sup>, Athina Kallimani<sup>(9)</sup>, Asimina Balaska<sup>(9)</sup>, Georgios Dougas<sup>(1)</sup>, Anita Vakali<sup>(9)</sup>, Chysovalantou Kefaloudi<sup>(9)</sup>, Apostolos Veizis<sup>(9)</sup>, Evdokia Vassalou<sup>(2)</sup>, Athanasios Tsakris<sup>(9)</sup>, Nikolaos Vakalis<sup>(10)</sup>, Theano Georgakopoulou<sup>(9)</sup>, Christos Hadjichristodoulou<sup>(11)</sup>, Jenny Kremastinou<sup>(9)</sup>

(1) Hellenic Centre for Disease Control and Prevention, Greece, (2) National Hellenic Nurses Association, Greece, (3) Field Epidemiology Services, Public Health England, (4) ECDC, Sweden, (5) Medical Faculty, University of Thessaly, Greece, (6) General Hospital of Sparta, (7) General Hospital of Molaoi, (9) Médecins Sans Frontières (MSF), Greece, (10) National School of Public Health, (11) School of Medicine, University of Thessaly

### BACKGROUND:

Greece has been malaria-free since 1974. In 2011, *P. vivax* malaria re-emerged with 42 locally-acquired cases, 36(86%) of whom in Evrotas, Lakonia, an agricultural area with many migrants from malaria-endemic countries. In 2012, we actively searched for cases to ensure early diagnosis and treatment. We evaluated this practice in terms of reduction of locally-acquired cases and timeliness of diagnosis.

### METHODS:

We interviewed all reported cases in Greece regarding their travel history to identify locally-acquired cases. In areas with at least one locally-acquired case, we a) tested for malaria all immigrants using Rapid Diagnostic Tests and microscopy and b) screened all residents for fever, weekly for one month. Additionally, in Evrotas, we visited all houses of immigrants, twice per month, and tested for malaria those with fever. We compared the number of locally-acquired cases in 2011 and 2012 all over Greece and in Evrotas. We evaluated timeliness of diagnosis before and after the implementation of active-case-detection (ACD) in Evrotas by estimating the time between onset of symptoms and diagnosis.

### RESULTS:

In 2012, 20 *P.vivax* locally-acquired cases were recorded in Greece (52% decrease compared with 2011). ACD identified 25 (27%) cases; 22 imported and 3 locally-acquired. In 2012 in Evrotas, 10 locally-acquired cases (72% decrease compared with 2011) and 17 imported were recorded; ACD identified 18 (67%) cases. The median delay between onset and diagnosis in Evrotas was three (range 0-15) days, down from six (range 2-17) in 2011.

### CONCLUSIONS:

ACD in Evrotas improved timeliness of diagnosis and may have contributed to a decrease in the number of locally-acquired cases. We recommend continuing ACD in all areas reporting locally-acquired cases to prevent re-establishment of transmission in Greece.

PRESENTED BY: Danai Pervanidou

Keywords: *Plasmodium vivax*, malaria, Greece, active-case-detection  
ESCAIDE REFERENCE NUMBER: 20131741

## Parallel Sessions 10 – 12 14.50 – 16.30 Wed 6

### Parallel Session 10 – International health

## Survival probability and predictors of mortality among patients enrolled for first-line antiretroviral therapy (ART), Andhra Pradesh, India, 2008-2011

Ramesh Allam<sup>(1)</sup>, Manoj Murhekar<sup>(2)</sup>, Tarun Bhatnagar<sup>(2)</sup>, Chengappa Kechamada<sup>(2)</sup>

(1) SHARE India, India, (2) National Institute of Epidemiology, India,

### BACKGROUND:

The national ART initiative in India began in 2004 and to date nearly 450,000 people living with HIV (PLHIV) are on ART. We estimated the mean cumulative survival probability and identified the predictors of mortality among patients initiated on first-line ART through the national program in Andhra Pradesh.

### METHODS:

We identified the cohort of PLHIV aged  $\geq 15$  years, initiated on ART during 1st January-31st December 2008 at two ART centres in Hyderabad. The cohort was followed-up retrospectively until death or through the end of study on 31st December 2011. Death from any cause during the study period was considered to be the result of HIV-infection. We used Kaplan-Meier method to estimate survival probability and Cox proportional hazard model to identify predictors of mortality.

### RESULTS:

Of the 1,690 PLHIV initiated on ART, 259 (15.3%) were transferred out and hence excluded from the analysis. Median time of survival was 55 months (Inter Quartile Range: 10-43 months). Mortality rate was 7.6 per 100 person years. Of the 275 deaths, 176 (64%) occurred during the first six months of therapy. Males were more likely to die [Adjusted Hazard Ratio (AHR): 1.61, 95% Confidence Interval (95%CI): 1.27-2.04]. Patients with history of tuberculosis before initiation of ART (AHR-2.46, 95%CI-1.2-4.6), baseline CD4 count  $< 200$  cells/ mm<sup>3</sup> (AHR-3.51, 95%CI-2.44-5.06) and baseline weight  $< 48$  kg (AHR-2.28, 95%CI-1.73-3.00) were associated with early mortality.

### CONCLUSIONS:

Delay in initiation of ART among HIV and HIV-TB co-infected patients was an important predictor of mortality. We recommended program managers to 1) follow the new ART guidelines and initiate ART at CD4 counts  $< 350$  cells/mm<sup>3</sup> compared to  $< 200$  cells/ mm<sup>3</sup> ii) initiate ART irrespective of CD4 count to prevent early death in HIV-TB co-infected patients.

PRESENTED BY: Ramesh Allam

Keywords: Survival probability, First line ART, Mortality, HIV  
ESCAIDE REFERENCE NUMBER: 20131258

## Food-poisoning outbreak and fatality following ingestion of sea-turtle meat in the rural community of Ndrondroni, Mohéli Island, Comoros, December 2013

Saindou Ben Ali Mbaé<sup>(1)</sup>, Mohamed Mlindassé<sup>(1)</sup>, Saindou Mihidjae<sup>(1)</sup>, Thomas Seyler<sup>(2)</sup>

(1) Ministry of Health, Comoros, (2) Indian Ocean Commission, UVS-SEGA, FETP Coordinator, Mauritius

### BACKGROUND:

On 24 December 2012 a newspaper reported cases of food-poisoning in the coastal village of Ndrondroni, Mohéli Island, Comoros. We conducted an investigation to confirm the outbreak, identify the source, the vehicle and implement control measures.

### METHODS:

Door-to-door case finding was done in the affected area of Ndrondroni. A case was defined as a person from Ndrondroni who presented at least two symptoms compatible with food-poisoning between 19 December 2012 and 1 January 2013. We conducted a case-control study. We randomly selected two symptom-free individuals (controls) in each household from the affected area. We administered questionnaires to collect demographic information, symptoms, food and water consumption and environmental exposures. We calculated ORs and interviewed employees from the nearby marine protected area.

### RESULTS:

We identified 8 cases. A 6-month old baby died, two people were hospitalised. All age groups were affected. The attack rate in the affected area was 6.4%. Symptoms included itching (5), abdominal pain (3), vomiting (3), rash (2) and dysphagia (1). The incubation ranged from 0 to 5 days. We included eight cases and thirty controls. Consumption of turtle meat was more frequent among cases than controls (OR=19.5, 95%CI [2.2-233.5]). There was a dose-response effect. The deceased baby did not consume turtle meat but was breastfed by his mother who did. Marine biologists identified the remains of a sea turtle *Eretmochelys imbricata* (protected species) on the beach.

### CONCLUSIONS:

Our results suggest that ingestion of *Eretmochelys imbricata* meat caused the outbreak. Documented outbreaks from Micronesia suggest that a bio-toxin ingested by the turtle is the source. We informed the population on the danger of consuming turtle meat (even for breastfeeding babies) and that cooking does not destroy the toxin.

PRESENTED BY: Saindou Ben Ali Mbaé

Keywords: Outbreak &ndash, Comoros &ndash, sea turtle meat – fatality

ESCAIDE REFERENCE NUMBER: 20131723

## Misdiagnosis of human brucellosis in Kenya

William Anson de Glanville<sup>(1)</sup>, John Mwaniki<sup>(2)</sup>, Elizabeth Anne Cook<sup>(1)(3)</sup>, Mark Bronsvort<sup>(4)</sup>, Sam Kariuki<sup>(5)</sup>, Ignacio Moriyon<sup>(6)</sup>, Eric Fèvre<sup>(3)(7)</sup>

(1) University of Edinburgh, UK (2) Institute for Bacterial Infections and Zoonoses, Friedrich Loeffler Institute, Germany, (3) International Livestock Research Institute, Kenya, (4) Epidemiology, Economics and Risk Assessment Group, The Roslin Institute, University of Edinburgh, United Kingdom, (5) Centre for Microbiology Research, Kenya Medical Research Institute, Nairobi, Kenya, (6) Departamento de Microbiología y Parasitología, Facultad de Medicina, Universidad de Navarra, Spain, (7) Institute of Infection and Global Health, University of Liverpool, UK

### BACKGROUND:

We conducted a large-scale community survey for brucellosis in a mixed-farming area of western Kenya. This study revealed a very low seroprevalence in people (0.4% (95% CI 0.2-0.8)), as well as in cattle (0.3% (95% CI 0.06-0.8)) and small ruminants (0% (95% CI 0-1.0)). Despite this, health facilities within our study area regularly report detecting brucellosis cases. To investigate this discrepancy, we performed hospital-based surveillance to determine the true frequency and likely source of infection of brucellosis cases.

### METHODS:

Surveillance was performed in outpatient clinics at two hospitals. Patients with brucellosis-like illness meeting inclusion criteria were recruited by hospital clinicians and tested using a Brucella Agglutination Test (BAT), the standard assay in public hospitals in Kenya. To investigate the performance of this assay, we also screened samples using a Rose Bengal Test (RBT) and individuals reactive on BAT (or RBT) were confirmed using a rapid immunochromatographic assay (RIA). A structured questionnaire was used to record clinical history from all participants and identify high risk exposures during a defined exposure period.

### RESULTS:

Of the recruited individuals (n=918), 19.7% (95% CI 17.0-22.6) were reactive on BAT. In contrast, only 0.7% (95% CI 0.2-1.7) were positive using RBT. Moreover, only 5.5% (95% CI 1.8-12.4) of reactive BAT results were confirmed as positive using the RIA. Further confirmatory testing for brucellosis using ELISA and PCR is currently underway.

### CONCLUSIONS:

The result from a single BAT is often used to confirm the diagnosis of brucellosis in public hospitals in Kenya, and throughout much of sub-Saharan Africa. Initial results from this study suggest such diagnoses can be very unreliable, potentially contributing to over-diagnosis and inappropriate treatment in areas where brucellosis is not endemic.

PRESENTED BY: William Anson de Glanville

Keywords: Brucellosis Predictive Value of Tests Neglected Diseases Zoonoses Serology

ESCAIDE REFERENCE NUMBER: 20131815

## High levels of crude mortality rate in Carnot city, Central African Republic, January-July 2012

Nelly Fournet<sup>(1)</sup>, André Munger<sup>(2)</sup>, Chantal Gamba<sup>(2)</sup>, Sandra Cohuet<sup>(3)</sup>

(1) National Institute for Public Health and the Environment (RIVM), The Netherlands, (2) Médecins Sans Frontières, France, (3) Epicentre, France

### BACKGROUND:

In Carnot city (Central African Republic), from January to July 2011, Epicentre estimated that Crude Mortality Rate (CMR) and Specific Mortality Rate among children <5 years old (U5MR) were three times higher than the SPHERE emergency thresholds (1 and 2 deaths/day/10.000 inhabitants). In January 2012, Médecins Sans Frontières (MSF) initiated health care activities. In July 2012, we conducted a retrospective mortality survey to evaluate the impact of this programme.

### METHODS:

We selected a two-stage cluster sample to estimate CMR and U5MR between January and July 2012. We interviewed heads of households using a questionnaire to obtain information on deaths and causes of deaths (verbal autopsy). We analysed survival to obtain overall and seasonal estimates.

### RESULTS:

We included 32 clusters in 23 neighbourhoods for a sample of 8,857 persons in 1,526 households (0.92 Male/Female). Twenty-one per cent were children <5 years old and 46% <15 years old. Household heads reported 322 deaths, including 116 deaths (36%) among children <5 years (CMR: 1.8 deaths/day/10.000 inhabitants, 95% confidence interval (CI): 1.4-2.3); U5MR: 3.0/day/10.000, 95%CI: 2.0-4.4). U5MR was 3.1 (95%CI: 2.2-4.4) before the rainy season (January-April) and 2.9 (95%CI: 1.9-4.5) in May-July. The main reported causes of deaths were HIV among adults >15 years (n=55, 30%) and malaria among children <5 years (n=40, 35%).

### CONCLUSIONS:

In Carnot city, CMR and U5MR dropped by half compared to 2011 and U5MR were similar before and during the rainy season, suggesting a positive impact of the MSF programme. However, these indicators still exceed emergency thresholds, pointing out the need to improve access to health care centres with a focus on HIV and malaria prevention and management.

PRESENTED BY: Nelly Fournet

**Keywords:** Mortality, death rate, Central African Republic, cause of death

ESCAIDE REFERENCE NUMBER: 20131477

## Factors associated with vaccine wastage at facility level in Akwa Ibom State, Nigeria, between 2010-2011

William Nwachukwu<sup>(1)</sup>, Gabriele Poggensee<sup>(1)</sup>, Margaret Aghaji<sup>(2)</sup>

(1) Nigeria Field Epidemiology and Laboratory Training Programme, Nigeria, (2) Dept. of Community Medicine, University of Nigeria Teaching Hospital Enugu, Nigeria

### BACKGROUND:

Vaccine wastage (VW) is the proportion of vaccine supplied but not administered to children. Vaccines are procured with an expected level of VW during immunization sessions. However, this should be balanced with optimal wastage, safety and timely use. World Health Organization estimated that more than half of all vaccines produced are wasted each year. There is problem of securing adequate quality and quantity of vaccines, lack of knowledge and poor documentation of VW among healthcare-workers. The study aimed to determine factors associated with VW at healthcare-facility level.

### METHODS:

The study design was a descriptive cross-sectional. Cluster-sampling method using probability proportional to population size was used, the sampling unit was healthcare facility. Altogether 40 facilities with 80 respondents were selected. Data were extracted from registers using data sheets, and questionnaires were administered. Vaccine wastage rates (VWR) were calculate, VWR  $\geq$  15% was considered high.

### RESULTS:

Mean VWR for the different vaccine were as follows: BCG: 17.8%, Oral Polio Vaccine: 11.8%, Diphtheria, pertusis, tetanus toxoid vaccine: 11.8%, measles vaccine: 16.6%, yellow fever vaccine: 16.4%, hepatitis B vaccine: 13.6%. Lyophilized and injectable vaccines had higher VWR (58.8% versus 37.2%;  $p=0.012$ ). In 47% of health facilities the documentation was complete. Factors affecting VW included: breakage (OR=4.33; 95%CI: 1.27-14.78), vaccinating children above age of 24-months (OR=7.36; 95%CI: 2.20-24.60), vaccinators malpractices (OR=4.06; 95%CI: 1.57-10.51), and poor labelling of returned vials (OR=3.22; 95%CI=1.27-8.19). Ameliorating measures included: community-mobilization (67.5%; 95%CI: 56.1-77.6), implementing multi-dose-vial-policy (61.3%; 95%CI: 49.7-71.0), good injection practices (33.3%; 95%CI: 23.6-45.2).

### CONCLUSIONS:

Lyophilized vaccines, poor documentation, breakages, vaccinating older-children, and malpractices cause VW. Good reconstitution practices of lyophilized vaccines, training of healthcare workers, proper documentation, and effective community-mobilization will reduce VW.

PRESENTED BY: William Nwachukwu

**Keywords:** Vaccine preventable disease, vaccine wastage, Nigeria

ESCAIDE REFERENCE NUMBER: 20131619



## Parallel Session 11 – TB and other respiratory diseases (excluding influenza)

### Practices and challenges in investigation of Tuberculosis in prisons: a case study in South West England

Iro Evlampidou<sup>(1)</sup>, Maya Gobin<sup>(1)</sup>, Isabel Oliver<sup>(1)</sup>

(1) Public Health England, United Kingdom

#### BACKGROUND:

In England, TB contact screening in prisons requires multiple collaborations and can often be complex and prolonged. We followed the investigation of a large cluster and report the challenges of contact screening in prison settings.

#### METHODS:

In 2013, we reviewed a Variable Number Tandem Repeat (VNTR) cluster of 12 cases with links to prisons in South West England that dated back from 2004. We collected information on prison history, contact type, investigation time and screening outcomes using Public Health England case management tool (HPZone) and outbreak control team documents. We calculated proportions of screened and positive contacts and relative risks (RR) among different contact groups.

#### RESULTS:

Ten of 12(83%) cases had a direct prison link (eight inmates, two staff); 7/12(58%) had missing data on incarceration history and/or contact screening. Ten of 12 investigations were complete and involved 21 prisons, mostly because of prisoners' movement. The investigation time ranged from 7.7-22.7 (median:13.6) months. Of 347 contacts identified (range:1-124/case), 196(56%) were screened and 21(11%) were positive; 75% of identified contacts were prison contacts. Compared with social contacts, prison contacts were less likely to have been screened (53% versus 66%, RR:0.88, CI95%:0.78-0.99) and to be positive (6% versus 22%, RR:0.51, CI95%:0.30-0.89). No standard tools were used to identify eligible contacts.

#### CONCLUSIONS:

Lack of quality data, incomplete / delayed provision of contact information, high number of contacts and movement of inmates / staff affected timeliness and completeness of screening, resulting in poor offer and uptake of screening and posing risks on further transmission. Improved collaboration between stakeholders, training of prison staff and standardised tools are needed for timely and effective investigation and control of TB outbreaks in prisons.

PRESENTED BY: Iro Evlampidou

**Keywords:** Tuberculosis, prisons, contact tracing, screening

ESCAIDE REFERENCE NUMBER: 20131530

### Cluster analysis of tuberculosis cases in Finland 2008-2011

Pieter Smit<sup>(1)</sup>, Outi Lyytikäinen<sup>(1)</sup>, Marjo Haanperä-Heikkinen<sup>(1)</sup>, Nalin Rastogi<sup>(2)</sup>, Petri Ruutu<sup>(1)</sup>, Hanna Soini<sup>(1)</sup>

(1) National Institute for Health and Welfare, Finland, (2) Institute Pasteur de Guadeloupe, Abymes Cedex, Guadeloupe, France

#### BACKGROUND:

A majority of tuberculosis (TB) cases in industrialized countries with low TB incidence are linked to immigration. In Finland, most cases are still Finnish born but the number of foreign cases is steadily increasing over time. We performed a cluster analysis and comparison of clinical manifestations of the TB patients in Finland in a 4-year population based study.

#### METHODS:

During 2008-2011, 1397 TB cases were reported to the national infectious disease registry by clinicians and laboratories. Mycobacterium tuberculosis isolates obtained from new TB patients were characterized by spoligo- and MIRU-VNTR typing. Two or more isolates with the same genotype were defined as a cluster.

#### RESULTS:

In total, 1021 M. tuberculosis isolates were obtained of which 733 (72%) were from persons born in Finland. Seventy-nine clusters covering 274 isolates (26%) were identified of which 10 clusters were shared by both Finnish and foreign born patients. The isolates from young Finns compared to elderly ( $\geq 65$  years old) were significantly more likely to be clustered (55% vs 25%,  $p < .001$ ). Young Finns were more likely to have pulmonary TB (87% vs 71%,  $p < .001$ ) and were more likely to be smear positive (57% vs 48%  $p < .05$ , 49% foreigners).

#### CONCLUSIONS:

The majority of TB isolates originated from patients born in Finland, which is rare for a low-incidence country. Transmission rarely occurs between Finnish and foreign born patients because only 13% of clusters were shared by the two populations. The predominance of pulmonary TB, positive smear test and higher rate of clustering among young Finnish born TB cases suggests that they are more likely to transmit TB than elderly Finns. This finding should be taken into consideration when performing contact tracing investigations.

PRESENTED BY: Pieter Smit

**Keywords:** Tuberculosis cluster analysis population surveillance

ESCAIDE REFERENCE NUMBER: 20131601

## Transmission rates of tuberculosis to children and infants during nosocomial versus school outbreaks: a systematic literature review

Monica Sañé Schepisi <sup>(1)</sup>, Enrico Girardi <sup>(1)</sup>

(1) Italian National Institute for Infectious Diseases, IRCCS L. Spallanzani

### BACKGROUND:

We investigated the extent of transmission of infectious pulmonary tuberculosis to infants or children up to 5 years of age by systematically reviewing primary studies on TB incidents reported in nosocomial or school settings.

### METHODS:

We systematically searched PubMed-MEDLINE, EMBASE and Web of Knowledge databases from 01/01/2000 up to 01/07/2013. The total number of cases of latent infection and active disease among those screened was calculated for each incident. Sub group analysis was undertaken by the type of index case and the setting in which exposure occurred. Non parametric tests (Mann-Whitney U test or Kruskal-Wallis one-way analysis) were used as appropriate.

### RESULTS:

We included 34 studies describing 21 TB incidents in nosocomial settings and 13 in school/childcare settings, which exposed 6,897 children (85.3% in hospitals and 14.7% in schools). The proportion of active TB cases among those who completed screening varied markedly depending on the setting: 0.09% (4/4,376 in hospitals/out-patients' clinics vs 13.4% (134/999) in school/childcare settings ( $p < 0.001$ ). Similarly, the median rate of active TB cases over the total of infected cases varied significantly: 0.0%, maximum value 0.8% in hospitals vs 52.0% (IQR: 17.8%-73.3%) in schools ( $p < 0.001$ ). Index cases of 21 nosocomial incidents generated more secondary cases if they were mothers of the exposed children/infants (2,63%, 3/114) compared to health care workers (0.03%, 1/3,918). None of 344 infants exposed to 7 infected infants developed active TB ( $p < 0.05$ ).

### CONCLUSIONS:

Infants and children were at higher risk of developing TB when exposure occurred in school compared to hospital settings. These results highlight the need for implementing contact investigations and establishing systems for prompt referral and treatment of contacts in school settings.

PRESENTED BY: Monica Sañé Schepisi

Keywords: Tuberculosis outbreaks nosocomial school children

ESCAIDE REFERENCE NUMBER: 20131826

## Influences on tuberculosis treatment success in the elderly in Germany

Ute Rexroth <sup>(1)</sup>, Lena Fiebig <sup>(1)</sup>, Bonita Brodhun <sup>(1)</sup>, Walter Haas <sup>(1)</sup>, Barbara Hauer <sup>(1)</sup>

(1) Robert Koch Institute, Germany

### BACKGROUND:

Germany's highest tuberculosis (TB) incidence and poorest treatment success are found in elderly patients. We compared clinical and demographic characteristics between elderly and younger adult TB patients and investigated factors associated with treatment outcome in order to identify challenges for treatment success.

### METHODS:

Based on German notification data 2002-2010, we compared elderly (60+ years) with younger adult (15-59 years) TB patients regarding sex, origin, multidrug resistance (MDR-TB), site of disease and mode of identification (contact tracing versus all other modes). To assess the association of these factors with treatment success (cured or treatment completed; excluding postmortem diagnosis, death of other causes, missing information) we used multivariable logistic regression within the subpopulation of elderly.

### RESULTS:

The age-specific TB incidence in elderly (median age 73 years) was 9.7/100,000: 1.4 times higher than the TB incidence in younger adults (6.9/100,000; median age 39 years). Among 49,211 adult TB-patients, elderly (N=18,025) were less often affected by MDR-TB (0.6% versus 3%,  $p < 0.001$ ), pulmonary-TB (76% versus 79%,  $p < 0.001$ ), born abroad (28% versus 58%,  $p < 0.001$ ), identified via contact tracing (1% versus 6%,  $p < 0.001$ ) and successfully treated (84% versus 91%,  $p < 0.001$ ). Among elderly patients treatment success was less likely in MDR-TB (aOR:0.23; 95%CI:0.13-0.41), pulmonary-TB (aOR:0.65; 95%CI:0.56-0.77), male (aOR:0.84; 95%CI:0.74-0.96), German-born patients (aOR:0.83; 95%CI:0.72-0.96) and decreased with increasing age (per year aOR:0.95; 95%CI:0.95-0.96). Treatment success was more likely in elderly patients diagnosed via contact tracing (aOR:1.90; 95%CI:0.94-3.40).

### CONCLUSIONS:

Among German TB patients elderly differ from younger adults regarding clinical and demographic characteristics. In the elderly, age, sex, origin, MDR-status and site of disease all independently influence TB-treatment outcome. In geriatric healthcare facilities an increased awareness and early diagnostics of TB is needed to improve treatment success.

PRESENTED BY: Ute Rexroth

Keywords: Tuberculosis, Treatment outcome, aged, adults, epidemiology

ESCAIDE REFERENCE NUMBER: 20131515

## Migration of people with tuberculosis infection within the European Union (EU) and European Economic Area (EEA), 2007-2011

Vahur Hollo <sup>(1)</sup>, Csaba Ködmön <sup>(1)</sup>, Phillip Zucs <sup>(1)</sup>

(1) ECDC, Sweden

### BACKGROUND:

Undetected large-scale migration of people with tuberculosis (TB) infection from high-prevalence countries can jeopardise TB elimination in low-prevalence countries. Little is known about the size and direction of such migration within Europe. The aim of this study was therefore to quantify this problem and identify potential hot spots in terms of countries exporting and importing TB, respectively.

### METHODS:

We analysed TB routine surveillance data collected in 27 EU and 2 EEA Member States from 2007 to 2011. We used place of birth abroad or foreign citizenship as a proxy for probable importation and described these cases by presumable exporting and importing country.

### RESULTS:

Of 394 869 TB cases notified from 2007 to 2011, 93 478 (24%) were known to be of foreign origin. Of the latter, 8 208 (9%) were known to have been born in or to be citizens of other EU/EEA countries. The countries presumably affected the most by importation of TB were Italy and Germany where 2 597 and 1 581 cases were from other Member States, accounting for 12 and 7% of all cases registered in these countries. Of all TB cases reported in one EU/EEA country but originating from another, the largest proportions, 4 199 (51%) and 1 046 cases (13%), were from Romania and Poland, respectively.

### CONCLUSIONS:

Although only 2% of TB cases notified in the EU/EEA originated from other EU/EEA countries, the uneven distribution of such presumable importation may well pose a challenge to TB programmes in individual Member States. At the same time, the overrepresentation of certain countries of origin may facilitate targeting TB prevention and control efforts, possibly involving support from countries importing TB.

PRESENTED BY: Vahur Hollo

**Keywords:** Tuberculosis, European Union, surveillance, migration, foreign origin

ESCAIDE REFERENCE NUMBER: 20131507

## Parallel Session 12 – Public Health microbiology and molecular epidemiology

### Impact of the London 2012 Olympic and Paralympic Games on demand for Microbiology Services

Kerry Williams <sup>(1)</sup>, Chantil Sinclair <sup>(1)</sup>, Ross McEwan <sup>(1)</sup>, Katie Fleet <sup>(1)(2)</sup>, Sooria Balasegaram <sup>(1)</sup>, Rohini Manuel <sup>(1)</sup>

(1) Public Health England, United Kingdom (2) North East and North Central London Health Protection Team

### BACKGROUND:

The regional Public Health Laboratory London (PHLL) is hosted within the Royal London Hospital Division of Infection Laboratory in East London. Planning assumptions for the 2012 Olympic and Paralympic Games were based on the requirement to meet increased demand with scalable capacity for response to infectious disease outbreaks. This study assessed the impact on demand for microbiology services during the Games period (July-September 2012).

### METHODS:

The weekly number of stool specimens received in the laboratory was used as a measure of demand. Data was collected for 2010-2012 and retrospective cross-sectional time series data analysis was used to ascertain whether there was an increase in the number of stool specimens received and/or the proportion of positive results during the Games period. Clinical reports of gastrointestinal outbreaks to the London Health Protection Units (HPUs) were also analysed.

### RESULTS:

There was no significant increase in the number of specimens received during the Games period. The odds of having a positive culture result was lower during the Games period (OR=0.53, p=0.005, 95%CI=0.40-0.71) while the odds of having a positive OCP result was higher (OR=3.19, p=0.001, 95%CI 1.58-6.43). There was no increase in the number of gastrointestinal outbreaks reported to the HPUs during the Games period.

### CONCLUSIONS:

The lack of increase in specimens suggests that the 2012 Games had no impact on demand for microbiology services at the laboratory despite its regional public health role and close proximity to the Olympic Park. The decrease in culture positivity may suggest a decrease in the incidence of gastrointestinal illness during the Games period. This study will inform public health microbiology preparedness for future Games or similar events.

PRESENTED BY: Sooria Balasegaram

**Keywords:** Microbiology Public Health Olympic Games

ESCAIDE REFERENCE NUMBER: 20131705

## Importance of bioinformatics to public health: a novel tool for early warning of upsurges in invasive GAS disease in the UK

Baharak Afshar,<sup>(1)</sup> Ali Al-Shahib<sup>(2)</sup>, Anthony Underwood<sup>(2)</sup>, Claire Turner<sup>(3)</sup>, Shiranee Sriskandan<sup>(3)</sup>, Matthew Holden<sup>(4)</sup>, Julian Parkhill<sup>(4)</sup>, Androulla Efstratiou<sup>(2)</sup>

(1) Health Protection Agency, United Kingdom (2) Public Health England, United Kingdom, (3) Imperial College London, United Kingdom, (4) Wellcome Trust Sanger Institute, United Kingdom

### BACKGROUND:

In December 2008, an unusual increase in invasive GAS infections caused by emm/M3 type strains was observed in England which led to a national alert. Whole genome sequencing was used to determine the factors behind this upsurge. Using comparative genomics we examined the phylogenetic characteristics, diversity and 'evolutionary drift' of emm/M3 from invasive and superficial disease.

### METHODS:

A total of 295 GAS emm/M3 strains from 2001-2011 (182 invasive & 113 non-invasive) were examined using multiplexed paired end Illumina sequencing at the Sanger Institute. Sequence reads from all strains were mapped onto an emm/M3 reference genome using the BWA mapping software. Single Nucleotide Polymorphisms (SNPs) were identified between genomes and SNP phylogenetic trees were constructed using FastTree and viewed using Dendroscope. The reads were assembled de novo using VELVET software and from the resulting contigs the MLST type of each strain was determined in silico

### RESULTS:

emm/M3 strains were differentiated into three sequence types (STs): ST15 (38%), ST315 (49%) or ST406 (13%). Examination of the accessory genome identified a novel phage-containing clade of strains (54/295); all of which were ST15 strains from the upsurge period. This novel phage (speC phage) consists of 63 genes, two of which are the exotoxin gene speC and DNAase gene spd1.

### CONCLUSIONS:

Using whole genome sequencing, we identified a novel phage-containing clade of GAS emm/M3 strains associated with the unusual upsurge in invasive GAS infections. We hypothesise that phage-encoded proteins contributed to this emergence either through biological activity or through reduced population immunity. Prompt genomic analysis and development of a curated database of GAS isolates emerging in the UK population could translate into improved advanced public health warning systems for newly emergent invasive strains.

PRESENTED BY: Baharak Afshar

**Keywords:** Invasive GAS infections, whole genome sequencing, comparative genomics, phage

ESCAIDE REFERENCE NUMBER: 20131797

## Genomic epidemiology of Legionella pneumophila outbreaks in Alcoy (Spain), 1999-2010

Leonor Sanchez-Buso<sup>(1)</sup>, Iñaki Comas<sup>(1)</sup>, Fernando Gonzalez-Candelas<sup>(1)</sup>

(1) University of Valencia, Spain

### BACKGROUND:

Legionella pneumophila is a strictly environmental opportunistic pathogen with high incidence of recurrent outbreaks in the Comunidad Valenciana, South-East of Spain. In the city of Alcoy, 18 legionellosis outbreaks have been declared by public health authorities in the 1999-2010 period, with 343 cases. These outbreaks were studied by traditional and molecular epidemiology methods, searching for the source of the strain causing the clinical cases. Now, we have used whole-genome sequencing to fully characterize the strains causing legionellosis outbreaks in this area and estimate their evolutionary and demographic dynamics in this area.

### METHODS:

We analyzed retrospectively 69 clinical and environmental L. pneumophila strains from 13 different outbreaks occurred in Alcoy between 1999 and 2010. Most isolates corresponded to sequence type ST578 (n=48), mostly from clinical samples, and ST1 (n=10), a world-wide distributed strain. We performed whole-genome sequencing using the SOLiD 5500XL platform, producing single-end 75 bp reads with a mean coverage of 90X.

### RESULTS:

Whole-genome sequencing revealed two sublineages within ST578 that diverged more than 20 years ago in this area. Despite the control and cleaning measures taken by public health authorities, this ST shows a demographic expansion over time with an inflexion point during three years in which no legionellosis outbreaks were detected in this area. We also found a tight clustering of samples by ST at the genome level, regardless their clinical or environmental origin.

### CONCLUSIONS:

Results from this study lead to a change in the current view of legionellosis outbreaks. The identification of the source can be misleading when traditional typing tools mask the evolution and demographic changes undergone by L. pneumophila strains colonizing an area

PRESENTED BY: Ernando Gonzalez-Candelas

**Keywords:** Whole-genome sequence, genomic epidemiology, Legionnaire's disease, phylodynamics

ESCAIDE REFERENCE NUMBER: 20131449

## SPA types, drug resistance patterns and persistence of nasal *Staphylococcus aureus* strains in a non-hospitalized population: A six-month prospective study in Braunschweig, Germany 2012/13

Jaishri Mehrj<sup>(1)</sup>, Manas Akmatov<sup>(1)</sup>, Claudia Sievers<sup>(1)</sup>, Julia Strömpl<sup>(1)</sup>, Anja Gatzemeier<sup>(1)</sup>, Franziska Layer<sup>(2)</sup>, Guido Werner<sup>(2)</sup>, Dietmar H Pieper<sup>(1)</sup>, Eva Medina<sup>(1)</sup>, Wolfgang Witte<sup>(2)</sup>, Frank Pessler<sup>(1)</sup>, Gérard Krause<sup>(1)</sup>

(1) Helmholtz-Zentrum für Infektionsforschung, Germany (2) Robert Koch Institute, Germany

### BACKGROUND:

Persistent *Staphylococcus aureus* nasal carriage plays a crucial role as a source for invasive infections. Here, we examined the frequency and risk factors of persistent *S. aureus* nasal carriage in the non-hospitalized general population of Braunschweig Germany. We also determined spa type and drug resistance patterns of selected isolates.

### METHODS:

A total number of 2026 potential participants randomly selected through the resident's registration office. Participants were requested to send a self-collected nasal swab each month for a period of six months. Persistent carriage was defined as at least six positive swab cultures and non carriage as all swab cultures being negative. Up to three isolates from each carrier were selected for molecular typing. Risk factors were determined through logistic regression.

### RESULTS:

Among 405 agreed participants, 360 (89%) provided complete data. Median age was 50 years (IQR; 41-61) and 61% were females. *S. aureus* point prevalence varied between 74 (19%) and 100 (26%). From the total participants 45 (13%) were persistent carriers and 105 (29%) were transient carriers. In multivariable analysis, male sex (OR=4.6, 95% CI: 2.17-9.76), presence of allergies (OR=3.8, 95% CI: 1.77-8.18) and antibiotic intake (OR=2.8, 95% CI: 1.03-7.41) were associated with persistent *S. aureus* nasal carriage. A total of 17 MRSA were detected from 610 isolated *S. aureus*. MRSA belonged to hospital associated spa types to32 and to25 and were multidrug resistant whereas the MSSA spa types varied greatly.

### CONCLUSIONS:

Our study is among the first to give insight in the *S. aureus* prevalence and persistence in non-hospitalized population of Germany. The data provided here will enhance awareness about MRSA spread in the community in Germany and will be helpful to make public health recommendations.

PRESENTED BY: Jaishri Mehrj

**Keywords:** *Staphylococcus aureus*, MRSA, General population, Epidemiology

ESCAIDE REFERENCE NUMBER: 20131807

## Parallel Sessions 13 – 15 16.50 – 18.30 Wed 6

### Parallel Session 13 – Vaccine coverage

## HPV vaccination coverage among girls 12-15 years of age in Germany: a retrospective cohort study using health insurance claims data

Thorsten Rieck<sup>(1)</sup>, Marcel Feig<sup>(1)</sup>, Ole Wichmann<sup>(1)</sup>

(1) Robert Koch Institute, Germany

### BACKGROUND:

In Germany, 3-dose human papillomavirus (HPV) vaccination is recommended for 12-17 year-old females. A nationwide surveillance of HPV vaccination coverage (HPV-VC) does not exist. The routine health check-up 'J1' (offered to all 12-14 year-old children) might provide easy access to this age-group. Our objectives were to analyse health insurance claims data of 12-15 year-old females to estimate HPV-VC and to assess the impact of J1 on HPV vaccine uptake.

### METHODS:

We sampled a subset of females aged 12-15 years in 2011 from anonymized health insurance claims data of 15 out of the 16 federal states. Sampling was based on documented physician contacts flanking the follow-up period 2008–2011. We reconstructed age and federal state stratified histories of individual-level HPV vaccination and J1 use.

### RESULTS:

The sample represented 58% (n=823,259) of the target-population. Estimates among 12/13/14/15-year-olds: ≥1-dose HPV-VC: 6/17/28/39% (mean 22%; West-Germany 21%, East-Germany 31%), 3-dose HPV-VC: 1/6/14/24% (mean 11%; West-Germany 10%, East-Germany 17%), J1 coverage: 8/31/46/48% (mean 33%; West-Germany 34%, East-Germany 31%). In the sub-group of J1-attendees, 35% had received HPV vaccinations, translating into a significant association of J1 and HPV vaccine utilization (12/13/14/15-year-olds: RR[West-Germany]=7.5/3.2/2.0/1.6; RR[East-Germany]=4.8/2.3/1.6/1.4).

### CONCLUSIONS:

HPV-VC is low, increases by age-group, and is higher in East-Germany than West-Germany. Attendees of health check-up J1 have an up to 7.5-fold higher chance to receive HPV vaccinations being lower in East-Germany and decreasing by age-group. However, J1 coverage is only moderate. In addition, 65% of all J1-attendees had not received any HPV vaccination representing a substantial proportion of missed opportunities to vaccinate. The benefit of J1 on HPV vaccine uptake needs to be further exploited. In addition to J1, continuous effort is needed to promote HPV vaccination in the target-group.

PRESENTED BY: Thorsten Rieck

**Keywords:** Vaccination coverage, surveillance, health services research, papillomavirus vaccines

ESCAIDE REFERENCE NUMBER: 20131734

## Seasonal influenza vaccine effectiveness against influenza hospitalizations in Lithuania: A reason to vaccinate

Giedre Gefenaite<sup>(1)</sup>, Janette Rahamat-Langendoen<sup>(2)</sup>, Arvydas Ambrozaitis<sup>(3)</sup>, Aukse Mickiene<sup>(4)</sup>, Ligita Jancoriene<sup>(3)</sup>, Monika Berniunaite<sup>(4)</sup>, Bert Niesters<sup>(2)</sup>, Ronald P. Stolk<sup>(2)</sup>, Daiva Velyvyte<sup>(4)</sup>, Kestutis Zagminas<sup>(3)</sup>, Eelko Hak<sup>(2)</sup>

(1) WHO Regional Office for Europe, Denmark, (2) University Medical Center Groningen, The Netherlands, (3) Vilnius University, Lithuania, (4) Kaunas Clinical Hospital, Lithuania

### BACKGROUND:

Due to scarce information on severe clinical influenza outcomes, we conducted a case-control study to assess seasonal influenza vaccine effectiveness (SIVE) against laboratory-confirmed influenza in hospitalized patients during the 2012-2013 influenza season.

### METHODS:

We conducted a test-negative case-control study among  $\geq 18$  years old patients with influenza-like illness (ILI) hospitalized in two Lithuanian hospitals. Cases were influenza A(H1N1), A(H3) or influenza B positive by RT-PCR, and controls were influenza negative. Additional demographic and clinical data to assess the role of confounding were collected. SIVE and its confidence intervals (95% CI) were estimated by using multivariate logistic regression as  $(1-OR)*100\%$ .

### RESULTS:

The sample consisted of 185 subjects. Seasonal influenza vaccine uptake was 5%. Among 111(60%) influenza positive cases, 24.3% were A(H1N1), 10.8% were A(H3) and 24.3 % were influenza B cases. Unadjusted SIVE was 79% (95% CI -6% to 96%) and after the adjustment it increased to 86% (95% CI 19% to 97%).

### CONCLUSIONS:

Seasonal influenza vaccination in 2012-2013 was associated with reduced occurrence of laboratory-confirmed influenza, but due to low sample size the estimate of SIVE is imprecise. Given high prevalence of influenza in hospitalized ILI cases and low influenza vaccination coverage, there is a need to increase influenza vaccination rates.

PRESENTED BY: Giedre Gefenaite

**Keywords:** Influenza, human; Hospitalization; Vaccination; Treatment outcome; Adult

ESCAIDE REFERENCE NUMBER: 20131719

## Through mud, water and mountains: estimating measles vaccination coverage in a conflict-affected area of Fizi, South Kivu, Democratic Republic of Congo, May 2013

Krystel Moussally<sup>(1)</sup>, Martins Dada<sup>(2)</sup>, Karla Bil<sup>(3)</sup>, Annick Lenglet<sup>(3)</sup>

(1) Médecins sans frontières (MSF), Lebanon, (2) Médecins sans frontières (MSF), Nigeria, (3) Médecins sans frontières (MSF), The Netherlands

### BACKGROUND:

Fizi health-zone (FHZ), population 296,611, is situated in the southern part of the conflict-affected province South Kivu, Democratic Republic of Congo (DRC). In response to a declared measles epidemic in FHZ in February 2013, the Ministry of Health and Médecins Sans Frontières conducted a mass measles vaccination campaign targeting children 6-59 months of age. We conducted a vaccination coverage survey to assess primarily the impact of the campaign in the target population in May 2013.

### METHODS:

We implemented a two-stage randomised cluster vaccination coverage survey in FHZ, including all security-accessible villages. Eligible children were those between 6-59 months at the time of the survey. Assuming a post-campaign coverage of 60%,  $\alpha$ -error of 5%, design effect of 4 and a 5% non-response rate, the calculated sample size was 1,474 children (50 cluster with a total of 1,755 households).

### RESULTS:

We surveyed 2,364 children. Vaccination coverage by card and verbal history was 91.7% (CI95% 90.0-93.5) versus 80.9% (CI95% 77.5-84.4) for the routine measles vaccination in health-centres. Fifty-four percent of children provided vaccination card evidence of the vaccination. The major reason for non-vaccination was the absence of the caretaker or child during vaccination or the lack of time to bring the child for vaccination (52.7%). The majority of respondents (83.7%) had learned about the vaccination campaign through community-health-workers. Only 49.4% of respondents (CI95% 43.8-54.3) described all symptoms of measles.

### CONCLUSIONS:

The measles vaccination campaign in FHZ achieved an acceptable coverage in the target group considering the difficulties of access in remote villages and conflict affected area of DRC. However, coverage falls short of the WHO targets. We recommend a catch-up campaign in the near future to address this shortfall.

PRESENTED BY: Krystel Moussally

**Keywords:** Measles, vaccination, community knowledge, hard-to-access villages, South-Kivu

ESCAIDE REFERENCE NUMBER: 20131460

## Time to talk about protection

Irina Dinca <sup>(1)</sup>, Ülla-Karin Nurm <sup>(1)</sup>

(1) ECDC, Sweden

### BACKGROUND:

Measles has re-emerged in the EU due to insufficient vaccination coverage, which puts Europe at risk of missing the 2015 elimination target, seeming that measles vaccination has become 'a victim of its own success'. Health professionals are considered to be the most trustworthy and the most credible sources of information on immunization. A communication guidance have been developed aimed at supporting healthcare providers while they advise parents to get their children vaccinated.

### METHODS:

Evidence was gathered in a three stage process: a) synthesis of knowledge via literature review, formative research and interviews and focus groups with experts, parents, 'hard-to-reach' groups and communication experts; b) peer review by an advisory group of experts in immunization; c) stakeholder review by healthcare professionals from different EU countries. A methodology for cultural adaptation at country level has been developed and tested in pilot Member States.

### RESULTS:

A peer reviewed communication tool has been developed using innovative approach reframing the issue of immunization focusing on protection rather than risks. As an attempt to shift from a provider-centred to a beneficiary-centred approach the guide includes 'advice' from target groups to healthcare professionals instead of the traditional approach of vertical message transmission. Thus the guide includes 'advices' from mothers and grandmothers, from so-called 'hard to reach' populations, from peers (other physicians) and from media.

### CONCLUSIONS:

The English guidance "Let's talk about protection" includes evidence-based key messages that healthcare providers throughout Europe can use in their daily practice. In addition the adaptation methodology allows for the guidance to better tailor and respond to concrete needs in each and every Member State. This set will soon become available for all EU Member States.

PRESENTED BY: Irina Dinca

**Keywords:** Measles, vaccine preventable diseases, health communication

ESCAIDE REFERENCE NUMBER: 20131810

## Under-vaccinated groups in Europe and their determinants regarding vaccination: two literature reviews

Nelly Fournet <sup>(1)</sup>, Liesbeth Mollema <sup>(1)</sup> Jim van Steenberg <sup>(1)</sup>

(1) National Institute for Public Health and the Environment (RIVM)

### BACKGROUND:

Despite national immunisation programmes in Europe, some groups remain unvaccinated, leading to outbreaks of Vaccine Preventable Diseases (VPD). Gaining insight into beliefs and attitudes of these under-vaccinated groups (UVGs) might give opportunities to communicate with them in a trusty manner and increase vaccine uptake. We performed two literature reviews: the first aimed to identify UVGs in Europe and the second to describe their main determinants concerning vaccination.

### METHODS:

We defined a UVG as a group of individuals who share the same ideological way of life and/or live in closed communities in Europe and who experienced outbreaks of VPDs since 1950. We searched MEDLINE, EMBASE and PsycINFO using specific search term combinations. The first search included articles focusing on VPD outbreaks within UVGs. From the second search, we selected articles describing beliefs, attitudes, and perceptions towards vaccination of these UVGs.

### RESULTS:

We selected 43 articles of 651 from the first review and 9 articles of 447 from the second. Five UVGs were identified: Anthroposophists, Orthodox Protestants, Orthodox Jewish, Roma and Irish Travellers communities. The main determinants regarding vaccination were the perceived non-severity of traditional "childhood" diseases, fear of vaccine side-effects, doubts about the effectiveness of the vaccine, religious objections, natural lifestyle, low access to health care centres and no trust in the Public Health authorities.

### CONCLUSIONS:

Within each UVG identified, there are a variety of beliefs and objections to vaccination. In addition, similar beliefs are shared by various groups. Communication programmes that take into account determinants shared by various groups, but also the specificity of each group, need to be developed in order to reach these UVGs and increase their vaccination coverage, thus preventing VPD outbreaks in the future.

PRESENTED BY: Nelly Fournet

**Keywords:** Vaccination coverage, immunisation, outbreak, beliefs, determinants

ESCAIDE REFERENCE NUMBER: 20131599

## Parallel Session 14 – Epidemiology and microbiology driving public health policy

### Improving hand hygiene compliance to reduce gastrointestinal and respiratory infections in child day care centres: a randomised controlled trial

Tizza Zomer<sup>(1)</sup>, Vicki Erasmus<sup>(2)</sup>, Jan Hendrik Richardus<sup>(2)</sup>, H el ene Voeten<sup>(1)</sup>

(1) Municipal Public Health Service Rotterdam-Rijnmond, (2) Erasmus MC, University Medical Centre Rotterdam, The Netherlands

#### BACKGROUND:

Children attending day care centres (DCCs) are at high risk for contracting infections, which can be prevented with adequate hand hygiene (HH). An intervention was developed to improve caregivers' compliance with HH guidelines and reduce gastrointestinal and respiratory infections among children attending DCCs. The study objective was to evaluate the effectiveness of this intervention.

#### METHODS:

The intervention was evaluated in a two-arm cluster randomised controlled trial among 71 DCCs in The Netherlands. 36 DCCs received the intervention including: 1) HH products; 2) training for caregivers about the HH guidelines; 3) two team training sessions; 4) posters and stickers. Intervention DCCs were compared to 35 control DCCs which continued usual practice. The primary outcome measure was observed HH compliance of caregivers, assessed with HH observations at baseline and at one, three and six months follow-up. The secondary outcome measure was incidence of diarrhoea and the common cold in children, monitored by parents over six months using an infection calendar. Logistic and poisson multilevel regression analyses were performed.

#### RESULTS:

In total, 795 caregivers and 5042 HH opportunities were observed, and 569 children were monitored over 110955 person days. At one month follow-up caregivers' compliance in intervention DCCs was 66% versus 43% in control DCCs (OR 6.33; 95% CI 3.71-10.80), and at six months follow-up 59% versus 44% (OR 4.13; 95% CI 2.33-7.32). Preliminary results show that children in intervention DCCs had 17% less diarrhoea than children in control DCCs (IRR=0.83, P=0.10). No effect was found on the incidence of the common cold (IRR=1.01, P=0.93).

#### CONCLUSIONS:

HH compliance increased due to the intervention. Therefore, we will disseminate the intervention in other DCCs.

PRESENTED BY: Tizza Zomer

**Keywords:** Infection control, hand hygiene, intervention, child care

ESCAIDE REFERENCE NUMBER: 20131676

### Gastrointestinal and respiratory disease among children that do and do not attend day care; small differences in disease incidence, big differences in costs

Remko Enserink<sup>(1)</sup>, Anna Lugner<sup>(1)</sup>, Anita Suijkerbuijk<sup>(1)</sup>, Patricia Bruijning<sup>(2)</sup>, Henriette Smit<sup>(2)</sup>, W van Pelt<sup>(1)</sup>

(1) National Institute for Public Health and the Environment, The Netherlands, (2) Julius Center for Health Sciences and Primary Care, The Netherlands

#### BACKGROUND:

Estimates for the societal costs of gastrointestinal and respiratory disease among children attending day care are essential in public health policy debates around prevention of day-care-associated illness, but are lacking for The Netherlands. Our objectives are to estimate the mean healthcare costs and productivity losses for episodes of gastroenteritis (GE) and influenza-like illness (ILI) in pre-school children aged 0-48 months old and to assess if these costs differ between children that do or do not attend day care.

#### METHODS:

We are conducting a monthly survey since oktober 2012. We ask families to register their demographics and socioeconomic characteristics as well as GE and ILI episodes and related health care utilization experienced by a pre-selected child during the past 4 weeks. Using two-part regression models, we calculated costs for doctor consultations, prescription and over-the-counter medication, hospitalization, laboratory testing, traveling to and from health care services, and productivity losses due to work absence of parents to care for their ill children.

#### RESULTS:

To date, 2323 questionnaires have been completed. Compared to children cared for at home, those attending daycare are at an increased risk of GE (IRR: 1.3 [1.1-1.8]) and ILI (1.2 [1.1-1.4]). The mean cost per episode were twice as high for day-care-attending children (GE: €255 [€168-€351]) and three times as high for ILI (€204 [€155-€223]) compared to these costs for non-day-care-attending children).

#### CONCLUSIONS:

Children attending day care experience slightly higher rates of GE and ILI compared to their non-day-care-attending counterparts, but the mean costs per episode are substantially increased. This difference is explained by the higher productivity losses induced by families with day-care-attending children. Further studies should focus on the most efficient and pragmatic infectious disease prevention practices in day care.

PRESENTED BY: Remko Enserink

**Keywords:** Day care, cost of illness, incidence, gastroenteritis, respiratory tract infections, gastroenteritis

ESCAIDE REFERENCE NUMBER: 20131444



## Perspectives of caregivers on screening migrants: managing conflicting policies, discourses and practices

Faustine Kyungu Nkulu Kalengayi <sup>(1)</sup>, Anna-Karin Hurtig <sup>(2)</sup>, Annika Nordstrand <sup>(2)</sup>, Clas Ahlm <sup>(3)</sup>, Beth Maina Ahlberg <sup>(3)</sup>

(1) Umeå University, Sweden, (2) Norrbottens Läns Landsting, Sweden, (3) Skaraborg Institute for Research and Development

### BACKGROUND:

Screening migrants from countries with high prevalence of certain communicable diseases is part of the Swedish national strategy against the spread of these diseases. However, very little is known about its implementation. This study aimed at exploring caregivers' experiences and perceptions about screening migrants in order to generate knowledge that could inform policy and clinical practice.

### METHODS:

Using a qualitative approach, an interpretive description framework was adopted to investigate how caregivers engage in screening of migrants in the Swedish context. Semi-structured interviews were carried out with 25 health care professionals in northern Sweden and a thematic analysis approach was used to analyze the transcripts.

### RESULTS:

The following themes were identified: 1) divergent views and expectations about medical screening between migrants and caregivers, 2) a complex working environment characterized by the influences of other institutions and overwhelming time pressure, and 3) conflicting migration and public health policies that were described as full of paradoxes and ambiguities. All these were compounded by language barrier and complex issues due to the use of interpreters and distant communication technology.

### CONCLUSIONS:

These findings illustrate complex challenges that could limit access, uptake and delivery of screening and compromise achievement of desired public health outcomes, and highlight the need to harmonize migration and public health policies to make health care services more accessible to migrants and improve public health. It also highlights the need to improve the working conditions of screening staff. Additionally, it emphasizes the need to improve the skills of health care professionals and other migrant-serving institution staff including interpreters in understanding and effectively responding to the needs of migrants through continuing education. Finally, the need to improve migrants' health literacy is emphasized.

**PRESENTED BY:** Faustine Kyungu Nkulu Kalengayi

**Keywords:** Caregivers, migrants, screening, Sweden

ESCAIDE REFERENCE NUMBER: 20131789

## The impact of smoke-free policies on the incidence of invasive meningococcal disease in Europe

Maria Louise Borg <sup>(1)</sup>, James Stuart <sup>(2)</sup>, Andre Charlett <sup>(1)</sup>, Anna Gilmore <sup>(3)</sup>, Michelle Sims <sup>(3)</sup>, Isabel Oliver <sup>(3)</sup>

(1) Public Health England, United Kingdom, (2) Independent, United Kingdom, (3) University of Bath, United Kingdom

### BACKGROUND:

Active and passive smoking has been associated with an increased risk of invasive meningococcal disease (IMD). Several European countries have recently adopted policies to make public places smoke-free. We aimed to determine whether the introduction of smoke-free policies (SFPs) in Europe led to a decrease in IMD incidence in children and young adults.

### METHODS:

We conducted a retrospective ecological study, including IMD cases reported to ECDC from 1999-2011 and SFPs implemented by countries over the same period. As a measure of tobacco smoke exposure, we used a scale based on the implementation and enforcement of SFPs in countries over time. We assessed the impact of SFPs on IMD incidence in 0-14 and 15-24 year olds by calculating incidence rate ratios (IRR) using negative binomial regression models. We excluded IMD serogroup-C cases to eliminate the effect of Men-C vaccination on IMD incidence and adjusted for seasonality, Influenza rates, population size and diagnostic tests.

### RESULTS:

Preliminary data from 15 countries showed that IMD incidence decreased by 1.8% (IRR=0.98, 95%CI 0.98-0.99) and 0.8% (IRR=0.99; 95%CI 0.98-1.00) per unit increase in SFP score in 0-14 year olds and 15-24 year olds, respectively. In 0-14 year olds, the incidence of IMD decreased significantly by: 19.7% in Portugal, 8.8% in Germany, 5.3% in France and 2.6% in Spain, per unit increase in SFP score.

### CONCLUSIONS:

SFPs may contribute to a reduction in IMD incidence, particularly in children. The association between introduction of SFPs and IMD incidence differed among countries. It is difficult to draw conclusions on a causal link due to different underlying trends in IMD incidence. These findings may inform tobacco control measures and their enforcement particularly in countries contemplating implementation of SFPs.

**PRESENTED BY:** Maria Louise Borg

**Keywords:** Smoke-free legislation, invasive meningococcal disease, tobacco smoke exposure, retrospective ecological study

ESCAIDE REFERENCE NUMBER: 20131572

## National Advisory Groups and their role in immunization policy-making processes in European countries

Hanna Nohynek <sup>(1)</sup>, Ole Wichmann <sup>(2)</sup>, Fortunato D'Ancona <sup>(3)</sup>, Venice National Gatekeepers <sup>(4)</sup>

(1) National Institute for Health and Welfare, (2) Robert Koch Institute, Germany, (3) Istituto Superiore di Sanita', Italy, (4) Venice, Italy

### BACKGROUND:

During the 21st century, the development of national immunization programmes (NIP) has matured into robust processes where evidence-based methodologies and frameworks have increasingly been adopted. A key role in country-level decision-making is played by National Immunization Technical Advisory Groups (NITAGs).

### METHODS:

In February 2013, we conducted among European Union member states, Norway and Iceland a web-based survey on the role and functioning of their NITAG.

### RESULTS:

Of the 27 responding countries 85% reported having established a NITAG, with number of members ranging from 7 to 35 (median 14). In 17 of 22 NITAGs, members are requested to declare their potential conflicts of interest. 45% of NITAGs have formal frameworks in place for the systematic development of vaccination recommendations. Independent of whether a formal framework is in place, common key factors are addressed by all NITAGs and also in countries without NITAGs. The four main factors addressed by all were: local disease burden, severity of the disease, vaccine effectiveness or efficacy, and vaccine safety at population level. Mathematical modelling and cost-effectiveness analyses are still not very common tools.

### CONCLUSIONS:

Differences in the relative weighing of these key factors, differences in data or assumptions on country-specific key factors, and differences in existing vaccination systems and their financing, are likely to be reasons for differences in NITAG recommendations and NIPs across Europe. Even if harmonization of NIPs is presently not a reasonable aim, systematic reviews and the development of mathematical/economic models could be performed at supranational level, thus sharing resources and easing the present work-load of NITAGs and institutions supporting them. Nevertheless, harmonisation could facilitate expansion of NIPs as well as improve comparability of effectiveness and safety data and vaccine coverage.

PRESENTED BY: Hanna Nohynek

**Keywords:** Vaccination immunization programme decision making recommendation evidence Europe  
ESCAIDE REFERENCE NUMBER: 20131573

## Parallel Session 15 – Zoonoses

### Surveillance and control of re-emerging rabies in northern Greece

Garyfallia Antoniou <sup>(1)</sup>, Georgios Dougas <sup>(2)</sup>, Georgios Rigakos <sup>(2)</sup>, Konstantia Tassioudi <sup>(3)</sup>, Peristera Iliadou <sup>(2)</sup>, Theano Georgakopoulou <sup>(1)</sup>, Sotirios Tsioltras <sup>(1)</sup>

(1) National and Kapodistrian University of Athens, Greece, (2) Hellenic Center for Disease Control & Prevention, Greece, (3) Ministry of Rural Development and Food, Athens, Greece

### BACKGROUND:

Greece was rabies-free since 1987. Rabies re-emerged in the northern regions of Greece on 19th October 2012. The Department of Epidemiological Surveillance and Intervention of the Hellenic Center for Disease Control and Prevention (HCDCP) in cooperation with the Emergency Operation Center/HCDCP, the local public health services and the clinicians in hospitals monitor human exposures to animals suspected for rabies.

### METHODS:

This is a descriptive study of the surveillance program for antirabies prophylactic treatments, implemented by the Zoonoses unit of the HCDCP.

### RESULTS:

265 cases of rabies postexposure prophylaxis administration have been recorded until 30 June 2013. Rabies vaccine only, received 149 (56.2%) and 116 (43.8%) received both vaccine and serum. Category III exposure, according to World Health Organization (WHO), had 162 (61.1%) of the cases, while 83 (31.3%) presented with category II exposure. Exposure to laboratory confirmed rabid animals had 17 (6.4%) individuals. None of the victims has suffered rabies symptoms so far. The majority of the animals involved in possible human exposure were dogs (87.1%) and among them, 75.7% were stray dogs. The total of laboratory confirmed rabid animals was 24.

### CONCLUSIONS:

The animals involved in the majority of cases were stray dogs. The management of these cases is difficult, partly because the population of stray dogs is large and also because it is often impossible to find and examine the animals. The rabies post-exposure stewardship is directly associated with the creation of hydrophobia clinics, the ongoing public awareness, the effective collaboration for final animal assessment and the control of stray dogs. Pre-exposure prophylaxis is recommended only for travelers likely to get in contact with wildlife in northern Greece.

PRESENTED BY: Garyfallia Antoniou

**Keywords:** Re-emerging rabies, surveillance, rabies vaccines, rabies serum, communicable diseases  
ESCAIDE REFERENCE NUMBER: 20131841

## Persistent high IgG phase I antibody levels against *C. burnetii* among veterinarians compared to acute Q fever patients after 3-4 years of follow-up.

Anneroos W. (Roos) Boerman <sup>(1)</sup>, Cornelia C.H. (Lieke) Wielders <sup>(1)(2)</sup>, Barbara Schimmer <sup>(1)</sup>, René van den Brom <sup>(3)</sup>, Daan W. Notermans <sup>(1)</sup>, Wim van der Hoek <sup>(1)</sup>, Peter M. Schneeberger <sup>(1) (2)</sup>

(1) Centre for Infectious Disease Control, National Institute for Public Health and the Environment (RIVM), Bilthoven, The Netherlands, (2) Jeroen Bosch Hospital, The Netherlands, (3) Animal Health Service, Deventer, The Netherlands

### BACKGROUND:

A *Coxiella burnetii* seroprevalence of 65.1% was found among veterinarians in 2009 in The Netherlands. Little is known about the development of chronic Q fever in occupational risk groups. The aim of this study was to describe the course of IgG phase I antibodies against *C. burnetii* in Dutch veterinarians over a period of 3-4 years, as IgG phase I titer is an important indicator for chronic Q fever.

### METHODS:

Veterinarians with an IgG phase I titer  $\geq 1:256$  in a cross-sectional study in 2009-2010 were asked to provide a second serum sample early 2013. IgG phase I antibodies were determined using immunofluorescence assay (IFA) and results were compared to acute Q fever patients with IgG phase I  $\geq 1:256$  12 months after diagnosis and serological follow-up.

### RESULTS:

Seventy-six (mainly livestock) veterinarians and 98 acute Q fever patients were included. After 3-4 years, IgG phase I antibodies were detected in 100% of the veterinarians, compared to 84.7% in patients ( $p < 0.001$ ). IgG phase I  $\geq 1:1024$  was found in 27 (35.5%) veterinarians compared to 12 (12.2%) patients (OR 3.95; 95%CI 1.84-8.49,  $p < 0.001$ ). Compared to the first serum sample, IgG phase I titers increased (36.8%) or remained the same (30.3%) in 51 (67.1%) veterinarians. In contrast, IgG phase I titers decreased in 82 (83.7%) patients.

### CONCLUSIONS:

This study shows that IgG phase I antibodies increase or remain high among veterinarians compared to decreasing IgG phase I titers in acute Q fever patients. Continuous occupational exposure to *C. burnetii* is a likely cause of the observed antibody responses in absence of reported clinical symptoms. Serological and medical follow-up of veterinarians and other occupational exposed groups at risk for chronic Q fever should be considered.

PRESENTED BY: Anneroos W. (Roos) Boerman

**Keywords:** Occupational exposure, *Coxiella burnetii*, Q fever, follow-up studies

ESCAIDE REFERENCE NUMBER: 20131592

## Effective application of an integrated outbreak management plan for the control of leptospirosis in dairy livestock in north-eastern Italy: a way to prevent leptospiral infection from spilling over to humans

Lapo Mughini-Gras <sup>(1)</sup>, Lebara Bonfanti <sup>(2)</sup>, Alda Natale <sup>(2)</sup>, Arianna Comin <sup>(3)</sup>, A Ferronato <sup>(4)</sup>, E La Greca <sup>(4)</sup>, Tommaso Patregnani <sup>(2)</sup>, L Lucchese <sup>(2)</sup>, Stefano Marangon <sup>(2)</sup>

(1) National Institute for Public Health and the Environment (RIVM), The Netherlands, (2) Istituto Zooprofilattico Sperimentale delle Venezie, Italy, (3) National Veterinary Institute, Sweden, (4) Azienda Unità Locale Socio-Sanitaria (A.U.L.S.S.) No. 15 Alta Padovana, Italy

### BACKGROUND:

Leptospirosis is a bacterial zoonosis of public health concern worldwide. Cattle are maintenance hosts for serovar Hardjo and can serve as reservoirs for human infection. Italy's north-eastern area is particularly prone to leptospirosis; in 2007-2011, two large leptospirosis outbreaks in dairy cattle herds provided the opportunity for assessing the value of an integrated outbreak management plan based on enhanced biosecurity, whole-herd antibiotic treatment and vaccination as to prevent further leptospiral circulation.

### METHODS:

MAT antibody titres against *Leptospira Hardjo* were determined in paired serum samples from non-infected cattle three (T1: n=125, 97% seroconversion; median titre 1:800, range 1:100-12800) and 24 (T2: n=110, 88% seroconversion; median titre 1:200, range 1:100-1:6400) weeks after enhancing biosecurity measures and completing antibiotic treatment (Panterramicina®) and vaccination (Spirovac®) in the affected herds. Urine samples from infected cows, taken before (#25) and after (#79) treatment/vaccination, were processed for leptospiral culture and RT-PCR-based DNA detection; likewise for 12 kidney samples.

### RESULTS:

Tobit regression analysis revealed that, from T1 to T2, post-vaccination antibody titres decreased by 84.7% (95%CI: 76.2-90.1%). Consistent with increasing immunocompetence in calves and immunosenescence in adult cows associated with ageing, vaccine-elicited antibody titres correlated positively with calves' age (<12mths) and negatively with adult cows' age (>36mths). Five urine samples, taken before treatment and vaccination, were PCR-positive to *L.Hardjo*, but afterwards none of the tested urine or kidney samples had cultivable and/or PCR-detectable leptospires.

### CONCLUSIONS:

Vaccination together with proper biosecurity measures and chemoprophylaxis are an affordable insurance to control bovine leptospirosis in high-risk situations as to prevent further leptospiral circulation within the herd and eventually prevent leptospiral infection from spilling over to humans, provided that cattle age-related responses to vaccination and related boosting schemes are addressed.

PRESENTED BY: Lapo Mughini-Gras

**Keywords:** Leptospirosis, *Leptospira Hardjo*, zoonosis, MAT

ESCAIDE REFERENCE NUMBER: 20131821

## Risk factors for sporadic salmonellosis in adults and children – A case-control study in Lower Saxony, Germany

Sophie Rettenbacher-Riefler<sup>(1)</sup>, Dagmar Ziehm<sup>(1)</sup>, Amely Campe<sup>(2)</sup>, Lothar Kreienbrock<sup>(2)</sup>, Johannes Dreesman<sup>(1)</sup>

(1) Governmental Institute of Public Health of Lower Saxony, Germany, (2) WHO-Collaboration Centre of Research and Training in Veterinary Public Health, University for Veterinary Medicine, Hannover, Germany

### BACKGROUND:

Out of the 20.000 annually reported gastroenteric infections caused by non-typhoidal salmonellae in Germany, about 80% are sporadic cases with unknown sources of infection. The aim of the present case-control study was to identify potential risk factors.

### METHODS:

Standardised telephone interviews were performed with 1901 laboratory-confirmed, sporadic salmonella cases reported according to the German infectious disease notification system. As controls, 680 rotavirus cases were recruited via the same notification system. Data were stratified for adults (1017 cases, 170 controls aged >14 years) and children (0-14 years; 884 cases, 510 controls). Odds ratios (OR) and 95 % confidence intervals (CI) were assessed via univariate and multiple logistic regression.

### RESULTS:

As risk factors for both age groups, multivariable analysis revealed consumption of raw ground pork (adults: OR 2.4; 95% CI 1.3-4.4; children: OR 5.8; 95% CI 2.2-15) and food items containing egg (OR 2.1; 95% CI 1.2-3.5 and OR 1.4; 95% CI 1-1.8, in adults and children, respectively). In adults only, significant associations with salmonella infection were found for travelling abroad (OR 2.1; 95% CI 1.1-4.3) and job-related animal contacts (OR 3.0; 95% CI 1.2-7.6). In children, uncooked pork sausage (OR 1.9; 95% CI 1.2-2.8), poultry consumption (OR 1.3; 95% CI 1-1.7), contact with cattle (OR 2.6; 95% CI 1.1-6.4) and having a pet cat (OR 1.5; 95% CI 1-2.2) were associated with illness.

### CONCLUSIONS:

Raw pork was identified as the major risk factor for sporadic salmonella infections, especially in children. To prevent infections via this popular food item, public education is urgently needed. At the same time, efforts to reduce salmonella load in pigs and cross-contamination during slaughter and food processing should be further intensified.

PRESENTED BY: Sophie Rettenbacher-Riefler

**Keywords:** Foodborne zoonosis, raw minced pork, Mett, Salmonella enterica,

ESCAIDE REFERENCE NUMBER: 20131648

## Preventive measures for hantavirus infections in Europe: a review

Ides Boone<sup>(1) (2)</sup>, Bernardo Guzman-Herrador<sup>(3)</sup>, Aleksandra Polkowska<sup>(4)</sup>, Javiera Rebolledo<sup>(5)</sup>, Katrin Leitmeyer<sup>(1)</sup>, Wim Van Bortel<sup>(1)</sup>, Herve Zeller<sup>(1)</sup>, Helena de Carvalho Gomes<sup>(1)</sup>, Zaida Herrador<sup>(6)</sup>

(1) ECDC, Sweden, (2) Baden-Wattemberg State Health Office, District Government Stuttgart, Germany (3) Norwegian Institute of Public Health, Oslo, Norway, (4) National Institute for Health and Welfare (THL), (5) Scientific Institut of Public Health, (6) CNMT, Instituto de Salud Carlos III, Spain

### BACKGROUND:

Between 1990-1999 and 2000-2009, the annual average of reported human hantavirus infections in Europe increased from 1671 to 3138, despite affected countries having developed guidance and communication on preventive measures. We performed a literature review and a survey on existing preventive measures for hantavirus transmission in Europe and how they are communicated.

### METHODS:

Keywords used for PubMed search were hantavirus, prevention and control, communication, health education and promotion, awareness, and Europe. We reviewed articles from Europe published between 2000 and 2012. We interviewed experts from the European Network for Diagnostics of Imported Viral Diseases and public health officers from 29 European countries who notified at least one case of hantavirus infection since 2005 via telephone using structured questionnaires.

### RESULTS:

We identified eight articles focusing on preventive measures including one article on communication strategies. No publication studied effectiveness or acceptability of preventive measures. Twenty-six of 29 countries (90%) provided institutional information on preventive measures focusing on animal reservoir (rodent control) and/or human/environmental aspects (e.g. how to avoid exposure to rodents, how to clean up utility rooms). Twenty-six countries (90%) communicate preventive measures through a variety of media in case of an outbreak. Nine of these (31%) also provided information on a regular basis and before an expected outbreak. Three countries (10%) reported they had assessed the impact of preventive measures on disease incidence, however no results have been published yet.

### CONCLUSIONS:

Although most European countries inform the public on preventive measures, these measures are not evidence based. Studies that assess the impact of preventive measures on disease incidence are needed. Affected countries should develop evidence-based preventive strategies, adapted to their local situation.

PRESENTED BY: Ides Boone

**Keywords:** Hantavirus, preventive measures, communication, Europe  
ESCAIDE REFERENCE NUMBER: 20131823

## Parallel Sessions 16 – 18 13.15 – 15.15 Thur 7

### Parallel Session 16 – Vaccine effectiveness

#### Low to moderate vaccine effectiveness against laboratory confirmed influenza hospitalisation among high risk population in Europe in 2012-13: a multicentre test negative case control study

Marc Rondy<sup>(1)</sup>, Odile Launay<sup>(2)</sup>, Joan Puig-Barbera<sup>(4)</sup>, Corinne Merle<sup>(2)</sup>, Giedre Gefenaite<sup>(5)</sup>, Eelko Hak<sup>(6)</sup>, Jesus Castilla<sup>(6)</sup>, Marcela Guevara<sup>(6)</sup>, Simona Costanzo<sup>(7)</sup>, Katleen de Gaetano Donati<sup>(8)</sup>, Alain Moren<sup>(5)</sup>

(1) Epiconcept, Paris, France, (2) Inserm, CIC 0001, Réseau national d'investigation clinique en vaccinologie (REIVAC), Montpellier, France, (3) Université Paris Descartes, Paris, France, (4) Centro Superior de Investigación en Salud Pública CSISP, Valencia, Spain, Centro de Salud Pública de Castellón, Castellón, Spain, (5) University of Groningen, The Netherlands, (6) Instituto de Salud Pública de Navarra, CIBER Epidemiología y Salud Pública, Spain, (7) Fondazione di Ricerca e Cura "Giovanni Paolo II", Campobasso, Italy, (8) Catholic University, Rome, Italy

#### BACKGROUND:

While influenza vaccines aim to decrease the incidence of severe influenza among high risk groups, evidence of influenza vaccine effectiveness (IVE) among influenza vaccine targeted population (IVTP) is sparse. We conducted a multicentre test negative case control study to estimate IVE against hospitalised laboratory confirmed influenza in the IVTP in 18 hospitals in Europe (France, Italy, Lithuania, Navarre and Valencia (Spain)).

#### METHODS:

All ≥18 years hospitalised patient, belonging to IVTP presenting an influenza-like illness within seven days were swabbed. Patients RT-PCR positive for influenza were cases and those negative for any influenza virus were controls. Using logistic regression we calculated IVE by influenza subtype adjusted for potential confounders (onset month, study site, age, chronic conditions, smoking status, access to care and previous vaccination).

#### RESULTS:

Of the 1974 patients included, 116 were positive for A(H1N1), 58 for A(H3N2) and 232 for B influenza. Adjusted IVE was 5.8% (95%CI:-74.2;49.1; N=1624), 62.2% (95%CI:4.8;85.0; N=557) and 52.0% (95%CI:25.0;60; N=1530) against influenza A(H1N1), A(H3N2) and B respectively. Among patients aged ≥75 year, IVE was 33.7 (95%CI:-101.7;78.2; N=870), 76.0% (95%CI:10.4;93.6; N=275) and 53.7% (95%CI:15.7;53.6; N=846) against influenza A(H1N1), A(H3N2) and B.

#### CONCLUSIONS:

Our results suggest that the 2012-13 IVE was moderate against influenza A(H3N2) and B and low against influenza A(H1N1). Although vaccines of moderate effectiveness remain the best preventive approach, it should be complemented by the use of antivirals to better protect high risk population against severe Influenza outcomes. Enlarging the network of hospitals to reach a larger sample size would allow for measuring IVE by vaccine type and brand. Early estimates of IVE in IVTP are useful to guide composition of the next season vaccines.

PRESENTED BY: Marc Rondy

Keywords: Influenza vaccine, Effectiveness, Case control studies, Hospitalisation

ESCAIDE REFERENCE NUMBER: 20131668

#### Testing assumptions underlying the case test-negative estimation for seasonal influenza vaccine effectiveness

Beatrix von Wissmann<sup>(1)</sup>, Arlene Reynolds<sup>(1)</sup>, Rory Gunson<sup>(2)</sup>, Alasdair MacLean<sup>(2)</sup>, Louise Primrose-Shaw<sup>(1)</sup>, Catherine Frew<sup>(2)</sup>, Jim McMenamin<sup>(1)</sup>

(1) Health Protection Scotland, United Kingdom, (2) West of Scotland Specialist Virology Centre, United Kingdom

#### BACKGROUND:

The case test-negative design is commonly used for the estimation of seasonal influenza vaccine effectiveness (VE). Two underlying assumption, required for an unbiased estimate of VE are explicitly assessed for the Scottish general practitioner (GP) sentinel swabbing dataset for season 2012/13.

#### METHODS:

Participating GPs submitted nasopharyngeal swabs from up to 5 patients with influenza-like illness (ILI) or other acute respiratory infection (ARI) per week, from October to May. Swabs were screened for influenza, respiratory syncytial virus (RSV), rhinovirus, coronavirus, human metapneumovirus and parainfluenza by multiplex real time polymerase chain reaction (PCR). Vaccination status and clinical signs were recorded. Logistic regression was used to assess whether the odds of non-influenza infection were affected by vaccine status, and whether disease severity (ILI/ other ARI) differed by aetiology (influenza / non-influenza).

#### RESULTS:

For season 2012/13, results for 1426 individuals were included, 485 and 410 of who were positive for influenza and non-influenza respectively (30 co-infections), 292 were vaccinated. The odds of influenza infection were significantly higher in cases with ILI than other ARI (OR: 2.2; 95%CI: 1.7-2.8), and the odds of ILI were significantly reduced in patients presenting 14 to 90 days after vaccination, compared to unvaccinated patients (OR: 0.6; 95%CI: 0.4-0.9). Vaccination status had no significant effect on the ratio of non-influenza pathogen positive swabs to all-negative swabs (OR: 0.9; 95%CI: 0.7-1.2).

#### CONCLUSIONS:

Adjustment for disease severity should be included as a confounder in multivariable models to assess vaccine effectiveness. This is a viable alternative to excluding non-ILI patients from the analysis. There was no evidence of trivalent inactivated influenza vaccine affecting the odds of non-influenza infection. Further analysis of historic datasets (2000/01 to 2011/12) will be carried out.

PRESENTED BY: Beatrix von Wissmann

Keywords: Influenza, sentinel surveillance, virology, respiratory pathogen, vaccine effectiveness

ESCAIDE REFERENCE NUMBER: 20131772

## Rapid effect of replacing the 7-valent pneumococcal conjugate vaccine with the 13-valent vaccine on the epidemiology of invasive pneumococcal disease in Norway

Anneke Steens <sup>(1)</sup>, Marianne A Bergsaker <sup>(2)</sup>, Ingeborg Aaberge <sup>(2)</sup>, Karin Rønning <sup>(2)</sup>, Didrik Vestheim <sup>(2)</sup>

(1) Norwegian Institute of Public Health, Norway, (2) Division of Infectious Disease Control, Norway

### BACKGROUND:

The introduction of PCV7 in the childhood immunisation programme in Norway in 2006 decreased the vaccine-type (VT) invasive pneumococcal disease (IPD) incidence in all age groups, and increased the non-vaccine-serotype (NVT) IPD incidence. The last phenomenon suggests serotype replacement. As the 13-valent pneumococcal conjugate vaccine (PCV) replaced the 7-valent PCV in 2011, further changes in epidemiology are expected. Close monitoring of IPD therefore remains important in order to quickly detect changes.

### METHODS:

In this observational retrospective population-based cohort study we used data notified nationally between 1 January 2004 and 31 December 2012 to determine age-specific VT- and NVT-IPD incidences. The diversity in serotype distribution per year was analysed by the Simpson's diversity index. PCV vaccine coverage and information on vaccine failure were obtained from the vaccination registry.

### RESULTS:

The incidence of VT-IPD decreased in both the targeted and non-targeted age groups since PCV7 introduction and further after PCV13 introduction. Since introduction, there have only been two IPD cases with vaccine failure. The decrease in PCV7-incidence in non-targeted age-groups became larger in later years, indicating a lag phase for the indirect protection, and suggesting that the indirect protection of PCV13 will increase in coming years. The incidence of some NVT increased after PCV13 introduction. As this coincided with an increase in Simpson's diversity index in the targeted age group, it suggests that serotype replacement occurs again.

### CONCLUSIONS:

Our results suggest a very high effectiveness of the 2+1 vaccine schedule and indirect protection of the non-targeted population. Since serotype replacement seems to occur again, it is important to continue monitoring of IPD so that adaptations to recommendations can be promptly issued.

PRESENTED BY: Anneke Steens

**Keywords:** Pneumococcal vaccines, Epidemiology, Norway,

ESCAIDE REFERENCE NUMBER: 20131496

## Pertussis in England – Different vaccine, different risk?

Carlos Carvalho <sup>(1)</sup>, Gayatri Amirthalangam <sup>(1)</sup>, Nick Andrews <sup>(1)</sup>, Mary Ramsay <sup>(1)</sup>

(1) Public Health England, United Kingdom

### BACKGROUND:

Acellular pertussis vaccines (aP) were introduced in the childhood immunisation programme in England and Wales in 1999, replacing whole-cell vaccine (wP) for primary course (PC) in October 2004. In 2001, a pre-school booster (PSB) at age 3-5 years with 3- (aP3) or 5- (aP5) component pertussis vaccine was included, affecting children born after 1997. Despite the high pertussis vaccination coverage over the last two decades (96% at 24 months and 87% at 5 years of age in 2011/2012), 9,397 cases were reported in England in 2012. 1459 (16%) were between 10 and 19 years old and 76% above that age. We aimed to compare protection provided by different vaccines.

### METHODS:

We conducted a case-control study. Cases were born from 1997 to 2006 and completed the recommended 4-dose vaccination schedule in England, before having laboratory-confirmed pertussis (from January 2011 to December 2012). Controls were identified from Child Health Information System (CHIS), representing 20% of the English population. We calculated adjusted odds-ratios (OR) and 95% confidence intervals (CI) using logistic regression.

### RESULTS:

We recruited 231 cases and 377,764 controls. Cases were more likely to have received exclusively acellular or mixed aP/wP vaccination for PC than controls [OR 2.35(95% CI: 1.42-3.88) and 1.97(1.30-3.01), respectively]. Receiving one, two or three doses of wP yielded ORs of 1.23 (0.74-2.05), 0.54 (0.30-0.98) and 0.42 (0.25-0.69), respectively.

### CONCLUSIONS:

Vaccination course with aP was associated with increased odds of developing pertussis when compared with wP, indicating lower immunogenicity of the acellular vaccine. Mixed PC with two doses of wP was more effective than a PC including exclusively aP or only one dose of wP. Further studies including older age-groups are important to assess longer-term effects.

PRESENTED BY: Carlos Carvalho

**Keywords:** Pertussis, vaccination, acellular, case-control, England

ESCAIDE REFERENCE NUMBER: 20131672

## Whooping cough – a never ending story? A role for waning vaccine-induced immunity and insufficient vaccination coverage in the Federal State of Thuringia, Germany

Sabine Schroeder <sup>(1)</sup>, Dagmar Rimek <sup>(1)</sup>, Wiebke Hellenbrand <sup>(2)</sup>

(1) Thuringian State Authority for Consumer Protection, Bad Langensalza, Germany, (2) Robert Koch Institute, Germany

### BACKGROUND:

In 2012, Thuringia reported 71 pertussis cases/100.000 population, compared to a mean of 23 in 2004-2011. Recommended immunization consists of a primary series of 4 doses pertussis vaccine by 14 months of life and boosters at ages 5-6 and 9-17 years. Thuringian surveillance and vaccination coverage (VC) data from 2004-2012 were analysed for possible explanations.

### METHODS:

We analysed demographics and vaccination status of reported pertussis cases. Persons were considered adequately vaccinated if they had received  $\geq 4$  doses of pertussis vaccine  $< 10$  years and  $\geq 3$  weeks before disease onset. However, persons  $\geq 9$  years required only  $\geq 1$  dose if they received their last dose at age  $\geq 9$  years and  $< 10$  years before illness onset. VC data were obtained from pre-school/school surveys.

### RESULTS:

In 2012, pertussis incidence was high at 110, 90, 240, and 130/100.000 in 1-4, 5-9, 10-14, 15-19 year-olds, respectively. VC was 97%, 80%, and 60% at ages 5-7, 9-10, 13-14 years, respectively. The proportion of adequately vaccinated cases in all age groups increased from a mean of 16% in 2004-2011 to 24% in 2012. This increase was particularly high among cases vaccinated  $< 5$  years before illness (6% in 2004-2011 versus 19% in 2012). Among cases aged 1-4, 5-9, and 10-19 years, 65%, 72%, and 47% were adequately vaccinated, respectively, in 2012. Of these, 100%, 77%, and 69% received their last dose  $< 5$  years before illness.

### CONCLUSIONS:

The incidence of pertussis in Thuringia increased despite high VC in younger children. The high percentage of adequately vaccinated cases particularly in young children suggests rapid waning of vaccine-induced immunity. Furthermore, the low VC and high proportion of incompletely/unvaccinated cases in adolescents demands better implementation of booster vaccinations to reduce pertussis incidence.

PRESENTED BY: Sabine Schroeder

**Keywords:** Pertussis, whooping cough, vaccination, Thuringia, outbreaks, waning of immunity

ESCAIDE REFERENCE NUMBER: 20131502

## Parallel Session 17 – Novel methodological approaches for disease investigation, surveillance and control

### At-home nasal swabbing of children by parents given only written instructions is acceptable in surveillance – a qualitative evaluation in Sweden

Mona Ali <sup>(1)</sup>, AnnaSara Carnahan <sup>(1)</sup>, Hanna Merk <sup>(1)</sup>

(1) Swedish Institute for Communicable Disease Control, Sweden

### BACKGROUND:

In Sweden during the 2012-2013 season, a surveillance system that monitors influenza-like illness among participants recruited from a random sample of the population was in place. Among the participants a subgroup were asked to perform a nasal swab when ill. Since little is known about the acceptability of nasal swabbing of children at home by parents given only written instructions, we performed a qualitative study to assess the parents' experience of and attitude towards nasal swabbing.

### METHODS:

We sent nasal swabbing kits with written instructions to 26 parents in Stockholm, with children aged 2-16 years and who had consented to sample their child when s/he experienced a cold or fever. Semi-structured telephone interviews were conducted with consenting parents during May 2013. The themes for the interviews were: reasons for participating, experience with nasal swabbing and possible improvements. The interviews were transcribed and analyzed with content analysis.

### RESULTS:

Interviews were conducted with 11/14 parents who had provided swabs and 9/12 parents who had not; the remaining parents were unreachable. Overall, parents had a positive attitude towards nasal swabbing, found swabbing easy, and both children and parents enjoyed contributing to the project. Some negative aspects mentioned were that the swab was too large and unappealing for the younger children and the system for obtaining the laboratory results too inflexible. Furthermore, parents cited lack of motivation, forgetfulness, and the time required for swabbing as reasons for not swabbing an ill child.

### CONCLUSIONS:

Swabbing of children in the present system worked well and was received positively. Despite needs for improvement, nasal swabbing with only written instructions to parents is an acceptable method for specimen collection from children in epidemiological studies and surveillance.

PRESENTED BY: Mona Ali

**Keywords:** Population Surveillance Qualitative Research Communicable Diseases Interviews, Telephone Specimen Handling Diagnostic Techniques, Respiratory System

ESCAIDE REFERENCE NUMBER: 20131582

## Further efforts in the achievement of congenital rubella syndrome/rubella elimination: alternative sources for retrospective case-finding, Puglia Region, Italy, 2003-2011

Vanessa Cozza <sup>(1)</sup>, Maria Giovanna Cappelli <sup>(2)</sup>, Francesca Fortunato <sup>(3)</sup>, Domenico Martinelli <sup>(3)</sup>, Biagio Pedalino <sup>(3)</sup>, Rosa Prato <sup>(3)</sup>

(1) Regional Epidemiological Observatory of Apulia, Italy, (2) University of Bari, Bari, Italy, (3) University of Foggia

### BACKGROUND:

In Italy, congenital rubella syndrome (CRS) and rubella infection in pregnancy are notifiable by law to the infectious disease routine notification system, and additionally, since 2005 to a dedicated surveillance system. In Puglia, no cases of CRS and rubella in pregnancy were reported to these systems in the last decade. In the CRS/rubella elimination phase we validated the reliability of these systems by comparing routinely collected data with alternative sources.

### METHODS:

We performed retrospective case-finding for the 2003-2011 period. We scanned through the regional hospital discharge registry to identify hospitalization with discharge ICD9CM codes 647.5 (rubella in pregnancy) and 771.0 (CRS) and retrieve individual records. We also scanned the delivery assistance certificate registry to retrieve clinical history of CRS mothers.

### RESULTS:

From hospital discharge registry, 14 hospitalizations for CRS and none for rubella in pregnancy were identified. We traced 13 CRS mothers. Individual hospital records were retrieved for 13 newborns and 12 mothers. Among newborns, five had the mother's positive anamnesis for rubella in pregnancy; seven a positive rubella test; two had one or more CRS clinical signs. One CRS, two congenital rubella infections and four suspected cases were identified. Among mothers, five had a positive anamnesis for rubella in pregnancy; four a positive test during pregnancy and one at delivery. Seven cases of rubella in pregnancy were identified.

### CONCLUSIONS:

In Puglia, routine notification of CRS and rubella in pregnancy is not reliable. We will disseminate our findings among health personnel involved in the care of pregnant women and newborns periodically, to encourage case notification. We will also explore reasons for under-notification and continue to compare surveillance data on CRS and rubella in pregnancy with individual hospital records.

PRESENTED BY: Vanessa Cozza

**Keywords:** Congenital rubella syndrome Rubella in pregnancy Surveillance Hospital discharge registry

ESCAIDE REFERENCE NUMBER: 20131527

## Spatio-temporal clustering of leishmaniasis cases during an outbreak in Fuenlabrada-Madrid, Spain, 2009-2013

Zaida Herrador <sup>(1)</sup>, Diana Gomez <sup>(2)</sup>, Juan Victor San Martin <sup>(2)</sup>, Alin Gherasim <sup>(1)</sup>, Pilar Aparicio <sup>(1)</sup>

(1) Instituto de Salud Carlos III, Spain, (2) Hospital de Fuenlabrada, Comunidad de Madrid, Spain

### BACKGROUND:

Leishmaniasis is an endemic disease in Spain caused by the parasite *Leishmania infantum*. Between September 2009 and April 2013, an outbreak of 157 cutaneous leishmaniasis (CL) and 90 visceral leishmaniasis (VL) cases occurred in Fuenlabrada, Madrid. The aim of this study was to determine the distribution of CL and VL cases as well as detection of the presence of local clustering using spatial analyses and related risk factors.

### METHODS:

We used geographic information systems and space-time permutation scan statistic techniques to identify patterns of the occurrence of VL and CL. The following variables were chosen as explanatory for case distribution: age, sex, nationality and residence districts. We set the upper limit on the geographical size of the outbreak to be a circle with a 1-km radius, and the maximum temporal length to be 180 days.

### RESULTS:

The analysis showed four statistically significant space-time clusters of CL. The most likely cluster comprises 3 census tracks with 24 of total CL cases, relative risk (RR)= 11,5 (13,6-9,2). 2 significant VL clusters were detected, most likely one comprised 1 census track with 8 cases (RR=9.2 (7,3-11,1)). When we sorted our data according to immigrant status, we found one significant cluster for VL, RR=12.8 (9,3-16,1). There was an indication of cluster spread from the northwest to other points of the municipality, all close to a recently built urban park.

### CONCLUSIONS:

The transmission of CL and VL showed a spatial and temporal pattern in the studied area. Local environmental changes such as rapid urbanization may have played an important role in the spread of the disease. Space-time analysis proved to be an important tool for identification of risk areas, assisting in the formulation of hypotheses about disease aetiology.

PRESENTED BY: Zaida Herrador

**Keywords:** Leishmaniasis, Spatial Analysis, Cluster analysis, Outbreak, Spain

ESCAIDE REFERENCE NUMBER: 20131839



## Time and space analysis of the incidence of acute respiratory infections in Sweden

Sharon Kühlmann-Berenzon <sup>(1)</sup>

(1) Swedish Institute for Communicable Disease Control, Sweden

### BACKGROUND:

A surveillance system implemented in Sweden during the 2012-2013 influenza season tracked the spread of acute respiratory infections (ARI) in the general population. Voluntary members of the population (n~2500) reported weekly fever and colds. No more than 174 of 234 municipalities had at any given moment participants, thus incidence maps were only possible at county level. We aimed at retrospectively create smooth incidence maps at municipality level for the whole country, in order to visualize the space-time dynamics of ARI at local scale.

### METHODS:

Data was obtained from week 40, 2012 to week 20, 2013. Based on the influenza laboratory confirmed cases in the national surveillance, we defined pre-peak (w40, 2012 to w4, 2013), peak (w5 to w10, 2013), and post-peak (w11 to w20, 2013) periods. Cumulative incidence rates of ARI per 100 person-weeks were calculated for each period and municipality; municipalities without participants had missing incidence. Spatial autocorrelation was estimated with Moran's I. Maps of smoothed estimated incidence were created with Poisson ordinary kriging, which also extrapolated to missing municipalities.

### RESULTS:

No spatial autocorrelation was detected (p-value=0.5-0.7). Incidence in the smoothed maps varied between 1.3 and 181/100 person-weeks per municipality. Higher incidence was observed in the center of the country and around the big cities. Between periods the spatial pattern changed only slightly.

### CONCLUSIONS:

By applying kriging in time periods, we were able to visualize the spread of ARI in time and space at local level. The next step is to apply these techniques to influenza-like-illness, and to incorporate them to work prospectively in other surveillance systems. These maps complement current epidemiological analyses and could potentially assist local health care providers with patient care and planning resources.

PRESENTED BY: Sharon Kühlmann-Berenzon

**Keywords:** Spatial Analysis, Geographic Mapping, Incidence, Sentinel Surveillance

ESCAIDE REFERENCE NUMBER: 20131824

## Influenza vaccine effectiveness estimates from the I-MOVE multicentre case-control study in Europe, 2012-13: moderate vaccine effectiveness for all circulating types and subtypes

Esther Kissling <sup>(1)</sup>, Marta Valenciano <sup>(1)</sup>, Udo Buchholz <sup>(2)</sup>, Amparo Larrauri <sup>(3)</sup>, Baltazar Nunes <sup>(4)</sup>, Justyna Rogalska <sup>(5)</sup>, Daniela Pitigoi <sup>(6)</sup>, Iwona Paradowska-Stankiewicz <sup>(7)</sup>, Jean Marie Cohen <sup>(8)</sup>, Annicka Reuss <sup>(2)</sup>, Silvia Jimenez-Jorge <sup>(3)</sup>, Ausenda Machado <sup>(4)</sup>, Joan O'Donnell <sup>(5)</sup>, Emilia Lupulescu <sup>(6)</sup>, Malgorzata Lipke <sup>(8)</sup>, Isabelle Daviaud <sup>(8)</sup>, Alain Moren <sup>(1)</sup>

(1) EpiConcept, France, (2) Robert Koch Institute, Berlin, Germany, (3) Instituto de Salud Carlos III, Spain, (4) Instituto Nacional de Saúde Dr Ricardo Jorge, Lisbon, Portugal, (5) Health Protection Surveillance Centre, Dublin, (6) Cantacuzino Institute, National Institute of Research, Bucharest, Romania (7) National Institute of Public Health-National Institute of Hygiene, Warsaw, Poland, (8) GROG/Open Rome, Paris

### BACKGROUND:

In the fifth season of I-MOVE (Influenza Monitoring Vaccine Effectiveness in Europe), we undertook a multicentre case-control study (MCCS) based on sentinel practitioner surveillance networks in seven European Union (EU) Member States to measure 2012/13 influenza vaccine effectiveness against medically-attended influenza-like illness (ILI) laboratory-confirmed as influenza. The season was characterised by substantial co-circulation of influenza B, A(H1N1)pdm09 and A(H3N2) viruses.

### METHODS:

Practitioners systematically selected ILI patients to swab within eight days of symptom onset. We compared influenza-positive by type/subtype to influenza-negative patients among those who met the EU ILI case definition. We conducted a complete case analysis using logistic regression with study as fixed effect and calculated adjusted vaccine effectiveness (AVE), controlling for potential confounders (age, sex, onset week and presence of chronic conditions). We calculated AVE by type/subtype and age-group.

### RESULTS:

We included 5993 patients, with 1937 influenza B, 1068 A(H1N1)pdm09 and 732 A(H3N2) cases. AVE was 49.3% (95%CI 32.1-62.1) against influenza B, 51.2% (95%CI 29.3-66.3) against A(H1N1)pdm09 and 42.1% (95%CI 14.8-60.7) against A(H3N2). AVE against all influenza was 28.9% (95%CI -15.1-56.1) among those aged 0-14 years, 58.6% (95%CI 41.5-70.8) among those 15-59 years and 52.4% (95%CI 23.8-70.3) among those 60 years and older. AVE for influenza B was 22.3% (95%CI -37.0-55.9) for 0-14 year olds, 64.0% (95%CI 42.2-77.6%) for 15-59 year olds and 40.7% (95%CI -2.2-65.6) for those aged 60 and older.

### CONCLUSIONS:

Our results suggest low to moderate AVE against influenza B, A(H1N1)pdm09 and A(H3N2), between 42-51%. Estimates are lowest in younger age groups. In this season with many co-circulating viruses, the high sample size enabled stratified AVE by type/subtype. The low estimates indicate seasonal influenza vaccines should be improved to achieve acceptable protection levels.

PRESENTED BY: Esther Kissling

**Keywords:** Influenza, Influenza vaccine, prevention & control, multicentre studies, case control studies

ESCAIDE REFERENCE NUMBER: 20131785

## Did the Dutch pneumococcal vaccination campaign decrease the need for respiratory antibiotics in children?

Giedre Gefenaite<sup>(1)</sup>, Maarten J. Bijlsma<sup>(2)</sup>, Jens H. Bos<sup>(2)</sup>, Eelko Hak<sup>(2)</sup>

(1) WHO Regional Office for Europe (2) Department of Pharmacy, Unit of PharmacoEpidemiology & PharmacoEconomics (PE2), University of Groningen, The Netherlands

### BACKGROUND:

*Streptococcus pneumoniae* causes childhood respiratory mucosal infections that are frequently treated with antibiotics. In June 2006, an infant pneumococcal vaccination campaign (PVC) with a 7-valent vaccine was introduced in The Netherlands. In 2011, this vaccine was replaced with a 10-valent pneumococcal vaccine. To estimate the effectiveness of PVC we analysed the respiratory antibiotic use in the period of 2002-2012.

### METHODS:

This study was performed in 1-9 years old children included in the Dutch pharmacy-dispensing IADB.nl prescription database. Seasonal autoregressive integrated moving average models were applied to estimate the effectiveness of PVC (%) and its 95% confidence intervals (95%CI).

### RESULTS:

The models showed that introduction of the 7-valent PVC reduced antibiotic prescription proportions by 2.8% [95%CI 0.2-5.3] and 5.6% [95%CI 2.3-8.8] in 3 and 4 years old children. When the 10-valent PVC was added to the models, it reduced the proportion of antibiotic prescriptions only in 1 year old children by 24.5% [95%CI 6.0-39.3].

### CONCLUSIONS:

There is a tendency towards a decrease in respiratory antibiotic prescription proportions after the introduction of 7-valent pneumococcal vaccination campaign. A 10-valent PVC demonstrated the reduction in antibiotic prescription proportions as well, but due to a relatively recent introduction the number of data points was limited and therefore the conclusions are preliminary.

PRESENTED BY: Giedre Gefenaite

**Keywords:** Vaccination, Pneumococcal Infections, Program evaluation, Anti-Bacterial Agents, Child

ESCAIDE REFERENCE NUMBER: 20131759

## Parallel Session 18 – Sexually transmitted infection

### European MSM (men who have sex with men) Internet Survey: Blood donation and HIV screening across Europe (2010)

Susanne Barbara Schink<sup>(1)</sup>, Ruth Offergeld<sup>(1)</sup>, Ulrich Marcus<sup>(1)</sup>

(1) Robert Koch Institute, Germany

### BACKGROUND:

MSM are deferred from donating blood in most European countries. We compare socio-demographic and behavioural characteristics of MSM who report that their last negative HIV test took place within the context of a blood donation to those testing negative in other settings to describe those who donate blood and explore potentially unmet healthcare needs.

### METHODS:

The first pan-European internet survey of MSM recruited more than 180,000 men from 38 countries and included questions regarding health and healthcare. We used logistic regression models to compare MSM who tested HIV negative in blood donation centres with MSM testing elsewhere in terms of self-reported age, residence, sexual activity and relationship status, as well as history of sexually transmitted infections (STI) and access to screening.

### RESULTS:

Among 108,718 respondents who tested negative, 6,985 (6.4%) indicated that their last HIV-screening took place within the context of a blood donation. Blood donation is more common among <30 years-olds (OR=2.3, 95%CI:2.2-2.4). Compared to metropolitan cities with ≥1 million inhabitants, the odds to use blood donor services double in towns with ≤10k residents (OR=2.0, 95%CI:1.8-2.2). MSM who donate blood are more likely to have a steady female partner (OR=2.2, 95%CI:2.0-2.3). Blood donors are less likely to have ever engaged in anal intercourse (OR=0.44, 95%CI:0.39-0.49). They had fewer STIs diagnosed in the preceding 12 months (OR=0.42, 95%CI:0.37-0.48), are more likely to experience symptoms when seeking STI testing (OR=2.5, 95%CI:2.2-2.9) and report less access to free or affordable sexual-health screening (OR=0.49, 95%CI:0.46-0.53).

### CONCLUSIONS:

Public health professionals need to (1) be aware that MSM donate blood and test for HIV at blood donation services irrespective of deferral policies and (2) provide accessible and acceptable HIV and STI screening alternatives.

PRESENTED BY: Susanne Barbara Schink

**Keywords:** Men, who, have, sex, with, men (MSM) / blood donor / HIV / STI / screening / online survey

ESCAIDE REFERENCE NUMBER: 20131756

## Increase of sexually transmitted hepatitis C virus in men who have sex with men in Barcelona, Spain

Garriga Cesar<sup>(1)</sup>, Sandra Manzanares<sup>(2)</sup>, Patricia Garcia de Olalla<sup>(2)</sup>, Pilar Gorrindo<sup>(2)</sup>, Sandra Gomez<sup>(2)</sup>, Virginia Plasencia<sup>(3)</sup>, Maria Jesus Barbera<sup>(4)</sup>, Ricard Sola<sup>(5)</sup>, Joan A Cayla<sup>(2)</sup>

(1) National Centre for Epidemiology, Spain, (2) Public Health Agency, Spain, (3) Catalunya Reference Laboratory, Spain, (4) Unitat de Malalties de Transmissió Sexual, Hospital Vall d'hebron, Spain, (5) Hospital del Mar, Barcelona, Spain

### BACKGROUND:

During the last decade, outbreaks of acute hepatitis C virus (AHCV) infection were reported among men who have sex with men (MSM) in several European cities. To study this infection in MSM in Barcelona, Spain, we reviewed all cases since 2008 until April 2013.

### METHODS:

All data were collected by the AHCV Registry. Descriptive design using data of laboratory confirmed cases living in the city and aged 18-59. We assessed frequencies of risk factors for HCV infection during the six months before diagnosis, as undergone surgery, blood transfusion, dialysis, drug use and sexual behaviour, taking into account individual demographics and HIV status.

### RESULTS:

During the study period, 40 AHCV were diagnosed, 33 men (83%) and 7 women (17%). In 2012, an increase of 67% were observed compared to median of cases of the past four years. This trend was observed only in MSM (15 cases) without other risk factors than sexual. Median age of them was 39 years (range 24-58 years), 9 Spaniards and 6 foreigners, 10 HIV-infected and 4 were diagnosed with another STI in the last year. Genotype was available in 12 cases: 6 had genotype 4, 2 genotype 2, 2 genotype 1 and, 1 mix genotype 1 and genotype 4.

### CONCLUSIONS:

We detected an increase of HCV in MSM, without other risk factors for HCV transmission than sexual. Different genotypes are circulating, giving rise to simultaneous outbreaks. Target awareness campaigns and routine screening are urgently needed to limit HCV spread

PRESENTED BY: Cesar Garriga

**Keywords:** Outbreaks, HIV, Hepatitis C, MSM, and Sexually Transmitted Diseases,

ESCAIDE REFERENCE NUMBER: 20131716

## High prevalence of genital infections with chlamydia, gonorrhoea and trichomonas in hard-to-reach female sex workers in Germany: Preliminary data of the STI-Outreach study

Klaus Jansen<sup>(1)</sup>, Viviane Bremer<sup>(1)</sup>, Gyde Steffen<sup>(1)</sup>, Sarma Navina<sup>(1)</sup>, Stine Nielsen<sup>(1)</sup>, Dieter Münstermann<sup>(2)</sup>, Andreas Lucht<sup>(2)</sup>, Carsten Tiemann<sup>(2)</sup>

(1) Robert Koch-Institute, Germany, (2) Labor Krone, Germany

### BACKGROUND:

In Germany, STI prevalence data only exist for female sex workers (FSW) attending local public health authorities (LPHA). FSW without regular contact to health services may be at high risk for STI. We measured the prevalence of chlamydia trachomatis (CT), gonorrhoea (NG) and trichomonas (TV) among FSW at their workplace to identify the most vulnerable subgroups and to plan appropriate and effective interventions.

### METHODS:

Specialised outreach-workers of LPHA screened FSW in Berlin, Hamburg and North Rhine-Westphalia for the respective STI on basis of self-collected vaginal swabs, using TMA (APTIMA Combo 2®; APTIMA® Trichomonas vaginalis Assay). Sociodemographics, sexual behavior and medical care situation were surveyed with help of translators and cultural mediators. We calculated prevalence ratios (PR) and 95% confidence-intervals (CI95%).

### RESULTS:

Up to June 26, 1020 FSW were enrolled by 18 LPHA. 88.8% of FSW were born abroad. Overall, 39.9% of non-Germans had no German language skills. German and non-German FSW differed regarding existing health insurance (86.7% vs. 18.0%,  $p < .01$ ) and ever attending a LPHA (66.7% vs. 42.5%,  $p < .01$ ). Prevalences were 10.8% for CT, 4.9% for NG, and 12.2% for TV. Prevalence for any STI was higher among FSW aged  $>39$  years compared to those  $<20$  years (PR:2.8; CI95%: 1.4-5.7), for FSW with duration of sexwork 0-1 years compared to  $>5$  years (PR:2.0; CI95%: 1.4-2.7), born abroad (PR:2.1; CI95%: 1.3-3.6), no German skills (PR:1.3; CI95%: 1.1-1.7), never attended a LPHA (PR:1.7; CI95%: 1.3-2.2) and no health insurance (PR:1.9; CI95%: 1.3-2.6).

### CONCLUSIONS:

Prevalences of CT, NG and TV were generally high. Specific public health actions should be implemented for foreign-born FSW with lacking language skills, especially to address free-of cost testing and treatment for STI for FSW without health insurance.

PRESENTED BY: Klaus Jansen

**Keywords:** STI, sex worker, epidemiology, hard-to-reach-setting

ESCAIDE REFERENCE NUMBER: 20131647

## Syphilis on the rise in Germany – is it temporary or a trend?

Viviane Bremer <sup>(1)</sup>, Ulrich Marcus <sup>(1)</sup>, Osamah Hamouda <sup>(1)</sup>

(1) Robert Koch-Institute, Germany

### BACKGROUND:

In Germany, laboratory-confirmed syphilis cases of syphilis are reported anonymously to the Robert Koch-Institut (RKI). After doubling 2001-04, syphilis cases remained stable or decreased until 2009. The number of syphilis cases is increasing since 2010. We analysed syphilis surveillance data until April 2013 to identify trends and potential risk groups.

### METHODS:

Laboratories notify syphilis to RKI, physicians complete laboratory findings with clinical information. Potential double notifications were identified by comparing available demographic data, diagnosis date, antibody titers, and clinical information. Syphilis was defined as: direct detection by microscopic or histological examination; positive screening test plus confirmation tests and VDRL/KBR activity, detection of IgM antibodies or clinical information consistent with syphilis. We plotted syphilis cases by month of diagnosis. We analysed the data by age, sex and area of residence transmission category.

### RESULTS:

Laboratories reported 4417 cases in 2012 and 1571 cases from January to April 2013. The overall incidence in 2012 was 5.4 per 100,000 inhabitants, with highest incidences in Cologne (28.4), Munich (22.9) and Berlin (20.9). The median number of monthly cases increased from 253 in 2010 to 381 in 2013, corresponding to an average increase of 4.4 cases/month. Cases in 2012 increased in 12/16 federal states and 93.2% were from men. Incidence in men was highest in urban areas (23.1/100,000). The likely mode of transmission was available for 72.8% of cases in 2012; of these, 75.7% were men who have sex with men (MSM) and in 16.4% heterosexual transmission was reported.

### CONCLUSIONS:

Syphilis cases continue to increase, which is mainly attributable to MSM in large cities. Consistent condom use, early diagnosis and treatment are important to decrease syphilis and subsequently potential HIV transmission.

PRESENTED BY: Viviane Bremer

**Keywords:** Syphilis, surveillance, men who have sex with men, Germany

ESCAIDE REFERENCE NUMBER: 20131513

## Epidemiology of sexually transmitted infections in Europe

Gianfranco Spiteri <sup>(1)</sup>, Marita van de Laar <sup>(1)</sup>

(1) ECDC, Sweden

### BACKGROUND:

STI are a significant cause of morbidity in Europe, particularly among young adults and men who have sex with men (MSM). Monitoring the spread of STI across key populations allows development of targeted prevention interventions.

### METHODS:

Surveillance for chlamydia, gonorrhoea and syphilis in the European Union is coordinated by the European Centre for Disease Prevention and Control. Data reported by Member States covering 1990-2011 were analysed.

### RESULTS:

In 2011, 346911 chlamydia cases were reported (175 per 100000 population). Rates were higher among women (203/100000) than men (145/100000). Young adults (15-24 years) were most affected (73% of cases). Transmission was mainly through heterosexual contact (86%). The overall rate increased from 144/100000 in 2000 to 332/100000 in 2011. In 2011, 39179 cases of gonorrhoea were reported (12.6/100000). Rates among men (21.2) were three times higher than women (7.6). Young adults contributed 42% of cases. MSM transmission accounted for 33% of cases (53% of male cases). HIV co-infection was reported among 11% of cases. Rates have increased by 27% since 2008. There were 19798 syphilis cases reported in 2011 (4.9/100000); rates among men (7.5) were four times higher than females (1.9). Young adults represented 16% of cases. The predominant mode of transmission was among MSM (42%). HIV co-infection was reported in 28% of cases. Following a decreasing trend since 1998, rates increased by 10% in 2011.

### CONCLUSIONS:

Increased rates of chlamydia result from strengthened case detection and improved diagnostics. Young adults constitute a large proportion of cases of chlamydia and gonorrhoea. Transmission among MSM accounts for the majority of syphilis and, increasingly, gonorrhoea spread. Both key populations need to be better targeted through specific prevention and control measures.

PRESENTED BY: Gianfranco Spiteri

**Keywords:** STI Chlamydia Gonorrhoea Syphilis

ESCAIDE REFERENCE NUMBER: 20131760

## Unprotected casual sex equally common with local and western partners among long-term Dutch travellers to (sub)tropical countries

Jane Whelan <sup>(1)</sup>, Sanne Belderok <sup>(1)</sup>, Gerard Sonder <sup>(1)</sup>, Anneke van den Hoek <sup>(1)</sup>

(1) Public Health Service Amsterdam, The Netherlands

### BACKGROUND:

Casual sex among travelers is common. It is unknown whether travelers use condoms differently with local versus western casual partners when visiting HIV-endemic regions. We studied Dutch long-term travelers to (sub)tropical regions, identifying traveler characteristics associated with unprotected casual sex, and within each casual sexual partnership, whether the partner's ethnicity was associated with condom use.

### METHODS:

A prospective mono-centre study of Dutch adult travelers, attending a travel clinic in Amsterdam (2008-2011) and travelling to any (sub)tropical country for  $\geq 12$  and  $\leq 52$  weeks, was conducted. Travelers reported demographic information, travel purpose, and number and nature of sexual contacts while travelling: ethnicity, gender, type of partner (steady/casual) and condom use. Analyses were conducted using Poisson regression (generalized estimating equations (GEEs) to account for multiple partnerships). Results are reported as incidence rate ratios (IRRs) or odds ratios (ORs).

### RESULTS:

There were 552 respondents and 11671 person-weeks of follow up (median age: 25 years, 34% male, median travel time: 20 weeks, 45% for work/study). Post travel, 35% (n=190/552) reported  $\geq 1$  casual sexual partner. Male, single travelers and MSM had more casual partners. Travel to Sub-Saharan Africa was protective; 46% had unprotected casual sex (87/190) and the risk increased by 21% with each additional casual sexual partner (IRR unit increments in partner count: 1.21, 95% CI: 1.1-1.3, p=0.003). Of 462 casual partnerships among 190 travelers, 42% (n=192/462) were with local partners from the destination country. Adjusting for multiple partnerships per traveler, OR of unsafe sex with a local, versus Dutch partner was not significant (GEE: OR 0.8, 95% CI: 0.56-1.24, p=0.221).

### CONCLUSIONS:

Inconsistent condom use occurred similarly with local and western sexual partners. Single travelers and those having multiple casual partners were most at risk. All single travelers should be advised on the need for safe sex while abroad.

PRESENTED BY: Jane Whelan

**Keywords:** Condoms, Sexual partners, Ethnicity, Travels

ESCAIDE REFERENCE NUMBER: 20131644



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# Poster Abstracts – Poster Session A

Poster Session A 16.35 – 18.00 Tues 5

## Antimicrobial resistance

### Microorganisms isolated from blood samples and their antimicrobial susceptibilities

Osman Sezer Cirit<sup>(1)</sup>, Ayşer Uzala Mızraklı<sup>(2)</sup>, Yalçın Vurupalmaz<sup>(2)</sup>, Ayşe Barış<sup>(3)</sup>, Tuba Müderris<sup>(4)</sup>

(1) Gaziantep Dr. Ersin Arslan State Hospital, Turkey, (2) Şanlıurfa Training and Research Hospital Microbiology Laboratory, Turkey, (3) Istanbul University Cerrahpaşa Medical Faculty Microbiology Department, Turkey, (4) Ankara Atatürk Training and Research Hospital Microbiology Laboratory, Turkey

#### BACKGROUND:

Our laboratory is a member of national antimicrobial resistance surveillance system. The aim of this study was to evaluate the microorganisms isolated from blood samples and antimicrobial susceptibility patterns which were sent to Microbiology laboratory of Şanlıurfa Training and Research Hospital between January 2010 and December 2012.

#### METHODS:

The bottles were incubated in BACTEC system for 7 days. During the incubation when system alerted for positive signals, blood culture samples inoculated on the 5% sheep blood agar and EMB agar. The strains were identified by both conventional methods and VITEK 2 Compact system. Antibiotic susceptibility of isolates was tested by both disc diffusion method and VITEK 2 Compact system according to CLSI guidelines.

#### RESULTS:

Among 6406 cultured blood samples, 2149 (33.5%) were positive. The predominant species was coagulase negative staphylococcus (CNS) (49.8%) followed by *Candida* sp. (9.3%), *Corynebacterium* sp. (6.8%), *E. coli* (6.7%), *Micrococcus* sp. (5.8%), *Acinetobacter* sp. (4.8%), *S. aureus* (4.7%), *Enterococcus* sp. (4.6%), *Pseudomonas* sp. (1.9%), *Klebsiella* sp. (1.3%), *Bacillus* sp. (1.2%), *Brucella* sp. (1.2%) and others (1.9%). The resistance rates of CNS for oxacillin, penicillin, erythromycin, ciprofloxacin were 79.3%, 89.4%, 72.5%, 55.2% respectively. The resistance rates for *E. coli* isolates were determined as following; ampicillin (93%), cefazolin (77%), gentamicin (37%), imipenem (4%) 73% of *E. coli* and 56% of *Klebsiella* sp. had ESBL positive.

#### CONCLUSIONS:

Most of the isolated microorganisms are normal flora of the skin. Hospital infection control nurses should educate staff for preventing contamination during blood sampling. Knowledge of the results of antimicrobial resistance rates is important for the selection of empirical treatment for bloodstream infections. Surveillance studies might be helpful for preventing the spread of multidrug strains in hospital.

PRESENTED BY: Osman Sezer Cirit

Keywords: Blood, surveillance, resistance, CNS

ESCAIDE REFERENCE NUMBER: 20131529

### A comparative analysis of bacterial resistance to antibiotics in a surgical oncology center from Romania, 2009-2012

Delia Mihaela Herghea<sup>(1)</sup>, Patriciu Achimas-Cadariu<sup>(1)</sup>, Alexandru Irimie<sup>(1)</sup>, Letitia Blag<sup>(2)</sup>, Adeline Honciuc<sup>(1)</sup>

(1) Institute of Oncology, Romania, (2) Synevo Laboratories Cluj-Napoca, Romania

#### BACKGROUND:

To analyse changes in bacterial resistance to antibiotics in cancer patients after a four-year period of surgical prophylaxis and treatment with third generation cephalosporins.

#### METHODS:

Laboratory-based surveillance was conducted in the Surgical Department of the Oncology Institute "I. Chiricuta", Cluj-Napoca, Romania in 2009 and 2012. Species of interest were *Staphylococcus aureus*, coagulase-negative staphylococci, *Enterococcus* sp., *Escherichia coli*, *Klebsiella* sp., *Pseudomonas aeruginosa* and *Acinetobacter baumannii* isolated from wound and pus samples. Pathogens were specified as resistant using CLSI criteria. Univariate analysis was performed with Epi Info 3.5; chi-square test was used to compare proportions; level of statistical significance was  $p < 0.05$ .

#### RESULTS:

There were 285 pathogens isolated in 2009 (54.0% Gram-positive) and 239 in 2012 (59.4% Gram-positive). The most common was *Staphylococcus aureus* (31.9% vs 28.9%;  $p=0.45$ ), followed by *Enterococcus* sp. (10.5% vs 24.3%,  $p < 0.001$ ), *Escherichia coli* (17.5% vs 16.3%;  $p=0.71$ ), *Klebsiella* sp. (5.9% vs 7.5%;  $p=0.47$ ) and *Pseudomonas aeruginosa* (9.5% vs 6.3%;  $p=0.18$ ). Resistance proportions were as follows in 2009 and 2012, respectively: methicillin-resistant *Staphylococcus aureus* (MRSA): 42.9% and 69.6% ( $p < 0.001$ ); methicillin-resistant coagulase-negative staphylococci: 13/26 and 9/10 strains ( $p=0.03$ ); extended-spectrum beta-lactamase (ESBL) *E. coli*: 12% and 48.7% ( $p < 0.001$ ); ESBL *Klebsiella* sp.: 7/17 and 9/18 strains ( $p=0.8$ ).

#### CONCLUSIONS:

The proportion of enterococci doubled in 2012 as a result of surgical prophylaxis and treatment with third generation cephalosporins. Significantly increased proportions were recorded in 2012 for MRSA, methicillin-resistant coagulase-negative staphylococci and ESBL *E. coli*.

PRESENTED BY: Delia Mihaela Herghea

Keywords: Bacterial resistance to antibiotics, third generation cephalosporins

ESCAIDE REFERENCE NUMBER: 20131834



## Decrease of vancomycin resistant enterococci (VRE) over a 9-year period in Italy

Maria Del Grosso <sup>(1)</sup>, Tommaso Renzi <sup>(1)</sup>, Fortunato D'Ancona <sup>(1)</sup>, Annalisa Pantosti <sup>(1)</sup>

(1) Istituto Superiore Di Sanita, Italy

### BACKGROUND:

Vancomycin-resistant enterococci (VRE) are multi-drug resistant nosocomial pathogens that emerged in the 1990s, associated with a large use of glycopeptides (vancomycin and teicoplanin) in the clinical setting. The use of the glycopeptide avoparcin as a growth-promoter in farm animals was banned in 1997 in EU after evidence of an animal reservoir of VRE. Aim of this study was to monitor the trend of VRE from bacteraemia in Italy.

### METHODS:

Susceptibility data for *Enterococcus faecalis* and *Enterococcus faecium* were obtained through the surveillance project AR-ISS, that collects routine antibiotic susceptibility data from 35 sentinel laboratories in different areas of Italy. Data from the period 2003-2011 were analyzed. A sample of VRE isolates were sent to ISS to identify vancomycin resistance genes (vanA or vanB) by PCR.

### RESULTS:

In the period 2003-2011, 6266 enterococcal isolates from bacteraemia were reported to AR-ISS; of these, 66.2% were *E. faecalis* and 33.8% were *E. faecium*. The proportion of VRE was stable over the years in the species *E. faecalis* (2-3%). Among *E. faecium*, the proportion of VRE was quite high in 2003 (24%) but decreased steadily in the subsequent years and since 2009 it reached a low 4%. All the VRE *E. faecalis* examined (n=27) from different periods of the surveillance carried vanA, while among VRE *E. faecium* (n=70), vanA was predominant and vanB was present in 10% of the isolates only.

### CONCLUSIONS:

The remarkable decrease of VRE is in contrast with the increasing trend of antimicrobial resistance in other pathogens under surveillance in Italy. It is unlikely that this decrease is associated with a decreased use of glycopeptides. The possibility of a decrease of the animal reservoir should be explored.

PRESENTED BY: Annalisa Pantosti

**Keywords:** *Enterococcus faecalis* *Enterococcus faecium* vancomycin resistance bacteremia surveillance

ESCAIDE REFERENCE NUMBER: 20131744

## A hospital-level risk factor analysis of methicillin-resistant *Staphylococcus aureus* bacteraemia in Scotland

Cheryl. L. Gibbons <sup>(1)</sup>, Margo. E. Chase-Topping <sup>(1)</sup>, Bram. A.D. van Bunnik <sup>(1)</sup>, Thibaud Porphyre <sup>(1)</sup>, J. Ross Fitzgerald <sup>(2)</sup>, Oliver Blatchford <sup>(3)</sup>, Chris Robertson <sup>(4)</sup>, Mark. E.J. Woolhouse <sup>(1)</sup>

(1) Centre for Immunity, Infection and Evolution (CIE), Ashworth Laboratories, University of Edinburgh, United Kingdom, (2) The Roslin Institute, Easter Bush Campus, University of Edinburgh, United Kingdom, (3) Health Protection Scotland, Glasgow, United Kingdom, (4) Department of Mathematics and Statistics, University of Strathclyde, Glasgow, United Kingdom,

### BACKGROUND:

There is a wealth of literature examining patient-level risk factors for methicillin-resistant *Staphylococcus aureus* (MRSA). However, such results are not applicable at the hospital-level. Furthermore, while it is generally accepted that MRSA is more common in larger hospitals, there are few studies attempting to verify or explain this. Therefore, we carried out a risk-factor analysis to identify hospital-level characteristics associated with MRSA bacteraemia in Scotland. The objective was twofold; firstly, to identify risk factors in hospitals with cases versus those without, and secondly, to investigate risk factors associated with increasing number of cases in MRSA 'positive' hospitals only.

### METHODS:

Case data (number of bacteraemia cases per hospital) were obtained from Health Protection Scotland (HPS) and data on all hospitals (defined as having at least one inpatient per year, n=206) were obtained from Information Services Division (ISD). Data included: hospital size, hospital classification, presence of specialties, occupancy rate, patient-to-worker ratio, and others. Information on patient movements was generated using referral data. Data were analysed for financial year 2007-08 using generalised linear models with the logarithm of occupied bed days (measure of hospital size) as an offset.

### RESULTS:

Results to date have shown that hospitals with greater connectedness, which are those that send or receive higher numbers of patients to/from other hospitals, have a higher risk of MRSA (given the at-risk population). This 'connectivity' may explain why hospitals of similar size have varying rates of MRSA. Further analyses are being carried out to identify additional risk factors.

### CONCLUSIONS:

This is the first Scotland-wide study utilising hospital-level characteristics to examine differences in MRSA morbidity between hospitals. Factors identified will inform mathematical models that will advance our understanding of transmission between hospitals.

PRESENTED BY: Cheryl. L. Gibbons

**Keywords:** Methicillin-Resistant *Staphylococcus aureus* Risk Factors Hospitals Bacteremia Models, Statistical

ESCAIDE REFERENCE NUMBER: 20131683

## Time for awareness: healthcare-associated infections and antimicrobial use in long-term care facilities – Hungary, 2013

Rita Szabo <sup>(1)</sup>, Karolina Borocz <sup>(1)</sup>

(1) National Centre for Epidemiology, Hungary

### BACKGROUND:

Healthcare-associated infections (HAI) and antimicrobial use are common among residents in long-term care facilities (LTCF). As part of the ECDC-funded HALT-project (Healthcare-associated Infections and Antibiotic Use in European Long-term Care Facilities), we conducted a point-prevalence survey with voluntary participation to establish representative baseline rates and identify priorities for improvement.

### METHODS:

All LTCFs with over 50 beds were invited to participate in the HALT-project. Between April – May 2013, trained LTCF-staff completed: i) an institutional questionnaire on infection control practices (ICP) and ii) a form on each resident with HAIs and/or on antimicrobial therapy on the day of the survey. We used the ECDC definitions and protocol. We calculated prevalence of infections and antimicrobial use, using the number of all residents as the denominator and 95% confidence intervals (95% CI).

### RESULTS:

98 (23%) LTCFs with approximately 11,700 beds participated in the study. The prevalence of HAI was 2.0 % (95% CI 1.8%-2.3%). Of 235 HAIs reported, the most common were respiratory (40%), skin/soft tissue (30%) and urinary infections (17%). Of all residents, 1.3 % (95% CI 1.1%-2.0%) used antimicrobials. Of 154 antimicrobials reported, 87% were for systemic use.

### CONCLUSIONS:

The first baseline data indicate that HAIs and antimicrobial use constitute a relevant public health problem in LTCFs in Hungary. We recommend implementing a surveillance system specific for LTCFs to follow trends in HAIs and antimicrobial use and to identify priorities for national and local intervention measures focusing on preventing infections and prudent antimicrobial use in the LTCF residents.

PRESENTED BY: Rita Szabo

**Keywords:** Long-term care facilities, healthcare-associated infections, point-prevalence survey, surveillance

ESCAIDE REFERENCE NUMBER: 20131558

## Third generation cephalosporins use in Southwestern France hospitals in 2012: time for action

Catherine Dumartin <sup>(1)</sup>, Caroline Bervas <sup>(1)</sup>, Muriel Péfau <sup>(1)</sup>, Anne-Marie Rogues <sup>(2)</sup>, Pierre Parneix <sup>(1)</sup>

(1) CCLIN Sud-Ouest, France, (2) INSERM, France

### BACKGROUND:

Third generation cephalosporin (3GC) use increased in recent years in French hospitals as in other European countries. In addition, a recent study suggested that ceftriaxone could be more related to 3GC-resistant Enterobacteriaceae rates than other 3GC such as cefotaxime. Therefore, a better understanding of factors linked to ceftriaxone use could help in promoting its rational use. We performed a study in Southwestern France to describe 3GC use in hospitals, with a focus on intensive care units (ICU).

### METHODS:

Data were retrospectively collected in voluntarily participating hospitals for the year 2012: hospital type; number of patient-days (PD); cefotaxime and ceftriaxone dispensed in inpatients wards, expressed in number of defined daily doses (DDD, WHO ATC-DDD system) per 1000 PD.

### RESULTS:

Among the 282 participating hospitals, pooled mean consumption was 3.8 DDD/ 1000 PD for cefotaxime and 18.6 for ceftriaxone. The ratio ceftriaxone /cefotaxime use was over 10 in long-term care, rehabilitation and psychiatry wards, 6.8 in medicine, 4 in surgery, and 1.4 in ICUs. Among ICUs, this ratio varied with hospital type: 0.9 in ICUs located in public hospitals (N=22), 2.5 in university hospitals (N=4) and 6 in private acute care clinics (N=7). Among public hospital ICUs, ceftriaxone use ranged from 0 to 260 DDD/1000 PD (inter-quartile range: 47-153).

### CONCLUSIONS:

This survey provided a first detailed analysis of C3G use in a sample of different hospitals and wards. If the preferred use of ceftriaxone is easily understandable in long-term care and psychiatry wards, the wide differences in its use in ICUs suggest room for improvement. Practice audits in high consumer wards would help in determining most efficient actions to reduce ceftriaxone use, in accordance with national guidelines.

PRESENTED BY: Catherine Dumartin

**Keywords:** Antibiotic use, hospitals, ceftriaxone, intensive care

ESCAIDE REFERENCE NUMBER: 20131819

## Crossborder comparison of antibiotic use in hospitals within the EurSafety Health-net project

Annette Jurke<sup>(1)</sup>, Judith Ludwigs<sup>(2)</sup>, Prashant V. Nannan Panday<sup>(3)</sup>, Jerome R. Lo Ten Foe<sup>(4)</sup>, Kasper Wilting<sup>(4)</sup>, Bhanu Sinha<sup>(4)</sup>, Inka Daniels-Haardt<sup>(5)</sup>, Robin Koeck<sup>(2)</sup>, Alexander Friedrich<sup>(4)</sup>

(1) Infectiology and Hygiene, NRW Centre for Health, Münster, Germany, (2) Institute of Hygiene, University Hospital Münster, Germany, (3) Dept. of Clinical Pharmacy, University of Groningen, University Medical Centre Groningen, The Netherlands, (4) Dept. of Medical Microbiology, University of Groningen, University Medical Centre Groningen, The Netherlands, (5) Health Information Health Reporting, NRW Centre for Health, Münster, Germany

### BACKGROUND:

Antibiotic exposure promotes selection of multiresistant pathogens. Monitoring the density of antibiotic use in cross border regional networks may identify areas for improvement.

### METHODS:

Within the Dutch-German EurSafety Health-net, German hospitals in the Münsterland and the UMCG in Groningen provided data on the use of antibiotics in intensive care units (ICUs) and other wards. The German data were assessed separately for the second half-year 2009 and the first half-year 2010, the data of UMCG in Groningen for 2009 and 2010. The use of antibiotics was reported by hospital pharmacies based on the Anatomical Therapeutic Chemical code in gram, transformed into daily defined doses (DDD) as defined by the World Health Organization.

### RESULTS:

Thirty-four regional hospitals within the network provided data on the use of antibiotics. The median density of antibiotic use on non-ICU wards was in 2009 in the Münsterland 48 DDD/100 patient-days (pd), in Groningen 37.3 and in 2010 in the Münsterland 47 DDD/100 pd but in Groningen 38.3. In the non-ICU setting, betalactamase-resistant penicillins (J01CF), cephalosporins (J01DB-DE), carbapenems (J01DH) and quinolones (J01M) accounted (2009: Münsterland, Groningen / 2010: Münsterland, Groningen) for 0.7%,9.3%/0.9%,10.3%; 38.9%,12.5%/41.6%,12.1%; 2.0%,2.6%/2.1%,3.0% and 11.7%,15.4%/7.9%,16.9% of the total antibiotic use, respectively. On 26 ICUs, the median (mean) density of antibiotic use was in 2009 in the Münsterland 108 DDD/100 pd, in Groningen 84.2 and in 2010 in the Münsterland 109 DDD/100 pd but in Groningen 74.2.

### CONCLUSIONS:

In Groningen betalactamase-resistant penicillins are more frequent but cephalosporines less frequent used, which should encourage Germany to reduce prescription of cephalosporines. Together with regional data on bacterial antibiotic-resistance and healthcare structure, our data can be used by the network hospitals for discussions aiming to improve local antibiotic policies.

PRESENTED BY: Annette Jurke

**Keywords:** Anti-bacterial agents, drug utilization, hospital information system

ESCAIDE REFERENCE NUMBER: 20131838

## Vector-borne diseases

### Dengue outbreak among European travellers at Koh Lanta Island, Krabi province, Thailand – January – May 2012

Kannika Suwanna<sup>(1)</sup>, Rome Buathong<sup>(2)</sup>, Prayad Klabpadung<sup>(3)</sup>, Hataya Kanjanasombut<sup>(2)</sup>

(1) Department of Disease Control, MOPH, Thailand, (2) FETP-Thailand, Department of Disease Control, Ministry of Public Health, Thailand, (3) Krabi Provincial Health Office, Thailand

### BACKGROUND:

On April, 2012 a private hospital in Phuket notified the Ministry of Public Health (MOPH) of increasing numbers of dengue cases among travellers. The MOPH undertook an outbreak investigation from April to May 2012 to confirm the outbreak, describe the characteristics of dengue cases among travellers, and implement control and prevention measures.

### METHODS:

We reviewed medical records from private clinics and hospitals in Phuket and Krabi. Active case finding was done in hotels and surrounding communities on Lanta island, Krabi. Dengue case definitions (DF, DHF and DSS) were defined by 1997 WHO criteria. Dengue serotyping was performed by RT-PCR for 6 cases. Adult female mosquitoes were collected at 4 hotels and underwent species identification and PCR testing.

### RESULTS:

Between January to May 2012, 55 dengue cases were identified among foreign travellers (33 DF, 15 DHF, 2 DSS, 5 unspecified). There were 26 cases reported via passive surveillance and 29 from active case finding. The male:female ratio was 1:1 and median age was 33 years (1 – 65). Travellers identified as dengue cases were predominantly from Sweden (49%), Germany (7%), Britain (5%) and Denmark (5%). The most common clinical presentations were fever, headache, myalgia and rash respectively. No fatal case was reported. Dengue serotype 1 was identified in 3 cases and serotype 2 in one. All collected mosquitoes (n=100) were *Ae. aegypti* and all tested negative for dengue.

### CONCLUSIONS:

A dengue outbreak due to multiple serotypes was confirmed among travellers. The outbreak included a high incidence of DHF/DSS cases, suggesting possible secondary infection in this group. Outbreak response was delayed due to initial cases not being reported to the surveillance. In response to the outbreak, warning messages and advice on repellent use were posted in hotels.

PRESENTED BY: Rome Buathong

**Keywords:** Traveller, dengue outbreak, European, Thailand

ESCAIDE REFERENCE NUMBER: 20131732

### Bacillus sphaericus biolarvicide, an added tool in the control of the *Anopheles gambiae*, in Kumasi, Ghana

Sandra Baffour-Awuah <sup>(1)</sup>, Ellis Owusu-Dabo <sup>(1)</sup>, Augustina Annan <sup>(1)</sup>, Kwasi Obiri-Danso <sup>(2)</sup>

(1) Kumasi Centre for Collaborative Research, Ghana, (2) Kwame Nkrumah University of Science and Technology, Ghana

#### BACKGROUND:

Malaria is holoendemic in Ghana, accounting for 38% of all outpatient illnesses and 36% of all admissions in hospitals and clinics in the country. Its vector control interventions are presently confined to the use of insecticides in indoor residual spraying and long-lasting insecticidal nets. Since vectors of malaria are becoming increasingly resistant to various classes of insecticides, biolarviciding would be an added tool to lower the impact of the disease. *Bacillus sphaericus*, a biolarvicide has been reported to exhibit very low insect resistance and has the ability to persist for some days in treated habitats.

#### METHODS:

We assessed the effectiveness of *Bacillus sphaericus* (Bs Vectolex®) as a tool against the *Anopheles gambiae* larvae in the laboratory and in a controlled field study in Kumasi metropolis, Ghana. The LC<sub>50</sub> and LC<sub>95</sub> of the biolarvicide, Bs Vectolex® were determined in the laboratory. In controlled field trials conducted during the rainy and dry seasons, the effectiveness of *Bacillus sphaericus* formulation and its residual effect were assessed.

#### RESULTS:

It was shown that the *Anopheles gambiae* larvae are susceptible to the biolarvicide with LC<sub>50</sub> and LC<sub>95</sub> of 0.0027 mg/l and 0.0086 mg/l respectively after 24 hours exposure in the laboratory. The residual effect of the *Bacillus sphaericus* formulation lasted for 12 days during the rainy season and 10 days during the dry season for both the 0.5 mg/l and 1.0 mg/l concentrations. No statistically significant difference between the 0.5 mg/l and the 1.0 mg/l concentrations during the rainy ( $p=0.2820$ ) and the dry ( $p=0.8578$ ) seasons were recorded.

#### CONCLUSIONS:

The biolarvicide proved to be an effective tool in the reduction of the *Anopheles gambiae* larval population.

PRESENTED BY: Sandra Baffour-Awuah

Keywords: *Bacillus sphaericus*, *Anopheles*, malaria, vector, biolarvicide  
ESCAIDE REFERENCE NUMBER: 20131669

### Knowledge, attitude and practice about long-lasting insecticide-treated bed nets (LLINs) in Moramanga, Madagascar, February 2012

Armand Rafalimanantsoa <sup>(1)</sup>, Milijaona Randrianariveolosia <sup>(2)</sup>, Rindra Vatosoa Randremanana <sup>(2)</sup>, Soatiana Cathycia Rajatonirina <sup>(2)</sup>, Maherisoa Ratsitorahina <sup>(2)</sup>, Christophe Rogier <sup>(2)</sup>

(1) Ministry of Health – FETP-OI fellow, Madagascar, (2) Institut Pasteur, Madagascar

#### BACKGROUND:

Mass distribution of long-lasting insecticide-treated bed nets (LLINs) is one of four major strategies implemented in Madagascar since 2007 to roll-back malaria. The objective of this study was to describe the knowledge, attitude and practices regarding the use of LLINs in a community in the east of Madagascar.

#### METHODS:

We conducted a cross-sectional study in Moramanga locality, February 2012. We randomly selected 1200 individuals from a census database. We administered a questionnaire collecting information on the accessibility of LLINs, their acquisition, use and acceptability. Questions were validated by direct observation by interviewers. Knowledge on malaria was assessed on a scale from 0(low) to 10(high) based on questions covering disease transmission, treatment and prevention.

#### RESULTS:

We interviewed 857 individuals. The sex ratio male/female was 0.87. All age groups were represented. The proportion of households owning at least one LLIN was 94.4% (272/288). On average, individuals scored 7.3 on the knowledge scale. All LLINs were obtained free of cost during distribution campaigns and 22% of interviewees were not ready to buy one at its market price. Seventy percent of respondents reported having used a LLIN the night before the survey. Among those who had a LLIN, personal discomfort (19%) was the major reason for not using it. Those who kept their nets permanently hanging from the ceiling were 4 times more likely to sleep under it than those who did not (Prevalence Ratio=3.9, 95% CI [2.8–5.7]).

#### CONCLUSIONS:

LLINs are well accepted in this community. Individual discomfort limits their use while having them hanged over the bed increases it. We recommend renewal of free universal distribution campaigns of LLINs to further increase accessibility, underlying the importance of easy set up.

PRESENTED BY: Saïndou Ben Ali Mbaé

Keywords: Mosquito Nets &ndash, Cross-sectional study &ndash, KAP – Madagascar  
ESCAIDE REFERENCE NUMBER: 20131678

### Ownership, Use and Hanging Rate of Campaign Long Lasting Insecticidal Nets in Ibarapa Central Local Government Area, Oyo State, Nigeria

Olukemi Olugbade <sup>(1)</sup>, Olabode Ladipo <sup>(2)</sup>, Olufemi Ajumobi <sup>(1)</sup>, Adebola Olayinka <sup>(1)</sup>

(1) Nigeria Field Epidemiology Laboratory Training Programme (N-FELTP), Abuja, Nigeria, (2) State malaria control programme, Oyo State Ministry of Health, Oyo State, Nigeria

#### BACKGROUND:

Integrated vector management (IVM) is a recognized prevention strategy in malaria control. Use of long-lasting insecticidal nets (LLINs) is more feasible and cost effective compared to other IVM interventions regardless of structure or location of households. The LLINs Campaign in Oyo State conducted in April/May 2013 had the aim of distributing 2 LLINs per household to 60% of households in 20 Local Government Areas (LGA) across the state. Our objective is if state target was achieved.

#### METHODS:

Using the Ibarapa Central LGA as our study location, we used simple random method to select 4 wards in the LGA, in these wards, 4 communities were selected via cluster sampling, in each, 10 households were selected via systematic random sampling methods. Data analysis was done with Direct mathematical calculations.

#### RESULTS:

In the 160 households surveyed there were 129 children under five years of age (U5; 19.5%), 47 pregnant women (PW; 7%) and 486 individuals above 5 years (males and non-PW; 73.4%) giving a total population of 662. A total of 159 netcards were issued to households visited (99.4% registration rate) and 314 nets were received in the community during LLINs distribution. At the time of the survey 310 nets were present in the households (retention rate: 98.7%), and 266 nets were hanging (hanging rate: 85.8%). The LLINs to people ratio was 1:2.4 for U5, 1:6.7 for PW and 1:0.7 for the rest of the population.

#### CONCLUSIONS:

Good LLINs use, net hanging and net retention rates, were observed in the study population with less than 60% state target for LLINs ownership achieved. It is recommended the state scale-up LLINs ownership through existing health programmes, a repeat survey should be conducted months/years post-campaign to assess the same parameters.

PRESENTED BY: Olukemi Olugbade

**Keywords:** Long Lasting Insecticidal Nets, Integrated vector management, Malaria, Nigeria

ESCAIDE REFERENCE NUMBER: 20131641

### Commodity Utilization of Malaria Control Tool: Comparison of Access and Utilization of Long-Lasting Insecticidal Net (LLIN) in Odeda and Imeko-Afon Local Government Areas of Ogun State, Nigeria

Adebiji Abdulhakeem Adeniran <sup>(1)</sup>, Akinola Stephen Oluwole <sup>(1)</sup>, Hammed Oladeji Mogaji <sup>(1)</sup>, Uwem Friday Ekpo <sup>(1)</sup>

(1) Federal University of Agriculture, Abeokuta, Nigeria

#### BACKGROUND:

Malaria causes an overwhelmingly large number of cases and deaths round the globe every year. Long Lasting Insecticide Net (LLIN) is one of the major control tools utilized in this part of the world to control and prevent malaria across all age groups.

#### METHODS:

A study was conducted to compare the accessibility and usage patterns of LLIN in the Odeda and Imeko-Afon LGAs. Three villages were purposefully selected from each Local Government (LG). Questionnaires were interviewer administered to house-heads and personal information was collected from individual member of the family. Househeads answered on behalf of unavailable members and young ones that cannot answer themselves. Household was defined as group of people eating from the same bowl. Data entry and analysis was performed using SPSS 16.0 for windows.

#### RESULTS:

A total of 140 households, 70 from each LG comprising of a combined 374 respondents participated in the study. 87.1% have LLIN in Imeko-afon LG compared to 60% in Odeda LG ( $p < 0.005$ ). 96.7% and 95.2% respectively of households in Imeko-afon and Odeda LG acquired the LLIN through free distribution by the government. There was no significant difference between the two communities in access to LLIN ( $p > 0.005$ ). The utilization rate by househeads in the study was 72.1% and 57.1% in Imeko-Afon and Odeda LG respectively ( $p > 0.05$ ). Of the total respondents, only 47.9% in Imeko-afon and 32.4% in Odeda sleep under the net every day and 22.9% and 62.1% respectively in both LGA do not sleep under LLIN ( $p < 0.005$ ).

#### CONCLUSIONS:

There is the need for more awareness and education on the proper utilization and maintenance of LLIN to enhance the effectiveness of the net.

PRESENTED BY: Adebiji Abdulhakeem Adeniran

**Keywords:** Intervention tools, Long-lasting insecticide net, malaria, LG

ESCAIDE REFERENCE NUMBER: 20131447

## Bat rabies, what is the risk? Knowledge, attitude and perception towards bat rabies among bat workers and animal ambulance employees in The Netherlands

Hetty Koppenaal <sup>(1)</sup>, Peter Lina <sup>(2)</sup>, Sandra Borsboom <sup>(3)</sup>, André Meeske <sup>(3)</sup>, Toos Waegemaekers <sup>(3)</sup>, Alma Tostmann <sup>(4)</sup>

(1) Public Health Service of Zwolle (GGD IJsselland), Zwolle, The Netherlands, (2) Naturalis Biodiversity Center, Leiden, The Netherlands, (3) Centre for Infectious Disease Control, National Institute for Public Health and the Environment, Bilthoven, The Netherlands, (4) Hygiene and Infection Prevention, Dept of Medical Microbiology, Radboud University Nijmegen Medical Centre, Nijmegen, The Netherlands

### BACKGROUND:

European Bat Lyssavirus (EBLV), a cause of rabies, has been found in two bats species in The Netherlands. The objective of this study was to get more insight into the risk, attitude and perception towards bat rabies among people with frequent exposed to bats through (voluntary) work or hobby in The Netherlands in order to formulate public health recommendations for these specific groups.

### METHODS:

In 2012, a cross-sectional survey was held among bat workers and animal ambulance employees in The Netherlands to collect information on the frequency of bat contact, bites or scratches, rabies vaccination coverage, post-incident behaviour and reasons for not taking preventive measures.

### RESULTS:

Of the 291 bat workers who responded, 56% has physical contact with bats. Vaccination coverage in bat workers with regular bat contact was 84% compared to 55% for those with irregular bat contact (odds ratio 4.3; 95% CI 1.8-10.4). In total, 58% of those with bat contact had been bitten in the last year, ranging from 1 to 50 times. The main reason for not being vaccinated was 'not working with bat species that could carry EBLV'. Of the 104 animal ambulance employees who responded, 71% has ever had contact with a bat during ambulance work. Less than 10% knew which bats could transmit rabies. Four had ever been bitten by a bat and all had contacted the public health authorities for post-exposure advice.

### CONCLUSIONS:

In order to further increase vaccination coverage among bat workers with frequent bat contact, we recommend streamlining of guidelines on the vaccination regime. Recommendations for the animal ambulance employees include increasing awareness of bat rabies and the advice to contact health authorities upon biting or scratching incidents.

PRESENTED BY: Alma Tostmann

**Keywords:** Lyssavirus, Rabies, Rabies Vaccines, Rabies virus, Bats, Chiroptera

ESCAIDE REFERENCE NUMBER: 20131440

## Food and water-borne diseases

### An investigation of cluster of Botulism cases, Rudaki District, Tajikistan, Jan 2, 2012

Mirkhamudin Kamalov <sup>(1)</sup>

(1) Administration of State Sanitary Epidemiological Surveillance, Tajikistan

### BACKGROUND:

On Jan 2, 2012 public health authorities in Rudaki District in Tajikistan were notified that five individuals with gastrointestinal and central nervous system manifestations were admitted to the local hospital. All attended a lunch that was organized two days earlier in a household. On Jan 4, we conducted an investigation to determine the cause and to identify the likely food source for disease

### METHODS:

All five case-patients were included in a descriptive study. Detailed information was collected on food exposure history within three days earlier including the lunch on Dec 31. Clinical data was obtained from medical records. Data was analyzed by time and person

### RESULTS:

Case-patients were 6 to 67 years old. Date of onset was between Dec 31 and Jan 1. Clinical presentation was suggestive of botulism and included: dryness of the mouth, diplopia, hoarseness of the voice and difficulty breathing. One case-patient was critically ill; he died of respiratory distress on Jan 4. Samples from the patients and food leftovers were not tested because of lack of lab capabilities. Botulism diagnosis was made on clinical ground only. The only common event to all case-patients was the lunch on Dec 31. Home-made conserved tomatoes and cucumbers were the only food item that was served during the lunch and was not made of fresh produce.

### CONCLUSIONS:

The conserved tomatoes and cucumbers was the most likely source for this outbreak; other food items were unlikely botulism source as they were made of fresh produce. Health education was provided to the local community on proper food conserving practices. We also recommend improving the capacity of local public health labs to detect microbial causes of illness

PRESENTED BY: Mirkhamudin Kamalov

**Keywords:** Botulism, conserves, Rudaki, Tajikistan

ESCAIDE REFERENCE NUMBER: 20131486

## Epidemiological patterns of campylobacteriosis in Germany, 2001-2010

Anika Schielke <sup>(1)</sup>, Bettina Rosner <sup>(1)</sup>, Klaus Stark <sup>(2)</sup>

(1) Robert Koch Institute, Germany, (2) Robert Koch-Institut, Department for infectious Disease Epidemiology, Germany

### BACKGROUND:

Campylobacteriosis is the most common notifiable bacterial gastrointestinal disease in Germany and in many other European countries as well. The aim of the study was to analyse the epidemiological patterns of campylobacteriosis in Germany in order to identify high risk groups and clues for prevention measures.

### METHODS:

Acute, laboratory-diagnosed *Campylobacter* infection is notifiable in Germany. We analysed national surveillance data of campylobacteriosis cases with clinical symptoms from 2001 through 2010. Special focus was placed on the demographic determinants, the geographical distribution and time trends of campylobacteriosis.

### RESULTS:

In total, 588,308 campylobacteriosis cases were recorded during the observed time period. The mean annual incidence increased from 67 cases/100,000 population in 2001 to 80/100,000 population in 2010. Almost 93% of the *Campylobacter* infections were acquired in Germany. A seasonal distribution was observed with a large peak in the summer months and a small peak in January. Incidence was highest in children <4 years and young adults 20-29 years of age. Especially young children living in rural regions in Germany seemed to be at high risk of *Campylobacter* infection.

### CONCLUSIONS:

Campylobacteriosis remains a major public health problem showing an increasing trend in recent years. The data deliver insight into the epidemiological patterns of the disease which may be exemplary for other European countries facing a similar increase. Challenges remain to better understand the epidemiology of campylobacteriosis (eg, contribution of different food and environmental sources of infection) and to improve food safety and prevention. There is a need for enhanced and better targeted prevention measures.

PRESENTED BY: Anika Schielke

**Keywords:** Campylobacter, Epidemiology, Prevention, Germany

ESCAIDE REFERENCE NUMBER: 20131657

## Pearls of norovirus; a large outbreak following University of Oxford student ball England, February 2013

Rebecca Close <sup>(1) (2)</sup>, Trish Mannes <sup>(1)</sup>, Lyndsey Key <sup>(3)</sup>, Noel McCarthy <sup>(1)</sup>

(1) Thames Valley Public Health England Centre, United Kingdom, (2) Field Epidemiology Training Programme (FETP), Public Health England, UK; European Programme for Intervention Epidemiology Training, ECDC, Sweden, (3) Oxford City Council, Oxford, United Kingdom

### BACKGROUND:

Eight hundred people attended a ball at Oxford University on 02 February 2013. Within two days, approximately 50 attendees reported gastrointestinal illness. The presence of oysters on the menu and the short incubation period suggested a possible norovirus outbreak – filter feeding crustaceans concentrate norovirus if exposed to contaminated water. To explore possible risk factors related to illness, we conducted a cohort investigation.

### METHODS:

The study population included all people attending the ball. A web-based questionnaire was emailed to all ticket holders. A case was defined as anyone “reporting onset of either diarrhoea or vomiting; or two of the following: nausea, abdominal pain or fever, between 03–10 February”. We used Poisson regression to calculate adjusted risk ratios with 95% confidence intervals. Kitchen and catering arrangements were reviewed; only hog roast meat remained, which was cultured for common bacterial pathogens. Faecal samples were tested for bacterial and viral pathogens.

### RESULTS:

The questionnaire response rate was 38% (n=303), 117 met the case definition. After adjusting for other variables, cases were 4.4 times more likely to have consumed oysters than non-cases (95% CI: 2.5-7.6). Four faecal samples were received, three tested positive for norovirus. No pathogenic bacteria were grown from the hog roast samples.

### CONCLUSIONS:

Our investigations once again implicate raw oysters as the vehicle of a norovirus outbreak. Although this association has previously been documented, outbreaks continue. Public Health England needs to continue to provide solid epidemiological and microbiological evidence of such outbreaks to other agencies, enabling them to enforce control measures that will reduce the risks associated with serving raw oysters at large events.

PRESENTED BY: Rebecca Close

**Keywords:** Norovirus, Oysters

ESCAIDE REFERENCE NUMBER: 20131701

### A food handler-associated, foodborne Norovirus GII.4 Sydney 2012 outbreak following a wedding dinner, Austria, October 2012

Sabine Maritschnik <sup>(1)</sup>, Elisabeth Eva Kanitz <sup>(1)</sup>, Erica Simons <sup>(1)</sup>, Marina Höhne <sup>(1)</sup>, Heidelinde Neumann <sup>(3)</sup>, Franz Allerberger <sup>(3)</sup>, Daniela Schmid <sup>(1)</sup>, Ingeborg Lederer <sup>(1)</sup>

(1) Austrian Agency for Health and Food Safety, Austria, (2) National Consultant Laboratory for Norovirus, Robert Koch Institute, Germany, (3) Public Health Authority Salzburg, Salzburg, Austria

#### BACKGROUND:

On October 12, 2012, a public health directorate reported a suspected norovirus outbreak among guests of a wedding reception. We investigated the outbreak to confirm the causative agent, identify the source and propose preventive measures.

#### METHODS:

A probable case was a wedding guest with diarrhoea or vomiting with disease onset between 7-10 October 2012, and who consumed food at the wedding dinner on 6 October 2012. A confirmed case was a probable case with laboratory-confirmed norovirus infection. We conducted a retrospective cohort study among the wedding guests, comparing exposed with unexposed in univariate and stratified analyses (by gender) by calculating risk ratios (RR). Food Safety Authorities inspected the kitchen.

#### RESULTS:

Of 90 respondents (response rate 87%), 26 (29%) fulfilled the case definition, including two confirmed cases. There were no severe or hospitalized cases. Female guests were three times more likely to develop disease (95%CI: 1.4-7.2), compared to males. A mushroom dish was associated with disease only among females (RR 2.3; 95%CI: 1.2-4.3). Two of two tested diseased guests and six of 14 kitchen staff tested positive for norovirus GII.4 Sydney. One norovirus positive kitchen staff member with diarrhoea was involved in preparation of the wedding dinner. The kitchen inspection showed no documented food safety training, as legally required.

#### CONCLUSIONS:

We report the first investigated outbreak due to the novel norovirus GII.4 Sydney strain in Austria, which was likely due to infected, symptomatic kitchen staff. Based on the clinical presentation of the cases, this novel strain did not show more virulence than other outbreak strains. Gender-specific eating preferences may have put female guests at higher risk of infection. We recommend public health authorities to monitor food handlers' annual training.

PRESENTED BY: Sabine Maritschnik

**Keywords:** Novel Norovirus GII.4 variant, hygiene violations, gender-specific risk, outbreak investigation

ESCAIDE REFERENCE NUMBER: 20131240

### Outbreak of gastroenteritis caused by norovirus GII.4 Sydney variant after a wedding reception, Finland, August 2012

Aleksandra Polkowska <sup>(1)</sup>, Maria Rönqvist <sup>(2)</sup>, Outi Lepistö <sup>(3)</sup>, Merja Roivainen <sup>(1)</sup>, Leena Maunula <sup>(3)</sup>, Sari Huusko <sup>(1)</sup>, Salla Toikkanen <sup>(1)</sup>, Ruska Rimhanen-Finne <sup>(1) (4)</sup>

(1) National Institute for Health and Welfare, Finland, (2) University of Helsinki, Finland, (3) Pirkkala, Finland, (4) Department of Infectious Disease Surveillance and Control

#### BACKGROUND:

On 20 August 2012 a municipality notified the National Institute for Health and Welfare (THL) of an outbreak of gastroenteritis (GI) among guests of a reception in a resort. We investigated the outbreak to identify the agent, the source of infection and to recommend control measures.

#### METHODS:

We defined a case as a guest who developed at least one of the following symptoms: diarrhoea, vomiting, nausea or abdominal pain between 18-21 August. We surveyed guests with available email addresses to collect information on food and beverages consumption and symptoms. We described cases by time, place and person and compared exposed with unexposed in terms of incidence using risk ratios with 95% confidence intervals. We collected stool specimens from guests, customer service employees and the environment to be tested for gastroenteritis-causing pathogens.

#### RESULTS:

Of 54 guests, 72% responded. Of those, we identified 23 cases (Attack rate: 43%, 65% of females, Median age: 34, 9% hospitalization) with the highest attack rate among persons 20-30 years of age (71%). Cases started to occur on 19 August, peaked on 20th and ended on 21st. No food items or beverage served was associated with disease. Two of the five stool specimens and 10 of the 36 specimens from surfaces yielded norovirus GII.4. Genotyping on norovirus RNA from 5 norovirus (NoV) positive samples revealed the new norovirus GII.4 Sydney variant.

#### CONCLUSIONS:

Epidemiological, laboratory and environmental investigation suggested that this outbreak occurred in a context of environmental contamination with NoV. After cleaning, disinfection with hypochlorite solution according to THL guidelines and one week of closure, the resort reported no new cases.

PRESENTED BY: Aleksandra Polkowska

**Keywords:** Outbreak, norovirus, environmental contamination

ESCAIDE REFERENCE NUMBER: 20131439



## Multiple-serotype salmonellosis outbreak linked to imported tahini

Craig Thornley <sup>(1)</sup>, Shevaun Paine <sup>(2)</sup>, Stephen Bell <sup>(1)</sup>, Muriel Dufour <sup>(2)</sup>, Maurice Wilson <sup>(2)</sup>

(1) Ministry for Primary Industries, New Zealand, (2) Institute of Environmental Science and Research Ltd, New Zealand

### BACKGROUND:

Following increased reporting of cases of Salmonella Montevideo infection in New Zealand, an investigation commenced to determine the source of illness and prevent further transmission. S. Maastricht and S. Mbandaka cases were included following detection of all three serotypes in tahini epidemiologically-linked to cases.

### METHODS:

Cases were defined as persons notified with laboratory-confirmed salmonellosis in New Zealand between 1 September and 31 December 2012 due to either S. Montevideo, S. Mbandaka or S. Maastricht, with a PFGE profile indistinguishable from outbreak strains of their respective serotype. Cases were interviewed to identify common exposures. Implicated foods were traced to sources, and food samples cultured for Salmonella. Serotypes and pulsed-field gel electrophoresis (PFGE) profiles were determined for Salmonella isolates from food samples and faecal specimens.

### RESULTS:

Twenty-seven salmonellosis cases with any of the three Salmonella serotypes were notified between 1 September and 31 December; 16 (59%) met the case definition, 12 with S. Montevideo, 3 with S. Mbandaka and 1 with S. Maastricht. One further S. Montevideo case had a closely related strain. Cases' PFGE profiles were indistinguishable from those of isolates from tahini in an import consignment from Turkey. Contrary to usual processes, the consignment had not been tested for Salmonella pre-entry. The investigation led to a trade withdrawal and consumer recall for tahini sesame paste from the consignment and products containing this tahini.

### CONCLUSIONS:

This investigation demonstrates that a multiple-serotype salmonellosis outbreak can be linked to a single contaminated product. Inadequate product declarations led to failure to detect or prevent entry of this product; planned changes to improve and harmonise border controls in New Zealand will need to address this problem to prevent similar incidents in the future.

PRESENTED BY: Craig Thornley

**Keywords:** Disease outbreaks Salmonella Sesamum New Zealand Foodborne diseases

ESCAIDE REFERENCE NUMBER: 20131637

## Monophasic Salmonella Typhimurium in the EU: Emerging pathogen or increased awareness?

Daniel Eibach <sup>(1)(2)</sup>, Celine Gossner <sup>(1)</sup>, Therese Westrell <sup>(1)</sup>, Jaime Martinez-Urtaza <sup>(1)</sup>, Johanna Takkinen <sup>(2)</sup>, Aftab Jasir <sup>(1)</sup>

(1) ECDC, Stockholm, Sweden, (2) Centre de Biologie et Pathologie Est, Hospices Civils de Lyon, France

### BACKGROUND:

In recent years foodborne outbreaks in Europe have drawn attention to monophasic Salmonella Typhimurium 4,[5],12:i:-. The aim of this study was to describe the epidemiological and microbiological information for monophasic S. Typhimurium from the "Epidemic Intelligence Information System" (EPIS) and "The European Surveillance System" (TESSy) to verify an increase in cases or detect changes in the notification procedure in order to guide future intervention and control activities at EU level.

### METHODS:

EPIS urgent inquiries and TESSy data for S. Typhimurium from 2007 to 2011 were analysed. In TESSy, monophasic S. Typhimurium were extracted by use of either the complete antigenic formula 4,[5],12:i:- or the specific serotype code, which was introduced in 2010. Cases are described by place, time, reported serotype code and/or antigenic formula.

### RESULTS:

The proportion of monophasic S. Typhimurium outbreaks among all mono- and biphasic S. Typhimurium outbreaks reported in EPIS increased from 0% (0/12) in 2008 to 91% (10/11) in 2011. During the same time period, the number of countries reporting monophasic S. Typhimurium to TESSy increased from 5 to 14, with a total of 9022 cases being reported. From 2010 onwards, 10 countries reported specific serotype codes, and the mean annual number of cases increased from 746 (2007-2009) to 3569 (2010-2011). Notifications with the serotype code lacked information on O- and H-antigens in 55% of cases.

### CONCLUSIONS:

Increased awareness and changes in notification procedures, with more countries using specific serotype codes for TESSy-reporting, reveal the true extent of monophasic S. Typhimurium cases in the EU. The high numbers of EPIS inquiries underline the public health impact of this serotype. Notification of the complete antigenic formulas to TESSy would further improve surveillance in the EU.

PRESENTED BY: Daniel Eibach

**Keywords:** Monophasic Salmonella Typhimurium, surveillance, outbreaks, Europe

ESCAIDE REFERENCE NUMBER: 20131489

## Epidemiology and microbiology driving public health policy

### Evidence based guidance on prevention of anthrax in people who inject drugs

Cornelius Bartels <sup>(1)</sup>, Anastasia Pharris <sup>(1)</sup>, Andreas Jansen <sup>(1)</sup>, Anna-Pelagia Magiorakos <sup>(1)</sup>, Lukas Wiessing <sup>(2)</sup>

(1) ECDC, Sweden (2) EMCDDA, The Netherlands

#### BACKGROUND:

Injection anthrax is described as a manifestation of anthrax in humans since a major outbreak 2009/2010 among heroin users, mainly in Scotland. In 2012 the disease re-emerged: Until July 2013, 15 new cases in Germany, France, Denmark and UK have been reported, seven of them died. The European drug monitoring agency EMCDDA and ECDC aimed to provide a joint guidance following evidence based principles. The main questions to be answered in the process were how far behavioural changes, prophylactic approaches and awareness raising are leading to a reduction of incidence and case fatality.

#### METHODS:

Following a systematic literature research the relevant documents were screened. Selected documents were graded according to their evidence level. The summary of evidence was discussed in an external experts panel workshop bringing together expertise in microbiology, epidemiology, infection control, clinical treatment, harm reduction, user preferences and drug control. Recommendation were agreed upon consensus among the experts.

#### RESULTS:

Out of 226 documents 85 were selected as reference documents. Generally the evidence levels for recommendations were low. Appropriately dosed opiate substitution (OST) and risk communication encouraging heroin users to seek medical advice as soon as symptoms appear, were identified as core recommendations by the panel.

#### CONCLUSIONS:

The study revealed high levels of uncertainty regarding prevention measures due the lack of high quality studies in the literature research. However, consensus building approaches on basis of an experts panel enabled the formulation of consistent recommendations. Behavioural changes and awareness raising were identified as most promising approaches to prevent anthrax in people who inject drugs.

PRESENTED BY: Cornelius Bartels

Keywords: Anthrax, drug users, evidence-based medicine, prevention

ESCAIDE REFERENCE NUMBER: 20131812

### Use of a cholera rapid diagnostic test during a mass vaccination campaign in response to an epidemic in Guinea, 2012

Isabel Martinez-Pino <sup>(1)(2)</sup>, Francisco J Luquero <sup>(1)</sup>, Keita Sakoba <sup>(3)</sup>, Souleymane Sylla <sup>(4)</sup>, Melat Haile <sup>(5)</sup>, Rebecca F Grais <sup>(1)</sup>, Iza Ciglenecki <sup>(6)</sup>, Marie Laure Quilici <sup>(7)</sup>, Anne Laure Page <sup>(1)</sup>

(1) Epicentre, France, (2) European Programme for Intervention Epidemiology Training (EPIET), ECDC, Sweden, (3) Ministère de la Santé et de l'Hygiène Publique, Conakry, Guinea, (4) Direction Préfectorale de la Santé, Forécariah Préfecture, Guinea, (5) Center Geneva (MSF-OCG), Conakry, (6) Médecins Sans Frontières, Operational Center Geneva (MSG-OCG), Geneva, Switzerland, (7) National Reference Centre for Vibrions and Cholera, Institut Pasteur, Paris, France

#### BACKGROUND:

The cholera rapid diagnostic test (RDT) Crystal VC detects antigens of *Vibrio cholerae* O1 and O139, both included in the oral cholera vaccine Shanchol. Hence, the use of Shanchol may lead to a positive RDT. During the 2012 cholera outbreak in the Republic of Guinea, Shanchol was used as a part of the emergency response. We aimed to estimate the proportion of vaccinated individuals reactive to the RDT and the duration of reactivity after vaccination

#### METHODS:

During the vaccination campaign, we conducted a cohort study where recently vaccinated individuals were systematically selected in 4 of the 31 vaccination sites. We collected stools specimens and tested them daily until the RDT became negative for two consecutive visits or for a maximum of 7 days. We calculated proportion of positive results by day of follow-up and 95% exact confidence intervals (95%CI) and calculated the mean time to become negative

#### RESULTS:

Among the 106 study participants, 100 (94%; 95%CI: 88-98) had a positive test after vaccination, of whom 99 reacted only to the O139 antigen. Among those with an initial positive result after vaccination, the mean time to become negative was 3.8 days (standard deviation 1.1). After five days, 2% (95%CI: 0-8) of the tests remained positive

#### CONCLUSIONS:

The RDT Crystal VC becomes positive in persons recently vaccinated against cholera, although almost exclusively for the O139 antigen and for less than one week. This suggests that this test could be used normally 24 hours after vaccination during O1 cholera epidemics (the most common), and after five days where O139 is present. The reason why only the O139 test line became positive needs to be investigated

PRESENTED BY: Isabel Martinez-Pino

Keywords: Oral cholera vaccine (OCV), campaign, rapid diagnostic test (RDT)

ESCAIDE REFERENCE NUMBER: 20131609

## A study of multiple antibiotic-resistant cholera and treatment of *Vibrio cholerae* O1 El Tor Ogawa during a cholera outbreak in southern Thailand

Lujisak Voradetwittaya<sup>(1)</sup>, Jiraphongsa Chuleeporn<sup>(2)</sup>

(1) FETP-Thailand, Department of Disease Control, Ministry of Public Health, Thailand, (2) International FETP Thailand, Thailand

### BACKGROUND:

In Thailand, a variety of antibiotic was used to treat cholera in the past. Laboratory surveillance shows increasing levels of antibiotic resistance nationally. In Ranong province, a *Vibrio cholerae* outbreak, started in July 2011, was still ongoing in October. Thai public health officials launched an investigation during October 2011-January 2012 to determine antibiotic prescriptions and antibiotic resistance within the outbreak.

### METHODS:

In a cross-sectional study, a simple random sampling was used to select 343 out of 2,781 diarrhea patients. Cholera cases were persons who had diarrhea from 1/7/2011-30/11/2011 and stool culture positive for *Vibrio cholerae*. We analyzed demographic and treatment data abstracted from medical records and antibiotic resistance data collected from laboratory log books.

### RESULTS:

Thirty-two cholera hospitalized patients met the case definition. Of these, 31 (97%) were treated with antibiotic (39% parenteral). Norfloxacin was prescribed in 27 (84%) cases. Thirteen (41%) cases were treated with >1 kinds of antibiotic. Twenty-four (75%) cholera cases resisted to >2 kinds of antibiotic. Antibiotic susceptibility test showed *Vibrio cholerae* O1 El Tor Ogawa specimens had high levels of resistance to Doxycycline (99%), Tetracycline (99%), Cotrimoxazole (99%) and Erythromycin (100%) but none resistant to Norfloxacin and Ceftriaxone. We found 50% of cholera cases with shock and 56% electrolyte imbalance.

### CONCLUSIONS:

Almost all cholera patients received antibiotic, even though they were not complicated. High level of resistances was found for Doxycycline, Tetracycline, and other agents commonly used to treat cholera in the past, but no resistance to Norfloxacin. Ranong officials recommended in October, based on these results, that single antibiotic use, Norfloxacin, is an adequate therapy for cholera. Rational use of antibiotic should be stimulated to minimize probability of antibiotic resistant pathogen.

PRESENTED BY: Lujisak Voradetwittaya

**Keywords:** Antibiotic resistance, cholera, treatment, Thailand

ESCAIDE REFERENCE NUMBER: 20131461

## Updated Norwegian vaccine recommendations for preventing severe pneumococcal disease in risk-groups

Anneke Steens<sup>(1)</sup>, Didrik Vestrheim<sup>(1)</sup>, Ingeborg Aaberge<sup>(1)</sup>, Berit Sofie Wiklung<sup>(1)</sup>, Jann Storsæter<sup>(1)</sup>, Marianne A Bergsaker<sup>(1)</sup>, Karin Rønning<sup>(1)</sup>, Ellen Furuseth<sup>(1)</sup>

(1) Norwegian Institute of Public Health, Norway

### BACKGROUND:

Since decades, vaccination with the 23-valent polysaccharide pneumococcal vaccine (PPV23) has been recommended to risk-groups in Norway to prevent invasive pneumococcal disease (IPD). In autumn 2011, a 13-valent pneumococcal conjugated vaccine (PCV) was licensed for use in adults, which might have higher effectiveness than PPV23 due to different immunogenic properties. This called for a revision of vaccine recommendations for risk-groups.

### METHODS:

We searched the literature for (medical) conditions that make people more at risk for IPD and for vaccine effectiveness (VE) and safety in risk-groups. The percentage of IPD cases in 2012 caused by vaccine serotypes were determined from national surveillance data. We quantified the risk per risk-group and elaborated step-wise recommendations for the need for vaccination, choice of vaccine and timing of revaccination.

### RESULTS:

Based on the 187 reviewed articles, medical conditions and vulnerability for IPD were heterogenic in most risk-groups, with asplenic patients at highest risk. The coverage of serotypes that caused IPD was higher for PPV23 (79%) than PCV13 (46%). VE of both vaccines depends on the level of immunosuppression. Only for HIV/AIDS patients, sufficient data were available to show an additional effect of PCV13 when used in combination with PPV23.

### CONCLUSIONS:

The need for vaccination should be based on a risk-assessment either for entire risk-groups, or following individual assessment. If vaccination is needed, PPV23 is recommended, as PCV13 covered a small percentage of cases. Additional use of PCV13 is recommended for individuals with HIV/AIDS and asplenia. However, PCV13 should be considered in other risk-groups depending on the severity of risk-conditions, degree of risk for IPD, VE, and timing related to immunosuppressive therapy.

PRESENTED BY: Anneke Steens

**Keywords:** Pneumococcal vaccine, Recommendations Health Planning, Norway,

ESCAIDE REFERENCE NUMBER: 20131499

## European survey on public health policies for managing meningococcal disease, 2013 – What has changed since 2007?

Sabine Vygen <sup>(1)</sup>, Wiebke Hellenbrand <sup>(2)</sup>, Pawel Stefanoff <sup>(3)</sup>, Germaine Hanquet <sup>(4)</sup>, Sigrid Heuberger <sup>(5)</sup>, James Stuart <sup>(6)</sup>

(1) InVS Cîre Bordeaux, (2) Robert Koch Institute, Germany, (3) Department of Infectious Disease Epidemiology, National Institute of Public Health, Oslo, Norway, (4) EpiConcept, Belgium. (5) Meningococcal Reference Laboratory, Austrian Agency for Food and Health Safety, Graz, Austria, (6) Independent, United Kingdom

### BACKGROUND:

In 2007, a European survey identified important differences in country policies on the management of invasive meningococcal disease (IMD) cases and their contacts. In 2010, ECDC developed evidence-based IMD management guidance. Our objectives were to describe public health IMD policies in European countries in 2013 and to assess changes since 2007.

### METHODS:

We asked 32 national IMD referents in European countries to complete a questionnaire on IMD chemoprophylaxis for close contacts and the use of meningococcal vaccines. We calculated proportions using the number of responding countries/regions as denominator. We compared responses of countries/regions that participated in 2007 and 2013 (n=23) using Fisher's exact test.

### RESULTS:

All 32 countries responded; for Belgium and Italy we included responses for two regions. Antibiotic prophylaxis was recommended to close contacts in 33/34 (97%) countries/regions, mainly rifampicin (27/32; 84%) and ciprofloxacin (29/32; 91%) for adults and rifampicin (29/32; 91%) and ceftriaxone for children (21/32; 66%). Seventeen (17/34; 50%) countries/regions used the ECDC guidance to update national guidelines. Between 2007-2013, the number of countries/regions recommending rifampicin for chemoprophylaxis to adults has increased from 14/21 (67%) to 17/21 (81%) (p=0.48) and to children from 16/20 (80%) to 18/20 (90%) (p=0.66); the recommendation of ceftriaxone for children has increased from 6/20 (30%) to 15/23 (65%) (p=0.033). In 2007, 11/23 (48%) countries/regions recommended chemoprophylaxis to all preschool-class children following an IMD case, compared with 20/23 (87%) in 2013 (p=0.011). The number of countries/regions routinely recommending meningococcal C vaccination increased from 8/23 (35%) to 11/23 (48%) (p=0.55) and post-exposure vaccination from 15/22 (68%) to 17/22 (77%) (p=0.73).

### CONCLUSIONS:

Adherence to ECDC policy has improved since 2007. Discrepancies remain in some areas and should be subject to further harmonization.

PRESENTED BY: Sabine Vygen

**Keywords:** Antibiotic prophylaxis, meningococcal vaccine, national health policies

ESCAIDE REFERENCE NUMBER: 20131537

## Application of the Robert Koch Institute method for prioritisation of diseases to the Swedish setting – evaluation of method relevance and suggestions for improvement

Anders Wallensten <sup>(1)</sup>, Anders Tegnell <sup>(1)</sup>

(1) Smittskyddsinstitutet, Sweden

### BACKGROUND:

As resources in public health are limited, allocation needs to be prioritised. In 2011, The Robert Koch Institute published a method for prioritisation of pathogens in which pathogens are scored according to ten criteria by consultation with experts using a consensus process. The criteria are: Incidence, Work and school absenteeism, Health care utilization, Chronification of illness or sequelae, Case fatality rate, Need for outbreak intervention, Trend, Public attention, Prevention and Treatment. The relative importance of the different criteria is weighted. We modified and applied this method to rank 107 pathogens' relevance for the work of the Swedish Institute for Communicable Disease Control. We compared our results with results from Germany to investigate the methods' validity and the effects of our modifications.

### METHODS:

We followed the original method with these exceptions: Asymptomatic infections were included in the incidence criteria, the chronification criteria was made to reflect risk per case instead of incidence and no weights were applied to the final scores.

### RESULTS:

The highest criteria group included 26 pathogens in the German list and 21 in the Swedish. Fifteen were on both lists. The Swedish also included, Borrelia, caliciviruses, HPV, SARS-CoV and TBE-virus but not Mycobacterium tuberculosis, Helicobacter pylori, Enterococcus, Klebsiella, Staphylococcus epidermidis, Legionella, Enterobacter, Streptococcus (other than pneumoniae), Pseudomonas, Chlamydia trachomatis and Hantavirus.

### CONCLUSIONS:

Despite method modifications and differences between the countries, the lists of highest ranked pathogens were similar. Differences seem to correctly reflect vector and disease prevalence. Effects of our modifications appear minor, but give severe pathogens like SARS-CoV higher ranking which we judge relevant. Considering the consistency in results we believe that this tool can help objective prioritisation of communicable diseases in different countries.

PRESENTED BY: Anders Wallensten

**Keywords:** Health priorities, Communicable diseases, Pathogens, Germany, Sweden

ESCAIDE REFERENCE NUMBER: 20131843

## Inequalities in the incidence of infectious disease in the North East region of England

Gareth Hughes <sup>(1)</sup>, Russell Gorton <sup>(2)</sup>

(1) Health Protection Agency, United Kingdom, (2) Public Health England, United Kingdom

### BACKGROUND:

Evidence suggests that social determinants contribute to the burden of infections, yet the extent may vary by setting. We examined the association between a multiple deprivation index and incidence of infectious diseases in the North East of England, one of the most deprived regions in the country.

### METHODS:

We selected the best fitting regression model (Poisson, zero-inflated Poisson, negative binomial or zero-inflated negative binomial) separately for 21 different infectious diseases using a combined five year incidence (2007-2011) as outcome. We modelled rates for 1656 small areas of approximately 1500 persons with regional quintiles of the United Kingdom Index of Multiple Deprivation (2010) and population/landscape data. We adjusted the association between incidence and deprivation quintiles for age distribution, area size, urban/rural classification, presence of minority ethnic groups and ethnic heterogeneity.

### RESULTS:

Deprivation significantly predicted incidence for 17 of the 21 infectious diseases considered. The direction of association was broadly consistent within groups of infections: increased incidence with increased deprivation for all three bloodborne viruses (BBVs), two of three invasive bacterial diseases (IBDs), four of five sexually transmitted infections (STIs) and tuberculosis (TB); decreased incidence with increased deprivation for five of six infectious intestinal diseases (IIDs) and two of three vaccine-preventable diseases.

### CONCLUSIONS:

While deprived populations may be at higher risk of BBVs, IBDs, STIs and TB through behavioural and environmental risk, a lower frequency of foreign travel and consumption of high risk foods may explain why these populations are at lower risk for IIDs. Further work is needed to understand these relationships in order to propose (a) interventions to prevent infections that disproportionately affect deprived populations and (b) targets for health improvement such as education and social capital.

PRESENTED BY: Gareth Hughes

**Keywords:** Socioeconomic Factors Inequalities Epidemiologic Determinants Infectious Diseases Regression Analysis

ESCAIDE REFERENCE NUMBER: 20131430

## Vaccine coverage

### Diphtheria in Indonesia: a survey of vaccine coverage and carriage in response to the current outbreak

Amy Mikhail <sup>(1)</sup>, Gareth Hughes <sup>(2)</sup>, Eveline Irawan <sup>(3)</sup>, Dominicus Husada <sup>(4)</sup>, George Kafatos <sup>(1)</sup>, Aruni De Zoysa <sup>(1)</sup>, Richard Pebody <sup>(1)</sup>, Sam Bracebridge <sup>(1)</sup>, Androulla Efstratiou <sup>(1)</sup>

(1) Public Health England, United Kingdom, (2) Health Protection Agency, United Kingdom, (3) Balai Besar Laboratorium Kesehatan Surabaya, Indonesia, (4) Airlangga University Surabaya

### BACKGROUND:

Indonesia has experienced a 30-fold increase in the incidence of diphtheria since 2008, resulting in 947 cases and 37 deaths in 2012 alone. To facilitate the identification of immunity gaps, we designed and piloted an immunisation and carriage study in one high and one low incidence district of East Java province.

### METHODS:

300 children aged 1–15 years were randomly selected from ten villages per district, with ten children per single year of age, from listings provided by the health authorities. Vaccination and health history were collected via a standardised questionnaire administered by oral interview to each child's guardian. Vaccination cards or midwife records were used to validate vaccination status. Throat swabs and serum specimens were collected from each child and sent to the regional laboratory for processing.

### RESULTS:

Of 293 eligible participants, 23% (n=68) had no indication of vaccination against diphtheria. The remainder had a guardian-reported positive vaccination status, which was confirmed by validation against written records for 126 participants (56%). Children resident in the low incidence district and under five were significantly more likely to have completed a validated infant vaccination schedule including DTP1, DTP2 and DTP3 (PR: 1.8 95%CI: 1.4–2.4 and PR: 2.9 95%CI: 2.2–3.7, respectively). *Corynebacterium diphtheriae* carriage was detected in participants from the high incidence district only (1.7%, n=5) and included two toxigenic strains in children with an unvalidated guardian report of anti-diphtheria vaccinations.

### CONCLUSIONS:

The results of this study are consistent with the hypothesis that the recent increase in incidence of diphtheria in Indonesia is due to a failure to vaccinate certain population sub-groups. A supplementary DTP vaccination campaign for children in high incidence districts is therefore recommended.

PRESENTED BY: Amy Mikhail

**Keywords:** Diphtheria, Vaccination status, Carriage status, Immunity gaps, Incidence

ESCAIDE REFERENCE NUMBER: 20131617

## Seasonal influenza vaccine coverage in the postnarcoleptic era in Finland

Ulrike Baum <sup>(1)</sup>, Jukka Jokinen <sup>(1)</sup>, Mika Lahdenkari <sup>(1)</sup>, Jonas Sundman <sup>(1)</sup>, Tuija Leino <sup>(1)</sup>, Terhi Kilpi <sup>(1)</sup>, Hanna Nohynek <sup>(1)</sup>

(1) National Institute for Health and Welfare, Finland

### BACKGROUND:

Childhood vaccine coverage has been very high in Finland. In contrast, seasonal influenza vaccine coverage has never reached similar rates; at best it has been approximately 50% in the medical risk groups. Seasonal influenza vaccination was added to the national immunisation programme (NIP) to children aged 6-35 months in 2006. After the 2009 AH1N1 pandemic, the adjuvanted pandemic vaccine Pandemrix was found significantly having contributed to 90 narcolepsy cases in previously healthy children and adolescents within 9 months from vaccination yielding an absolute risk of 18/100,000 person-years vaccinated. Parental concerns on vaccine safety and general anti-vaccine sentiments are feared to impact the uptake of NIP vaccines.

### METHODS:

In absence of a nationwide vaccine register, influenza vaccine coverage was measured using an administrative method until 2009. NIP coverage including seasonal influenza vaccination was measured by one-time collection data covering from 2009 to 2010 5.4 million, and from 2011 to 2012 approximately 2.2 million of the Finnish population. Since 2012 coverage estimates have been calculated using a nationwide database with continuous vaccination record collection.

### RESULTS:

Prior to the pandemic, influenza vaccine coverage (%) ranged seasonally from 30 to 34 in children 6-35 months, and 48 to 51 in those above 65 years of age. After the pandemic, the coverage dropped to 20.5 in 2010-11, 13.2 in 2011-12 and 13.7 in 2012-13 among children 6-35 months, to 4.4, 3.3, 4.6 among those 4-64 years of age, and to 40.3, 38.5, and 32.7 among those 65 years and above, respectively.

### CONCLUSIONS:

In the postpandemic postnarcoleptic era, seasonal influenza vaccine coverage has fallen in all age groups and in children particularly. The coverage of other childhood vaccines is being validated.

PRESENTED BY: Ulrike Baum

**Keywords:** Vaccination, coverage, childhood vaccines, influenza, narcolepsy

ESCAIDE REFERENCE NUMBER: 20131642

## Low vaccination coverage for seasonal influenza in Norwegian nursing homes during 2012/13 season

Horst Bentele <sup>(1)</sup>, Marianne Riise Bergsaker <sup>(2)</sup>, Siri Helene Hauge <sup>(3)</sup>, Jørgen V Bjørnholt <sup>(3)</sup>

(1) Norwegian Institute of Public Health, Norway, (2) Norwegian Institute of Public Health, Department of Vaccines, Norway, (3) Norwegian Institute of Public Health, Department of Infection Control Epidemiology, Norway

### BACKGROUND:

WHO has set a goal of 75% vaccination coverage (VC) for seasonal influenza for residents and recommends immunization for all healthcare workers (HCWs) in nursing homes (NHs). The coverage in Norway is unknown. We conducted a prevalence-survey to estimate the VC for seasonal influenza in Norwegian NHs in 2012/2013.

### METHODS:

We ascertained information from NHs managers on VC for residents and HCWs and vaccination costs for HCWs, using a web-based questionnaire. We calculated proportions of vaccinated individuals, using the total number of long-term residents or HCWs in each NH as a denominator and compared proportions, using the chi2-test.

### RESULTS:

Of 910 NHs, 354 (39%) responded. The overall VC for residents was 68.1% (95%CI; 67.4-68.8) and for HCWs 3.1% (95%CI; 3.8-2.4). VC per NH ranged from 0%-100% (median 71.7%) among residents and 0%-100% (median 0%) among HCWs with 214 (60%) NHs reporting that none of their HCWs was vaccinated. Coverage among HCWs was 4% (95%CI; 2.8-4.7) when vaccination was charged, compared to 5.8% (95%CI; 4.8-6.8) when vaccination was offered for free ( $p=0.004$ ).

### CONCLUSIONS:

Influenza VC in Norwegian NHs was lower than recommended among residents and exceptionally low among HCWs. Coverage in HCWs was significantly lower when vaccination was not offered free of charge. Estimates might have been overestimated due to low response. We recommend that NHs implement measures to increase VC among residents and HCWs, including vaccination promotion campaigns, providing incentives for vaccination to HCWs, and studies to identify potential barriers to vaccination.

PRESENTED BY: Horst Bentele

**Keywords:** Vaccination, Influenza vaccine, Health Personnel, Nursing Homes, Health Services for the Aged, Geriatric Nursing

ESCAIDE REFERENCE NUMBER: 20131517

## The use of routine data sources to generate the list of chronic patients candidate for active vaccination offer. Italy, Apulian region, 2013

Domenico Martinelli <sup>(1)</sup>, Francesca Fortunato <sup>(1)</sup>, Vanessa Cozza <sup>(2)</sup>, Silvio Tafuri <sup>(3)</sup>, Cinzia Germinario <sup>(3)</sup>, Biagio Pedalino <sup>(1)</sup>, Rosa Prato <sup>(1)</sup>

(1) University of Foggia, Italy, (2) Regional Epidemiological Observatory of Apulia, Italy, (3) University of Bari Aldo Moro, Italy

### BACKGROUND:

Vaccine preventable diseases among chronic patients are a public health priority in high-income countries. Despite several European countries have included vaccination recommendations for these subjects in their immunization programmes, vaccine coverage data are poorly available. We developed and tested a procedure to identify individuals with underlying medical conditions candidate to vaccinations.

### METHODS:

We reviewed national and international recommendations for medical conditions that suggest indications for anti-influenza, anti-pneumococcal, anti-meningococcal, anti-hepatitis A and B vaccination. For each indication we identified the ICD-9CM diagnosis and/or procedure, the Italian user fee exemptions, and the ATC drugs codes and we created ad hoc correspondence tables. Using these tables, we extracted lists of patients with underlying medical conditions from 1) the hospital discharge registry, 2) user fee exemptions registry and 3) drug prescriptions database. We linked patient lists with the Apulian regional immunization registry by using the personal ID number and generated the Chronic Patient List (CPL). We tested the CPL asking a sample of general practitioners and paediatricians region-wide to evaluate the matching between the list of patients with clinical indications for anti-influenza vaccination extracted from the vaccination registry and their patient's personal records database. We calculated the overall CPL sensitivity in identifying subjects with indications for anti-influenza vaccination.

### RESULTS:

We identified 1.204.496 subjects with underlying medical conditions (possible candidates to receive any of the mentioned vaccinations). Of these, 9% were found in three data sources, 18% in two sources and 73% in one database. The CPL overall sensitivity for anti-influenza vaccination was 90%.

### CONCLUSIONS:

The high sensitivity encouraged us to implement a specific tool in the new release of the software managing the Apulian regional immunization registry data.

PRESENTED BY: Domenico Martinelli

**Keywords:** Chronic patients Vaccination registry Immunization information System Routine data

ESCAIDE REFERENCE NUMBER: 20131752

## Low vaccination coverage among the medical residents of the University of Marseille: reasons for non-vaccination

Teija Korhonen <sup>(1) (2)</sup>, Ariane Neveu <sup>(2)</sup>, Alexis Armengaud <sup>(2)</sup>, Tiphonie Succo <sup>(2)</sup>, Caroline Six <sup>(2)</sup>, Philippe Malfait <sup>(2)</sup>

(1) European Programme for Intervention Epidemiology Training (EPIET), ECDC, Stockholm, Sweden (2) Regional Office of French Institute for Public Health Surveillance (InVS), Marseille, France

### BACKGROUND:

During 2008-2012, France and Europe experienced large measles outbreaks, involving also healthcare workers (HCW). We aimed to estimate the vaccination coverage (VC) of measles among medical residents of the University of Marseille, in South-Eastern France.

### METHODS:

In March 2013, we conducted a cross-sectional study among all medical residents of the Medical Faculty of Marseille. We used a self-administered questionnaire to collect information on self-reported VC and on reasons for vaccination and non-vaccination. We compared proportions, using the chi-squared test.

### RESULTS:

Of 1152 eligible residents, 703 (61%) participated in the study and 95 (14%; 95%CI: 12%–17%) reported having had measles in the past. Of all participants, 613 (93%; 95%CI: 91%–95%) reported being vaccinated against measles, and 389 (76%; 95%CI: 73%–80%) received two doses. Of the vaccinated residents, 151 (25%) could not recall how many doses they received. Only 268 (38%) reported having visited an occupational health physician. Nine (19%) unvaccinated residents reported lack of interest or time as the reason for non-vaccination. Vaccinated individuals were more likely to report easy access to vaccination as the main motivation for measles vaccination, compared to unvaccinated residents (435; 71% and 21; 45%;  $p < 0.001$ , respectively).

### CONCLUSIONS:

VC among the medical residents of the University of Marseille was well below the recommended 95% coverage for two doses of measles vaccination. The majority of the study participants had not visited an occupational health doctor. Lacks of easy access or interest seem to represent major barriers to measles vaccination. We recommend that occupational health services address these problems in order to improve VC in this group.

PRESENTED BY: Teija Korhonen

**Keywords:** Measles vaccine, vaccination coverage, medical students, France

ESCAIDE REFERENCE NUMBER: 20131762

## Immunization related behavior among Health Care Workers in Europe – Results of the HProImmune survey

Agoritsa Baka<sup>(1)</sup>, Pania Karnaki<sup>(2)</sup>, Athanasios Petralias<sup>(2)</sup>, Ursula Dietrich<sup>(3)</sup>, Valeria Alfonsi<sup>(4)</sup>, Carmen Montano<sup>(4)(5)</sup>, Maria Cristina Rota<sup>(6)</sup>, Silvia Declich<sup>(6)</sup>, Costas Christophi<sup>(7)</sup>, Martha Paisi<sup>(7)</sup>, Liubove Murauskiene<sup>(8)</sup>, Marija Veniute<sup>(8)</sup>, Dorota Szosland<sup>(9)</sup>, Daniela Pitigoi<sup>(10)</sup>, Anca Streinu-Cercel<sup>(11)</sup>, Maria Tseroni<sup>(12)</sup>, Birgitta Lesko<sup>(13)</sup>, Athena Linos<sup>(1)</sup>

(1) Hellenic Center for Disease Control and Prevention, Greece, (2) Institute of Preventive Medicine Environmental and Occupational Health, Greece, (3) Technische Universität Dresden, Medizinische Fakultät Carl Gustav Carus, Forschungsverbund Public Health Sachsen und Sachsen-Anhalt, Greece, (4) Istituto Superiore di Sanità (ISS), Rome, Italy, (5) Epiet training - ECDC, (6) Centro Nazionale di Epidemiologia, Sorveglianza e Promozione della Salute, Istituto Superiore di Sanità, Italy, (7) Cyprus International Institute for Environmental and Public Health in association with Harvard School of Public Health, Cyprus University of Technology, Cyprus, (8) Mokymu Tyrimu ir Vystymo Centras, Lithuania, (9) Nofer Institute of Occupational Medicine, Poland, (10) Cantacuzino Institute, National Institute of Research – Development for Microbiology and Immunology, Bucharest, Romania, (11) National Institute of Infectious Diseases Romania, (12) National Hellenic Nurses Association, Greece, (13) The National Board of Health and Welfare, Sweden

### BACKGROUND:

Despite a worker protection EU directive (2000/54/EC) no significant increase in vaccination coverage has been recorded for HCWs. The project “Promoting immunizations for HCWs in Europe” aims at developing tailored toolkits for this purpose. Background work for developing the toolkit includes the exploration of vaccine related behaviors. Results and implications for the project are presented.

### METHODS:

An online survey tool explored HCWs behaviors towards vaccination for seasonal/pandemic influenza, mumps/measles/rubella, varicella, hepatitis B and tetanus/diphtheria/pertussis. Data were adjusted based on WHO weights by country for professional categories. For the analysis descriptive statistics, chi-square and logistic regression were performed.

### RESULTS:

Analysis is based on 5058 respondents from 13 European countries. The majority (86.1%) believe vaccines are important for reducing serious disease with the exception of HCWs from Slovenia (OR 480.9,  $p < 0.001$ ) and Italy (OR 9.65,  $p < 0.001$ ). Physicians hold positive views towards vaccination, as opposed to nurses, pharmacists, social workers and ambulance personnel. HCWs believe Influenza (86.4%), Hepatitis B (71.9%) and Tuberculosis (59.1%) are risks in workplaces. However, 34.6% report not receiving a seasonal influenza vaccine and 56.5% not receiving the pandemic influenza vaccine. Most have been vaccinated against Hepatitis B, Td or Tdap at some point in their lives. Enablers include belief in vaccine protection and easy, free of charge availability. Barriers differ according to vaccine including concerns about side effects and long-term effects, low risk perception and lack of insurance coverage.

### CONCLUSIONS:

HCWs other than physicians need to be targeted. The toolkit should include up to date information concerning effectiveness and side effects of certain recommended vaccines, and guidance on how to address practical enablers like workplace delivery and free of charge availability.

PRESENTED BY: Agoritsa Baka

**Keywords: Immunization, Healthcare workers, Vaccine Preventable Diseases, Promotion of vaccinations**

ESCAIDE REFERENCE NUMBER: 20131659

## Influenza Epidemiology & Surveillance

### Epidemiology of Influenza B virus infections in Scotland

Heli Simmonds<sup>(1)</sup>, Rory Gunson<sup>(2)</sup>, Beatrix von Wissmann<sup>(3)</sup>, Arlene Reynolds<sup>(3)</sup>, Kate Templeton<sup>(3)</sup>, Jim McMenamin<sup>(3)</sup>

(1) Royal Infirmary Edinburgh, United Kingdom, (2) West of Scotland Specialist Virology Centre, United Kingdom, (3) Health Protection Scotland, United Kingdom

### BACKGROUND:

An increase in influenza B virus detections in Scotland was noted towards the end of 2012. Although it is generally thought to cause less severe infections than influenza A virus, a number of influenza B infected individuals presented with severe respiratory tract infection requiring Intensive Care Unit (ICU) admission.

### METHODS:

To estimate the burden of influenza B infections in Scotland (2012-2013), laboratory confirmed influenza B detections reported using the electronic ECOSS scheme (non-sentinel and sentinel surveillance) were analysed. Data on confirmed influenza B ICU cases were obtained from the severe influenza surveillance system.

### RESULTS:

In 2012-2013, over 21 weeks the majority of influenza B detections were in hospital samples (885/1279) with the remainder (394/1279) from samples submitted through general practice. Of all influenza B detections, the highest number of reports was in children under 5 years (25%) and those over 65 years (15%). A total of 37 individuals were admitted to ICU with confirmed influenza B, three of whom died (9%). The highest proportion of these ICU admissions, were in young adults (11%; 15-19 years and 12.5%; 30-34 years). Of those eligible for influenza vaccination (24), only 6 had received vaccination (25%). The majority of influenza B viruses typed from ICU cases were Yamagata lineage (16/19; 84%). Where known, 60% (16/27) of these ICU cases were recorded to have received antivirals.

### CONCLUSIONS:

Our results show that influenza B infections often lead to hospitalisation, ICU admission and a significant mortality rate within ICU. This study demonstrates the need for promoting influenza vaccination in risk groups, and the prompt usage of antiviral treatment in this group.

PRESENTED BY: Heli Simmonds

**Keywords: Influenza B virus, epidemiology, intensive care unit, vaccination, treatment**

ESCAIDE REFERENCE NUMBER: 20131437



## Good detection capability for avian influenza A(H7N9) virus in European Union and European Economic Area (EU/EEA) countries

Eva Broberg <sup>(1)</sup>, Rod Daniels <sup>(2)</sup>, Joanna Ellis <sup>(3)</sup>, Marc Struelens <sup>(4)</sup>, Dmitriy Pereyaslov <sup>(4)</sup>, Daniel Palm <sup>(4)</sup>, Adam Meijer <sup>(5)</sup>, Maria Zambon <sup>(5)</sup>, John McCauley <sup>(2)</sup>

(1) ECDC, Sweden (2) NIMR, United Kingdom, (3) PHE, United Kingdom (4) Influenza and Other Respiratory Pathogens, Division of Communicable Diseases, Health Security, & Environment, WHO Regional Office for Europe, Denmark, (5) RIVM, The Netherlands,

### BACKGROUND:

The Chinese authorities announced the first human cases of avian influenza A(H7N9) at the end of March 2013. Since then, 132 laboratory-confirmed cases, including 40 deaths have been reported. For the first time a low pathogenicity avian influenza virus caused lethal human infections. A few small clusters have been detected but no sustained human-to-human transmission has been confirmed.

### METHODS:

The European Centre for Disease Prevention and Control (ECDC), the European Reference Laboratory Network for Human Influenza (ERLI-Net) and the WHO Regional Office for Europe responded rapidly to the A(H7N9) outbreak by posting technical information of real-time RT-PCR assays for implementation. Subsequently a survey conducted at the end of May 2013 assessed if influenza reference laboratories in EU/EEA countries would be able to detect the novel A(H7N9) virus.

### RESULTS:

Twenty-seven of 29 EU/EEA countries considered their generic detection assay for influenza A to be appropriate for detecting influenza A(H7N9) virus and 22 countries reported containment facilities suitable for virus isolation and propagation. Most ERLI-Net laboratories had introduced specific H7 and/or N9 real-time RT-PCR assays to subtype these viruses: 27 countries had H7 and 21 had N9 assays in place. All influenza reference laboratories, including WHO-recognised National Influenza Centres (NICs), were offered positive control material for their detection assays and WHO Global Influenza Surveillance and Response System (GISRS) supplied 22 countries with the control material through the WHO Collaborating Centre in London. Twenty-four laboratories in 19 countries reported good performance of their H7N9 subtyping assays with the positive control material, indicating the accurate predictive potential of the survey conducted.

### CONCLUSIONS:

This survey shows that the ERLI-Net introduced rapidly an acceptable level of A(H7N9) detection capability, facilitated by the GISRS.

PRESENTED BY: Eva Broberg

Keywords: Influenza, public health, detection, H7N9

ESCAIDE REFERENCE NUMBER: 20131663

## Age-related prevalence of cross-reactive antibodies to influenza A(H3N2) variant virus in the German adult population in 2008-2010

Benjamin Bluemel <sup>(1)(2)</sup>, Brunhilde Schweiger <sup>(1)</sup>, Manuel Dehnert <sup>(1)</sup>, Panagiotis Kamtsiuris <sup>(1)</sup>, Heribert Stolzenberg <sup>(1)</sup>, Michael Thamm <sup>(1)</sup>, Annicka Reuss <sup>(1)</sup>, Silke Buda <sup>(1)</sup>, Walter Haas <sup>(1)</sup>

(1) Robert Koch Institute, Germany, (2) (Postgraduate Training for Applied Epidemiology (PAE, German FETP), European Programme for Intervention Epidemiology Training (EPIET)

### BACKGROUND:

In 2012, more than 300 influenza A(H3N2) variant virus (H3N2v) cases, a swine origin virus with pandemic potential, have been reported in the United States. We investigated the prevalence of cross-reactive antibodies against H3N2v as possible correlate of pre-existing protection to assess susceptibility in the German adult population.

### METHODS:

We analyzed an age-stratified (18-29, 30-59, ≥60 years) sub-set of the German Health Interview and Examination Survey for Adults (DEGS) collected November 2008 to April 2010. Cross-reactive antibodies against a representative H3N2v isolate (A/Wisconsin/12/10) were assessed using haemagglutination inhibition assay. A titre of ≥1:40 was defined as protective. Proportions of titres ≥1:40 were calculated and chi-square test was used to detect differences among age groups. Association between known prior influenza vaccination and seropositivity was analysed in a multivariable logistic regression model including age groups and sex.

### RESULTS:

The analysis included 600 samples, 200 per age stratum (median age: 47 years, range: 18-84, 50% female). Overall 43% (95%CI: 39-47) had titre ≥1:40. We found evidence of seroprotection in 58% (95%CI: 51-65) aged 18-29 years, 31% (95%CI: 24-37) aged 30-59 years and 42% (95%CI: 35-49) aged ≥60 years. Proportions between age groups differed statistically ( $p < 0.001$ ). In the multivariable model persons with prior influenza vaccination were more likely to have titres ≥1:40 (OR=2.3, 95%CI: 1.6-3.4,  $p < 0.001$ ) compared to non-vaccinated.

### CONCLUSIONS:

A substantial proportion of German adults have cross-reactive antibodies at titre ≥1:40 against H3N2v with older adults showing significantly lower prevalences compared to young adults. This information provides guidance which age groups should have high priority in risk assessment and targeted response. In case of pandemic emergence of H3N2v seasonal influenza vaccine could offer some protection before a pandemic vaccine is available.

PRESENTED BY: Benjamin Bluemel

Keywords: Influenza A H3N2 virus, Adult, Seroepidemiologic Studies, Germany, Aged

ESCAIDE REFERENCE NUMBER: 20131270

## Surveillance of influenza 2012/13 in England, from the Royal College of General Practitioners sentinel network

Hayley Durnall <sup>(1)</sup>, Simon de Lusignan <sup>(1)</sup>, Douglas Fleming <sup>(1)</sup>

(1) RCGP, United Kingdom

### BACKGROUND:

Influenza epidemics are a usual feature of the English winter season. Seasonal influenza vaccination is offered to persons over 65 and those under 65 that fall into clinical risk groups, as defined by the Chief Medical Officer (CMO). This study aims to summarise the 2012/13 influenza season focussing on vaccine uptake, clinical morbidity and virological sampling data collected from the Royal College of General Practitioner's Research and Surveillance Centre (RCGP RSC).

### METHODS:

RCGP RSC receives morbidity and vaccine uptake data from a sentinel network of approximately 100 GP practices, covering a population of approximately 1 million patients. The majority of GPs in the network collect virological samples from patients that present with acute respiratory illness.

### RESULTS:

Influenza vaccination uptake in the over 65 population was 73.8%; in the under 65 at risk population it was 44.5% and overall was 19.7%. The Influenza like illness (ILI) consultation rate peaked earliest in the 5-14 age group during week 49 at 30.5 per 100,000 persons. The all age ILI consultation rate peaked during week 52 at 32.7 per 100,000 persons. Of the positive virological samples received, 55% were influenza B and 21% influenza H3; 12% were respiratory syncytial virus (RSV) positive, of which the majority were RSV A.

### CONCLUSIONS:

Seasonal influenza vaccine uptake was high in the over 65 population, but methods for targeting the under 65 at risk population need to be improved. The 2012/13 season was a relatively low influenza season; Influenza B and Influenza H3 co-circulated. However, the season was dominated by influenza B. The clinical incidence peak was unusually early for an influenza B dominated season.

PRESENTED BY: Hayley Durnall

**Keywords:** Influenza, Epidemiology, Virology, Respiratory Syncytial Viruses

ESCAIDE REFERENCE NUMBER: 20131448

## Epidemiological and virological assessment of the 2012-2013 influenza season

René Snacken <sup>(1)</sup>, Julien Beauté <sup>(1)</sup>, Eeva Broberg <sup>(1)</sup>, Andrew Amato-Gauci <sup>(1)</sup>

(1) ECDC, Sweden

### BACKGROUND:

Annual influenza epidemics vary in their timing, intensity and circulating strains. Surveillance is essential to reduce the disease burden and impact on public health. We present here the main results of the influenza surveillance in 2012-2013 in Europe.

### METHODS:

Sentinel surveillance of influenza in Europe is based on syndromic and virological data collected from primary care patients and submitted to ECDC weekly. A subset of influenza viruses are characterised antigenically and genetically. In addition, in 2012-2013, eight countries reported hospitalised laboratory-confirmed influenza cases.

### RESULTS:

The influenza season 2012-2013 in Europe was of long duration, lasting from late December until late April with no clear geographic pattern. Intensity of influenza-like illness (ILI) was moderate, but higher than in 2011-2012 in most countries. The proportions of type A and B viruses varied across Europe. Overall, 38% of ILI patients and 61% of hospitalised severe cases were infected by influenza A viruses, mostly A(H1N1)pdm09. The proportion of hospitalised cases infected by A(H1N1)pdm09 was significantly higher in patients aged below 65 than in those above. The majority of characterised viruses matched relatively well with the vaccine strains.

### CONCLUSIONS:

The 2012-2013 influenza season was of moderate intensity with A and B viruses circulating in similar proportions. Hospitalised cases were more likely than outpatients to test positive for influenza A virus, especially in patients below 65 years. Vaccination of at risk middle aged adults is of particular importance when A(H1N1)pdm09 is circulating widely. It remains unknown why observational studies suggest a low vaccine effectiveness of the 2012-2013 influenza vaccine, against influenza A(H3N2) viruses and in the elderly, despite a relatively good antigenic match between circulating and vaccine viruses.

PRESENTED BY: Dania Pervanidou

**Keywords:** Influenza, surveillance, severity, vaccine effectiveness

ESCAIDE REFERENCE NUMBER: 20131770

## How many people died of influenza this season? Progress in the development of a timely influenza impact index

Anne Mazick <sup>(1)</sup>, Jens Nielsen <sup>(1)</sup>, Kåre Mølbak <sup>(1)</sup>

(1) Statens Serum Institut, Denmark

### BACKGROUND:

Timely estimates of influenza attributable mortality are needed for risk assessment and public health purposes. Such estimates are often only available retrospectively and are derived from a variety of non-standardised methods. Pneumonia & influenza (P&I) and respiratory & circulatory (R&C) excess mortality are applied as upper and lower bounds of influenza attributable mortality, however, in Europe, these estimates are not available for an end-of-season influenza mortality estimate. All-cause mortality data are available close to real time in many European countries, but may overestimate influenza mortality. We tested different methods of estimating winter excess mortality using all-cause and cause-specific mortality in order to identify indicators that give a timely, robust and meaningful approximation of the seasonal influenza impact for public health action

### METHODS:

We used the standard EuroMOMO Poisson regression model adjusting for trend and seasonal variation to model weekly number of expected deaths for Danish weekly all-cause, P&I, R&C mortality from 2006-2011. We cumulated residual variation around the baseline of expected deaths by winter season (week40-week 20) and by the Danish influenza epidemic periods and analysed the relations between the different outputs.

### RESULTS:

Excess R&C mortality during influenza epidemic periods explained between 40 to 61 % of excess all-cause mortality cumulated over the total winter season in four winter seasons between 2008-2011. An outlier was the 2009/2010 pandemic season where the proportion was 20 %. Underlying baseline fit varied considerably by the length of mortality time series examined.

### CONCLUSIONS:

In typical influenza seasons a simple index to estimate seasonal influenza attributable mortality based on all-cause mortality may be feasible; however an appropriate fit of the baseline is critical for the reliability of this approach.

PRESENTED BY: Anne Mazick

**Keywords: Mortality, burden of illness, influenza, surveillance, statistical models**

ESCAIDE REFERENCE NUMBER: 20131747

## Influenza Fatalities in Europe 2009-2013

Elizabeth Bancroft <sup>(1)</sup>, Julien Beauté <sup>(1)</sup>

(1) ECDC, Sweden

### BACKGROUND:

Influenza fatalities are a key indicator of the severity of an influenza season. Since the 2009/10 influenza A(H1N1) pandemic, countries voluntarily report hospitalised laboratory-confirmed influenza cases and their outcome to the European Centre for Disease Prevention and Control (ECDC). Analysis of fatalities can provide insight into risk groups for severe outcomes due to influenza and opportunities for intervention.

### METHODS:

During the influenza season, data for hospitalised influenza cases are uploaded on a weekly basis. Information includes age, outcome, date of death and/or onset, influenza type and subtype, and antiviral treatment.

### RESULTS:

Since 2009, 1384 fatalities have been reported to ECDC over 4 influenza seasons. An average of 346 cases was reported each year (range 101-558). A median of 7 countries report each season (range 5-10) with only 3 countries reporting all seasons. The mean and median age of all deaths was 52 and 55 years, respectively (IQR 41-68 years); the mean age at death varied by type/subtype (50 years for influenza A[H1N1], 68 for influenza A[H3N2] and 58 for influenza B). The mean and median time between onset and death was 18 and 11 days (range 0-304). Cases received antiviral medication a mean and median of 6 and 5 days (range 0-39) after their date of onset.

### CONCLUSIONS:

Data from the severe influenza surveillance system provide unique insights into the epidemiology of influenza-related fatalities in Europe and help identify opportunities for prevention. Antiviral treatment should be started earlier for maximal benefit. Different influenza types/subtypes affect different age groups which has implications for preventive measures depending on the prevalent strain each season. The surveillance system could be improved with greater participation by European countries and better standardization.

PRESENTED BY: Elizabeth Bancroft

**Keywords: Influenza, Mortality, Surveillance, Europe**

ESCAIDE REFERENCE NUMBER: 20131658

## HIV/Blood borne virus'

### Factors affecting HIV-1 sero-positivity among female Serodiscordant couples attending antenatal clinic- A case Control Study, Maharashtra, India-2009-2012

Ramesh Allam <sup>(1)</sup>, Asha Hegde <sup>(2)</sup>, Chengappa Kechamada <sup>(1)</sup>, Nalini Chava <sup>(1)</sup>

(1) SHARE India, India, (2) MAHASACS, India,

#### BACKGROUND:

Proportion of spouses of HIV positive pregnant women tested positive for HIV increased from 54.6% to 73.2% (2008-2011) in Maharashtra. We undertook a case control study to determine the factors associated with HIV-1 sero-positive female discordant couples compared to the concordant sero-positive couples.

#### METHODS:

Cases and controls were identified from the secondary data available at the integrated counselling and testing centres (ICTC) in antenatal clinics across eleven high prevalent districts of Maharashtra. Records of the concordant HIV positive couple next to the eligible female seropositive discordant couple (case) identified during 2009-2012 were considered as control. Exposure variables like history of second marriage, STIs, prior risk behaviour, migration, alcoholism in females and spouses were analysed to calculate the adjusted odds ratio (AOR) and 95% Confidence Interval (CI) using logistic regression. HIV status of the husband was outcome variable in both cases and controls .

#### RESULTS:

Among the identified 417 cases and controls age, education and occupation were not associated ( $p < 0.005$ ) with female Discordance. Female discordancy was associated with history of second marriage (AOR-1.38; CI- 3.15-8.39), history of risk behaviour (AOR-2.51; CI- 1.87-3.38), history of STI/RTI (AOR-3.84; CI- 1.88-7.86), single migrant (AOR-3.48; CI-1.88- 6.45) among females and history of condom use among spouses (AOR-2.15; CI-1.62- 2.84) compared to female concordant positive couples.

#### CONCLUSIONS:

With increasing female discordancy in the state, the counsellors at the ICTCs need to specifically screen the couples with history of second marriage, STI, single migration and history of risk behaviour among married couples. Selective couple testing will enable the program to address sero-discordant couples to reduce the risk of HIV transmission to uninfected spouse.

PRESENTED BY: Ramesh Allam

**Keywords:** Serodiscordant couple, HIV, Pregnant women, Seropositive  
ESCAIDE REFERENCE NUMBER: 20131259

### Men who have sex with men Multiresistant HIV-1 Outbreak in Southern Spain

Jorge del Diego Salas <sup>(1)</sup>, Isabel Viciano Ramos <sup>(1)</sup>, Carmen Montano <sup>(2)</sup>, Jesús Santos González <sup>(1)</sup>, Alfonso del Arco <sup>(1)</sup>, Juan de Dios Colmenero <sup>(1)</sup>

(1) Andalusian Health Service, Spain, (2) EPIET training - ECDC, Sweden and Istituto Superiore di Sanità (ISS), Rome, Italy

#### BACKGROUND:

To describe the characteristics of a reverse transcriptase multiresistant HIV-1, transmitted as an outbreak across men who have sex with men (MSM), in southern Spain.

#### METHODS:

We describe the epidemiological, clinical and virological features of patients presenting at diagnosis with a virus with mutations at positions D67N, T69N/D, V118I, V179D, T215S, and K219D, in the reverse transcriptase (RT) gene (Malaga Strain-MS-), conferring multiresistance to non-nucleoside reverse transcriptase inhibitors (NNRTIs) and nucleoside reverse transcriptase inhibitors (NRTIs). Population sequencing of RT and Protease (Pro) was done with the Siemens Trugene HIV Genotyping Kit. The sequences generated were used to perform phylogeny and clustering analysis.

#### RESULTS:

Through January 2007 to June 2013, 1,503 newly diagnosed patients have been tested for baseline resistance. MS has been detected in 20 patients, being a B subtype, CCR5 tropic virus, with no additional mutations in the protease. All patients were Caucasian, non-related MSM, with a mean age of 33,9 years (IQR 29,5-38,5). Ten patients have started HAART, five with a NNRTI based regimen and five with a PI based regimen with a good virologic response. Phylogenetic analysis with the UDS generated sequences shows the clustering of the outbreak patients, and temporal association between the clustered isolates.

#### CONCLUSIONS:

We have detected an outbreak of a highly transmissible and persistent reverse transcriptase multiresistant virus among MSM in Southern Spain. We recommend treat all these patients with HAART or NNRTI due to the rapid viral load reduction that they produced and because without treatment this viral load became high again quite fast. We also suggest perform better public health policies and change strategies to make visible this problem with this kind of population as a target

PRESENTED BY: Jorge del Diego Salas

**Keywords:** HIV, disease outbreaks, drug resistance, multiple, viral  
ESCAIDE REFERENCE NUMBER: 20131660

## Factors associated with new diagnosis of HIV infection among commercial sex workers, The Netherlands, 2006-2012

Nelly Fournet <sup>(1)(2)</sup>, Femke Koedijk <sup>(1)</sup>, Petra van Leeuwen <sup>(3)</sup>, Martijn van Rooijen <sup>(3)</sup>, Marianne van der Sande <sup>(1)</sup>, Maaïke van Veen <sup>(3)</sup>

(1) National Institute for Public Health and the Environment (RIVM), The Netherlands, (2) EPIET, (3) Public Health Service Amsterdam, The Netherlands,

### BACKGROUND:

Commercial sex workers (CSW) are particularly exposed to sexually transmitted infections including HIV. To direct prevention and intervention measures, we calculated the proportion of consultations with new diagnosed HIV and examined factors associated among male (MSW) and female (FSW) sex workers.

### METHODS:

A CSW was defined as a person exchanging sex for money or other valuable goods in the 6 months prior to the consultation. Using 2006-2012 national surveillance data on STI-clinic visits, we calculated the proportion of consultations with a new diagnosis of HIV infection among CSW. We used univariable and multivariable logistic regression to identify factors associated with this outcome, stratified by sex.

### RESULTS:

Between 2006-2012, the proportion of new diagnosis of HIV infections was 0.1% (40) among 28,398 FSW and 2.5% (66) among 2,688 MSW consultations. The proportion of HIV infections was higher among MSW having sex with men than among heterosexual MSW (OR=26.9 95%CI:3.7-197.7) and among MSW who had a co-infection with bacterial STI (OR=5.4 95%CI:3.2-9.1). FSW from Sub-Saharan Africa had a higher proportion of HIV infections than Dutch FSW (OR=20.6 95%CI:8.0-53.0). Among FSW, intravenous drug use was associated with HIV infection (OR=7.3 95%CI:1.6-32.0). The proportion of new diagnosis of HIV infections was higher among both FSW and MSW who were never tested prior the consultation for HIV compared to those who were previously tested negative.

### CONCLUSIONS:

MSW and FSW had different factors associated with new diagnosis of HIV infections. Prevention and intervention activities on HIV need to target MSW having sex with men, sub-Saharan FSW and CSW who were never tested for HIV in order to increase early diagnosis, prevention and treatment and to avoid further transmission through their clients or partners.

PRESENTED BY: Nelly Fournet

**Keywords:** Sexually transmitted diseases, HIV, prevalence, risk factors, sex workers

ESCAIDE REFERENCE NUMBER: 20131475

## HIV prevalence and unprotected sexual intercourse with steady and casual partners among MSM in Cyprus

Magdalini Pilli <sup>(1)</sup>, Nicos Middleton <sup>(2)</sup>, Andreas Charalambous <sup>(2)</sup>, Vasilios Raftopoulos <sup>(2)</sup>

(1) Hellenic Centre for Diseases Control and Prevention, Greece, (2) Cyprus University of Technology, Cyprus

### BACKGROUND:

Men who have sex with men (MSM) are among the groups with high risk sexual behaviors. In 2012 MSM in Cyprus comprised the first group affected by HIV. The aim of this study was to estimate HIV prevalence and explore the factors associated with unprotected anal intercourse with steady and casual male sexual partners

### METHODS:

Time location sampling has been used to recruit MSM who were frequenting in gay friendly venues in Cyprus during January 2011 to January 2012. Self completed questionnaires and Orasure oral fluid collection kits were distributed to participants. Ethical approval was obtained by the National Bioethics Committee

### RESULTS:

Two hundred MSM participated in the study (response rate 89%). HIV prevalence was 2.5%. The mean age of all the participants was 29±6.6 years old. The prevalence of unprotected anal intercourse last time they had sex was 30% while the prevalence of unprotected oral sex last time they had sex was 87.7%. Concerning the sexual behavior regarding the type of sexual partner during last six months, the proportion of non condom use during insertive anal intercourse ranged the same level with both casual and steady partner, as opposed to the receptive anal intercourse, in which the rate of unprotected anal sex was higher with steady partner compared to casual partners. In the multivariate analysis, sexual identity and alcohol use were independently positively associated with unprotected receptive intercourse with casual partner whilst sexual identity, cocaine use and the lack of knowledge of transmission modes of HIV infection were positively correlated with unprotected receptive intercourse with steady partner

### CONCLUSIONS:

HIV prevalence in Cyprus among MSM remains stable in low levels, similar to other countries of Central Europe

PRESENTED BY: Vasilios Raftopoulos

**Keywords:** HIV prevalence, Men who have sex with men, time location sampling, unprotected anal intercourse, steady sexual partner, casual sexual partner

ESCAIDE REFERENCE NUMBER: 20131589

## Coverage and Uptake of HIV Counselling and Testing Services in Oyo State, South Western Nigeria, December 2012

Aishat Usman <sup>(1)</sup>, Olubunmi Ayinde <sup>(2)</sup>, Patrick Nguku <sup>(3)</sup>, Saheed Gidado <sup>(4)</sup>, Funmilayo Fawole <sup>(5)</sup>

(1) Nigerian Field Epidemiology and Laboratory Training Programme, Nigeria, (2) HIV/AIDS Unit, Oyo State Ministry of Health, Nigeria,

### BACKGROUND:

HIV counselling and testing (HCT) is the critical entry-point for engagement into treatment and care as well as for primary and secondary prevention efforts. Despite the importance, most HIV-infected patients in resource-poor settings are unaware of their HIV status and uptake of HCT services is relatively limited. The adult HIV prevalence in the state was 3.1% as at 2012. We assessed the coverage and uptake of HCT services in Oyo State.

### METHODS:

A retrospective cross-sectional study of clients above 15 years of age who accessed HCT services in HCT facilities Oyo State. We desk reviewed the data submitted on HCT to the HIV unit of the State Ministry of Health to obtain information on clients socio-demographic characteristics, HIV status, type of counseling received and history of HIV testing in the last two years. Univariate, bivariate and multivariate analysis was done using Epi-info version 3.5.3 Software

### RESULTS:

117,569 clients accessed HCT services between January 1st 2011 and December 31st 2012. Mean age was  $33.3 \pm 15.26$ . Most (65%) had at least secondary school education and 80% (94,055) had individual counselling. Only 2.3% (2735) had reactive positive test results. Of which 71.0% (1942) were female. The percentage coverage of HCT was 1.8% (obtained from number of people counselled and tested with the population of 15years and above in the State). Factors promoting HCT uptake were secondary education or more [AOR= 6.7, 95% CI 5.5-10.1], female gender [AOR=6.3,95%CI 3.4-8.7], previous HIV testing [AOR= 2.9, 95%CI2.3-7.8], individual counselling [AOR=4.5,95%CI2.2-.4.8]

### CONCLUSIONS:

HCT coverage of within the State was low compared to 85% target. There is the need to scale up of HCT services among the male population and those who have never been reached.

PRESENTED BY: Aishat Usman

**Keywords:** HIV/AIDS, HCT Coverage, HCT Uptake, Nigeria  
ESCAIDE REFERENCE NUMBER: 20131690

## Targeted vaccination programme successful in reducing acute Hepatitis B in men having sex with men in Amsterdam, The Netherlands

Gini van Rijckevorsel <sup>(1)</sup>, Jane Whelan <sup>(2)</sup>, Mirjam Kretzschmar <sup>(2)</sup>, Evelien Siedenburg <sup>(3)</sup>, Gerard Sonder <sup>(1) (3)</sup>, Ronald Geskus <sup>(1) (4)</sup>, Anneke van den Hoek <sup>(1) (3)</sup>

(1) Public Health Service (GGD) Amsterdam, Dpt of infectious diseases, The Netherlands, (2) Julius Centre for Health Sciences and Primary Care, University Medical Centre Utrecht Centre for Infectious Disease Control, National Institute for Public Health and the Environment, RIVM, The Netherlands, (3) Academic Medical Centre, Department of Internal Medicine, Division of Infectious Diseases, Tropical Medicine and AIDS, The Netherlands, (4) Academic Medical Centre, Department of Clinical Epidemiology, Biostatistics and Bioinformatics, The Netherlands

### BACKGROUND:

In The Netherlands, transmission of hepatitis B virus (HBV) occurs mainly within behavioural high-risk groups, such as in men who have sex with men (MSM). Therefore, a vaccination programme has targeted these high-risk groups. Previous evaluations of this programme up until 2006 (incidence trend analysis, mathematical modelling and molecular sequence models) could prove no impact. This study evaluates the impact of the vaccination programme targeting Amsterdam's large population of MSM from 1998 through 2011.

### METHODS:

The Amsterdam data from the national database of the vaccination programme for high-risk groups (January 1, 1998 to December 31, 2011) were used. Programme and vaccination coverage were estimated with population statistics. Incidence of acute HBV was analyzed with notification data from the Amsterdam Public Health Service (1992 to 2011). Mathematical modelling accounting for vaccination data and trends in sexual risk behaviour was used to explore the impact of the programme.

### RESULTS:

At the end of 2011, programme coverage was estimated at 41% and vaccination coverage 30% to 38%. Most participants (67%) were recruited from the outpatient department for sexually transmitted infections (STI) and outreach locations such as saunas and gay bars. Incidence of acute HBV dropped sharply after 2005. The mathematical model in which those who engage most in high-risk sex are vaccinated, best explained the decline in incidence.

### CONCLUSIONS:

Transmission of HBV virus among Amsterdam's MSM has decreased, despite ongoing high-risk sexual behaviour. Despite international concern about the effectiveness of such programmes when the uptake or coverage remains low, this study proves that a targeted vaccination programme can be effective with vaccination coverage below 40%, as long as MSM who engage most in high-risk sex are reached.

PRESENTED BY: Gini van Rijckevorsel

**Keywords:** Hepatitis B Men Incidence Vaccination Mathematical Model Sexual Behavior

ESCAIDE REFERENCE NUMBER: 20131646

## Specialist Referral and Treatment for Hepatitis C following diagnosis by Dried Blood Spot in Scotland in 2009

Georgina McAllister <sup>(1)</sup>, Hamish Innes <sup>(2)</sup>, Allan Mcleod <sup>(2)</sup>, Kate Templeton <sup>(1)</sup>, Celia Aitken <sup>(3)</sup>, Sharon Hutchinson <sup>(2)</sup>, David Goldberg <sup>(2)</sup>

(1) NHS Lothian, United Kingdom, (2) Health Protection Scotland, United Kingdom, (3) NHS Greater Glasgow & Clyde, United Kingdom

### BACKGROUND:

In Scotland approximately 1% of the population (50,000 individuals) have been infected with hepatitis C (HCV). The majority of HCV infections in Scotland occur in current/former injecting drug users (IDUs), 58% (95% CI 45–62%) of whom were undiagnosed in 2006. Since the introduction of dried blood spot (DBS) testing in Scotland in May 2009 the number of new diagnosis in specialist addiction services has increased. The objective of this study was to determine the downstream efficacy of DBS testing in terms of the successful referral to a treatment centre and initiation of treatment.

### METHODS:

Routine DBS testing data for HCV was available from the West of Scotland Specialist Virology Centre and Health Protection Scotland; this included epidemiological data such as sex, age group, ethnicity and time since onset of injecting. The epidemiological information, along with HCV test results, was linked to the HCV clinical database to determine rates of treatment referral and treatment initiation. Predictors of referral to specialist clinics and initiation onto treatment were specifically examined in univariate and multivariate analyses.

### RESULTS:

A total of 597 individuals were tested for HCV by DBS across Scotland in 2009. Of these individuals 53% were seropositive and approximately two-thirds (65.3%) had an active HCV infection. Linkage of these individuals to the HCV Clinical Database showed that 82 (39.6%) of currently infected individuals had attended a treatment centre within 24 months following collection of their DBS specimen, whereas, 18 (22.0%) were initiated on treatment within 18 months following collection of the DBS specimen.

### CONCLUSIONS:

DBS testing has the capacity to increase diagnosis in a high risk population but action must be taken to improve specialist referral and treatment of this population.

PRESENTED BY: Georgina McAllister

**Keywords:** Hepatitis C, treatment, dried blood spot (DBS), epidemiology

ESCAIDE REFERENCE NUMBER: 20131728

## Universal treatment success among healthcare workers with occupationally-acquired acute hepatitis C

Sarah Tomkins <sup>(1)</sup>, Brian Rice <sup>(1)</sup>, Kirsty Roy <sup>(2)</sup>, Beth Cullen <sup>(2)</sup>, Fortune Ncube <sup>(1)</sup>

(1) Public Health England, United Kingdom, (2) Health Protection Scotland, United Kingdom

### BACKGROUND:

Healthcare workers (HCWs) are at risk of acquiring bloodborne viruses (BBVs) following occupational exposure. There are UK National Institute of Clinical Excellence guidelines for treatment of chronic hepatitis C (HCV).

### METHODS:

The surveillance of significant occupational exposures to BBVs (HIV, Hepatitis B (HBV) and HCV) in HCWs started in 1997 and covers England, Wales and Northern Ireland. In addition, Scotland provides information on seroconversion cases to the scheme.

### RESULTS:

Between 2002 and 2011, 4381 exposures were reported to the scheme, including 14 HCV seroconversion cases. Three additional cases were reported from Scotland. All 17 cases involved percutaneous injuries of varying severity and mainly hollowbore needles contaminated with blood or blood-stained fluid. The HCW's first positive HCV RNA tests were detected 2.5-11.3 weeks post-exposure. Where genotype was reported, eight were infected with genotype 1 and four with genotype 3. Fifteen received antiviral therapy, within 1-32 weeks (median 8 weeks) from diagnosis. Of these, 12 are known to have achieved viral clearance and results awaited for the other three. Of the 12 HCWs that received antiviral therapy, one HCW with genotype 4 required two courses of treatment and one cleared the virus spontaneously following one week of treatment. In the remaining two cases, one spontaneously cleared the virus without treatment, and the other was lost to follow-up.

### CONCLUSIONS:

These data corroborate the observation that treatment of acute HCV is not genotype dependent. Early ascertainment of occupational seroconversion cases is important for prompt referral to specialist care. These surveillance outcome data are an important addition to the evidence base for acute HCV treatment and emphasis the need in the UK for guidelines on the management of occupational seroconversions.

PRESENTED BY: Sarah Tomkins

**Keywords:** Occupational exposure Health Personnel Hepatitis C Infectious disease transmission, patient-to-professional

ESCAIDE REFERENCE NUMBER: 20131714

# Poster Abstracts – Poster Session B

Poster Session B 13.20 – 14.50 Wed 6

## Influenza

### What do Swedish stakeholders need to know about influenza?

Marie Rapp <sup>(1)</sup>, Malin Kark <sup>(1)</sup>, Hélène Englund <sup>(1)</sup>

(1) Smittskyddsinstitutet, Sweden

#### BACKGROUND:

The main tasks of the Swedish Institute for Communicable Disease Control (SMI) are to conduct epidemiological surveillance and analyse and disseminate surveillance data to stakeholders. Surveillance reports should be adapted to stakeholders' needs. We aimed to identify stakeholders' needs of influenza data as a part of a comprehensive evaluation of the influenza surveillance in order to adapt the surveillance reports accordingly.

#### METHODS:

Representatives of health care organisations, government agencies and the media were invited to participate in telephone interviews. Main users and reporters of influenza data mentioned in publications and policy documents or stakeholders known by the working group were selected. Health care personnel represented both small and large facilities, and were geographically spread throughout Sweden. A questionnaire guided the semi-structured telephone interviews. Data was condensed and categorised through a qualitative descriptive analysis.

#### RESULTS:

Out of 19 invited representatives, 17 agreed to participate. Health care personnel and media found up-to-date information about trends, geographical spread, number of laboratory-confirmed cases and types and subtypes of influenza to be most important in order to increase awareness and preparedness among colleagues, patients and the general public. Government agencies mainly needed the same information to predict the development and maintain pandemic preparedness, to inform risk groups and the community and to make evaluations and plan interventions. Detailed virological information was of less interest. The stakeholders asked for more frequent updates on the current situation, more predictions and deeper and more comprehensive analyses. A web survey supported the results (n=172).

#### CONCLUSIONS:

The needs assessment gave us a deeper understanding of stakeholders' need of influenza data. The results will drive changes in SMI's reporting and guide us in customizing Sweden's surveillance systems for influenza.

PRESENTED BY: Marie Rapp

**Keywords:** Epidemiological monitoring, Surveillance, Influenza, Needs assessment, Interviews, telephone, Sweden

ESCAIDE REFERENCE NUMBER: 20131603

### Effectiveness of travel restrictions in the rapid containment of human influenza: a systematic review

Ana Mateus <sup>(1)(2)</sup>, Harmony E. Otete <sup>(3)</sup>, Gayle Dolan <sup>(1)</sup>, Charles R. Beck <sup>(3)</sup>, Jonathan S. Nguyen-Van-Tam <sup>(3)</sup>

(1) Public Health England, United Kingdom, (2) Field Epidemiology Training Programme (FETP), (3) University of Nottingham, United Kingdom

#### BACKGROUND:

Travel restrictions have been recommended by the World Health Organization in pandemic influenza scenarios. Our aim was to systematically review the effectiveness of travel restrictions for the rapid containment of human influenza.

#### METHODS:

We conducted study searches in healthcare databases and grey literature based on inclusion and exclusion criteria defined in the protocol registered on the PROSPERO website. Reviews, historical, observational and mathematical modelling studies were considered for inclusion. International/internal travel restrictions by any means of transportation were included. Outcomes of interest were; impact on attack rate (AR) and delay of peak/spread of epidemics. We sifted studies at title, abstract and full text levels. We independently conducted double data extraction, and synthesised findings narratively according to the PRISMA statement.

#### RESULTS:

Twenty-two studies were included in the review. Domestic land and air travel restrictions above 90% led to an epidemic peak delay up to 3 weeks and reduced AR of influenza by 0.1%. For international flight restrictions of 90% and 99.9% in moderate transmissibility scenarios ( $R_0 < 1.9$ ), estimated epidemic peak delays varied widely from 1-2 weeks to 4 months with an AR reduction  $< 2\%$ . Effectiveness of travel restrictions was reduced when these were implemented  $> 45$  days after epidemic notification, strains were of high transmissibility ( $R_0 > 1.9$ ), or if geographical sources were large urban hubs with high population density and extensive links to the global travel network.

#### CONCLUSIONS:

Travel restrictions had a limited impact on delaying the spread and peak of influenza epidemics. The extent of restrictions required to achieve the maximum estimated delay of epidemic spread would be unfeasible due to the negative economic and social impact caused.

PRESENTED BY: Ana Mateus

**Keywords:** Influenza, Human; Epidemics; Travel; Disease Transmission, Infectious; Pandemics; Disease Outbreaks; Basic Reproduction Number

ESCAIDE REFERENCE NUMBER: 20131266



## Low to moderate seasonal influenza vaccine effectiveness in Ireland: a test-negative case-control study, I-MOVE project, 2012/13

Justyna Rogalska <sup>(1) (2)</sup>, Joan O'Donnell <sup>(1)</sup>, Lisa Domegan <sup>(1)</sup>, Claire Collins <sup>(3)</sup>, Michael Joyce <sup>(3)</sup>, Suzie Coughlan <sup>(4)</sup>, Joanne Moran <sup>(4)</sup>, Grainne Tuite <sup>(4)</sup>, Darina O'Flanagan <sup>(1)</sup>

(1) Health Protection Surveillance Centre, Dublin, Ireland, (2) ECDC EPIET Programme, (3) Irish College of General Practitioners, Dublin, Ireland, (4) National Virus Reference Laboratory, University College, Dublin, Ireland

### BACKGROUND:

Influenza vaccination campaigns are conducted every year in Ireland, targeting a high number of individuals. We aimed to estimate 2012/13 influenza vaccine effectiveness (VE) against laboratory-confirmed influenza, as part of the Influenza Monitoring Vaccine Effectiveness in Europe (I-MOVE) project.

### METHODS:

Sentinel general practitioners swabbed ILI patients within seven days of symptom onset according to a systematic sampling scheme. We compared medically attended influenza-like-illness (ILI) laboratory-confirmed as influenza (cases) to patients who tested negative for influenza (controls) among those meeting the EU ILI case definition. We considered patients to be vaccinated if the interval between receiving a dose of vaccine and symptom onset was > 14 days. Using logistic regression, we calculated influenza VE adjusting for age, presence of chronic conditions, and month of symptom onset. We estimated overall VE, stratified by influenza type and restricted to target groups for vaccination.

### RESULTS:

We included 167 cases and 96 controls. Crude VE was 45.2% (95% CI -53.4 to 80.3) overall, 53.9% (95% CI -46.8 to 86.7) against B and -37.6% (95% CI -429.2 to 71.1) against influenza A(H3). Adjusted VE was 58.1% (95% CI -33.6 to 86.9) overall. Among target groups for vaccination (N=62), crude VE was -14.3% (95% CI -322.1 to 68.8) overall, 5% (95% CI -303 to 78) against B.

### CONCLUSIONS:

The 2012/13 trivalent influenza vaccines against medically-attended ILI laboratory-confirmed influenza provided low to moderate protection in Ireland. The main limitation of the study was the small sample size resulting in low precision around the VE estimates. Efforts to improve influenza vaccines should continue to better protect those at risk of severe illness or complications.

PRESENTED BY: Justyna Rogalska

**Keywords:** Influenza, Influenza vaccine, vaccine effectiveness, case control studies

ESCAIDE REFERENCE NUMBER: 20131552

## Estimating the 2012/13 influenza vaccine effectiveness using the cycEVA study, the Spanish component of the multicentre I-MOVE study

Silvia Jimenez-Jorge <sup>(1)</sup>, Salvador de Mateo <sup>(2)</sup>, Concha Delgado-Sanz <sup>(2)</sup>, Francisco Pozo <sup>(3)</sup>, Inmaculada Casas <sup>(3)</sup>, Unai Pérez-Sautu <sup>(3)</sup>, Amparo Larrauri <sup>(2)</sup>

(1) National Center of Epidemiology, Health Institute Carlos III, Madrid, Spain, (2) National Center of Epidemiology, ISCIII / Ciber Epidemiología y Salud Pública (CIBERESP), Ministerio de Economía y Competitividad, ISCIII, Madrid, Spain (3) National Center of Microbiology, ISCIII, Spain

### BACKGROUND:

The 2012/13 influenza activity peaked late in Spain, as in the previous season, and was clearly dominated by the circulation of influenza B/Yamagata lineage co-circulating with both A(H1N1)pdm09 and A(H3N2) influenza A subtypes. We presented the end-season 2012/13 vaccine effectiveness (VE) estimates in Spain against influenza laboratory confirmed infection using the cycEVA study, the Spanish component of the multicentre I-MOVE study

### METHODS:

We conducted a test-negative design. Cases were influenza confirmed patients and controls those negative for any influenza virus. VE was estimated for all and target groups for vaccination swabbed <4 days after symptom onset. Using logistic regression we calculated adjusted vaccine effectiveness, controlling for potential confounders. Influenza VE was estimated according to: type/subtype, age groups, time since vaccination and prior influenza vaccination

### RESULTS:

Adjusted influenza VE for the target groups against B infections was 93% (95% CI, 65; 99), 68% (95% CI, 17; 88) and 66% (95% CI, -142; 95) in elderly population, 15-64 years and children, respectively. Results were similar in all and target groups. After 3 months since vaccination, estimates were not significantly lower than before 3 months. Protection was higher in <65 years population vaccinated with both previous and current vaccines, 52% (95% CI, -11; 80), compared with only vaccinated with 2012/13 vaccine, 25% (95% CI, -749; 92)

### CONCLUSIONS:

2012/13 influenza vaccine showed a good protection against B predominant influenza infections and A(H3N2), and lower against A(H1N1)pdm09. VE estimates against B were higher in young adults and elderly than in children. It was not found any clear evidence of waning immunity of the 2012/13 vaccine. It was suggested a good effect of the prior vaccination in <65 years population. Our results reinforce the importance of annual influenza immunisation in elderly and high-risk populations

PRESENTED BY: Silvia Jimenez-Jorge

**Keywords:** Influenza, vaccine effectiveness, case-control studies, sentinel networks, age group

ESCAIDE REFERENCE NUMBER 20131703

## Behavioural study results on attitudes towards seasonal influenza vaccination among risk groups and health care professionals

Ana Flamind <sup>(1)</sup>, Olga Sadikova <sup>(2)</sup>, Ülla-Karin Nurm <sup>(3)</sup>, Iiris Saluri <sup>(3)</sup>

(1) ECDC, Sweden, (2) Health Board of Estonia, Estonia, (3) Terviseamet – Health Board, Estonia

### BACKGROUND:

Estonia has reported the lowest seasonal influenza vaccination uptake rates in the EU MS, being 1.1% [1] for the season 2010-11. The objective of the project was twofold: to gain a better understanding of the attitudes and beliefs toward influenza vaccination among health care professionals and the risk groups and to field test a communication toolkit on seasonal influenza prevention developed by the European Center for Disease Prevention and Control (ECDC). [1] Vaccine European New Integrated Collaboration Effort (VENICE) 2010-11 influenza season report.

### METHODS:

All Estonian active family physicians were invited to participate in a survey (204 answers received). Data were collected through a web-based self-administered poll in November 2012. Out of 27 questions, 10 opened conditionally. Similarly, a random sample (n=500 representative of the Estonian population) was surveyed. Focus groups involving risk groups and health care professionals were later conducted.

### RESULTS:

Seasonal influenza vaccination was considered by family physicians as necessary for the entire population with the exception of young children (<2 years old) and pregnant women. 85.8% of family physicians faced situations where patients refused vaccination. The main reasons for refusal were mistrust in vaccine effectiveness and anti-vaccination beliefs. Price of vaccine only came in 4th place. Only 55% of family physicians had access to materials on influenza for their patients but 94.6% thought having access to varied information was important.

### CONCLUSIONS:

The results of the focus groups discussions concurred on the lack of communication materials addressing risk groups and the need for more detailed information on topics such as vaccines impact in reducing influenza incidence rates; vaccine effectiveness data; evidence-based studies about frequency of complications and benefit of vaccination.

PRESENTED BY: Olga Sadikova

**Keywords:** Influenza, vaccination, health behaviours, vaccine effectiveness

ESCAIDE REFERENCE NUMBER: 20131456

## Drivers and barriers of seasonal influenza vaccination in the European Union and European Economic area (EU/EEA): a systematic review

Luciana Brondi <sup>(1)</sup>, Martin Higgins <sup>(1)</sup>, Teymur Noori <sup>(2)</sup>, Andrew Amato-Gauci <sup>(2)</sup>, Sheila Fiske <sup>(3)</sup>, Dermot Gorman <sup>(3)</sup>, Duncan McCormick <sup>(4)</sup>, Alison McCallum <sup>(4)</sup>

(1) NHS Lothian, United Kingdom, (2) ECDC, Sweden, (3) University of Edinburgh, United Kingdom, (4) Scottish Government, United Kingdom

### BACKGROUND:

Vaccination against seasonal influenza reduces disease burden in older people, individuals with chronic diseases, pregnant women, small children and healthcare workers (HCWs). Vaccination policies and programmes vary; only The Netherlands meets the EU Council Recommendation target of 75% uptake. A systematic review of the evidence of drivers and barriers to uptake of seasonal influenza vaccination was conducted to inform national and EU level policies.

### METHODS:

We searched Medline, EMBASE and the Cochrane Library for papers published in English between 2008 and 2012. Two authors screened articles, appraised quality and extracted data. A random selection of articles were independently assessed, level of agreement evaluated and differences resolved by discussion.

### RESULTS:

29 of 4,981 articles met inclusion criteria; systematic reviews, randomized controlled trials, cohort, case-control and cross sectional studies. For older people (over 65), standard reminder postcards or letters, personalized postcards or phone calls work. For individuals with chronic diseases, effectiveness varies by condition. Reminder systems increase influenza vaccination rates in asthmatic children from 10% to a maximum of 21%. Among HCWs, multi-component campaigns – inclusion of education/promotion and improved access to vaccines – increase vaccination (up to 68.5%) in non-hospital settings. Mandatory vaccination policies achieve the highest uptake with vaccination rates over 95% reported consistently. Evidence on drivers and barriers to seasonal influenza vaccination for healthy children and pregnant women is limited to qualitative studies and natural experiments.

### CONCLUSIONS:

Peer-reviewed literature in this area is limited. This systematic review identified strategies to improve uptake of seasonal influenza vaccination in target groups, particularly older people and HCWs. Implementation of effective interventions should reduce the burden of influenza related morbidity and mortality. Future interventions should be specified clearly and evaluated rigorously.

PRESENTED BY: Luciana Brondi

**Keywords:** Influenza, Human; Vaccination; Review

ESCAIDE REFERENCE NUMBER: 20131673

## TB and other respiratory diseases (excluding influenza)

### A national outbreak of PVL-Staphylococcus aureus Pneumonia in England with a high influenza co-infection rate

Gavin Dabrera <sup>(1)</sup>, Iro Evlampidou <sup>(1) (2)</sup>, Philip Conaglen <sup>(3)</sup>, Anna Vickers <sup>(4)</sup>, Nandini Shetty <sup>(4)</sup>, Theresa Lamagni <sup>(4)</sup>, Maya Gobin <sup>(5)</sup>, Joanna Ellis <sup>(4)</sup>, Rachel Campbell <sup>(4)</sup>, Alan Johnson <sup>(4)</sup>, Bruno Pichon <sup>(4)</sup>, Robert Hill <sup>(4)</sup>, Hongxin Zhao <sup>(4)</sup>, Angie Lackenby <sup>(4)</sup>, Janet McCulloch <sup>(4)</sup>, Isabel Oliver <sup>(5)</sup>, Richard Pebody <sup>(4)</sup>, Angela Kearns <sup>(4)</sup>

(1) Health Protection Agency, United Kingdom, (2) European Programme for Intervention Epidemiology Training, (3) NHS Fife, United Kingdom, (4) Public Health England, United Kingdom, (5) Field Epidemiology Services Public Health England, United Kingdom

#### BACKGROUND:

Panton-Valentine Leukocidin toxin-producing *Staphylococcus aureus* (PVL-SA) pneumonias are infrequent, with 30-40 cases per year nationally. On 11th January 2013, the Staphylococcal national reference laboratory (NRL) reported an apparent increase with 18 PVL-SA pneumonia cases in the preceding month, several deaths and reported household clustering and influenza co-infection. This occurred amid influenza B and later A/H3N2 circulation; influenza is associated with secondary bacterial infections. An epidemiological investigation was launched to describe the cases in time, place and person, household clustering and the role of influenza co-infection to inform prevention and control.

#### METHODS:

Cases were defined as PVL-SA-positive blood culture or respiratory specimens notified to NRL between 1st December 2012 and 10th May 2013, with clinical or radiological evidence of pneumonia confirmed by their clinician during follow-up. We used telephone-administered questionnaires to follow-up cases and household contacts and collect clinical and microbiological information from cases' clinicians. We described the proportions of cases by age, sex and hospital admission and calculated the 21-day case fatality risk and proportion of cases with influenza co-infection.

#### RESULTS:

We identified 54 cases in 23 weeks (compared to 40 annually, in previous years), with 32% case fatality risk. The median age was 44 years (range <1- 93), and 31/54 (57%) were female. All were hospitalised or died before admission. Seven cases were part of three household clusters; the remainder were sporadic. Influenza co-infection was identified in 18/27 (67%) tested cases (8 Influenza A, 10 Influenza B).

#### CONCLUSIONS:

This national PVL-SA pneumonia outbreak was unparalleled with a rapid increase in cases and household clustering. This could be explained by co-infection with circulating influenza but only confirmed through comparison with prospective surveillance during the next influenza season.

PRESENTED BY: Gavin Dabrera

**Keywords:** *Staphylococcus aureus*; Pneumonia; Influenza, Human; Disease Outbreaks;

ESCAIDE REFERENCE NUMBER: 20131598

### Prevalence of latent tuberculosis infection in prison: a cohort study following contact tracing of a prisoner with active tuberculosis, Saxony-Anhalt, Germany, 2012

Carina Helmeke <sup>(1)</sup>, Lutz Graefe <sup>(1)</sup>, Lena Fiebig <sup>(2)</sup>, Claudia Kohlstock <sup>(1)</sup>, Sabine Baethge <sup>(1)</sup>, Hanns-Martin Irmischer <sup>(1)</sup>, Barbara Hauer <sup>(2)</sup>, Walter Haas <sup>(2)</sup>, Henning Preisler <sup>(3)</sup>, Peter Klose <sup>(4)</sup>, Hanna Oppermann <sup>(1)</sup>

(1) State Agency for Consumer Protection of Saxony-Anhalt, Germany, (2) Robert Koch Institute, Germany, (3) Local Health Office Jerichower Land, Germany, (4) Penitentiary Burg, German

#### BACKGROUND:

In April 2012, a Local Health Office in Saxony-Anhalt, Germany, reported an asymptomatic patient with laboratory confirmed pulmonary tuberculosis (TB) in a prison. This 30-year-old man from Kazakhstan had been imprisoned there since 2009. We aimed to determine if latent TB infection (LTBI) prevalence was higher among contacts than in persons without close contact to the TB patient.

#### METHODS:

We conducted a cohort study including all 904 prisoners and staff who had been in this prison within six months prior to the report. Thorax x-ray and interferon gamma release assays (IGRA) were offered to everyone. An LTBI case was defined as a person, who tested positive with an IGRA and had an inconspicuous x-ray. Multivariable Poisson regression was performed testing for different exposures: close contact (German guidance, culture-positive TB:  $\geq 40$  hours cumulative exposure), sex, status (prisoner, staff), origin and age groups (<30; 30-49;  $\geq 50$  years).

#### RESULTS:

Overall, 84 contacts and 564 persons without close contact were included in the analysis. LTBI prevalence was 33% among immigrants, 7% among Germans, 15% among contact persons and 7% among persons without close contact. LTBI was independently associated with foreign origin (Incidence risk ratio (IRR): 3.96, 95% CI: 2.06-7.63) and higher age group (IRR: 1.93, 95% CI: 1.23-3.03), but not with close contact (IRR: 1.62, 95% CI: 0.85-3.09).

#### CONCLUSIONS:

This study did not find an association between close contact and LTBI. But recent transmissions cannot be totally ruled out given the challenge to perform detailed contact tracing and the impossibility to distinguish new from preexisting LTBI. To reduce the need for resource-intensive contact tracing in prisons, early TB case finding and prevention are essential.

PRESENTED BY: Carina Helmeke

**Keywords:** Latent tuberculosis, tuberculosis, Interferon-gamma Release Tests, Prisons, Cohort Studies

ESCAIDE REFERENCE NUMBER: 20131478

## Evaluation of early detection of pulmonary TB among contacts of TB patients, Adjara Region, Georgia, 2012-2013

Nona Ephadze <sup>(1)</sup>, Edmond Maes <sup>(2)</sup>, Mariam Geleishvili <sup>(2)</sup>

(1) Public Health Center of Adjara Region/ SC/FELTP, Georgia, (2) US CDC Georgia Country Office, Georgia

### BACKGROUND:

Annually, 3,000 new pulmonary tuberculosis patients are registered in Georgia, including 300 in Adjara Region. In March, 2012, Georgia began tuberculin skin testing (TST) among contacts of persons positive for acid-fast bacteria (AFB+) for latent and active TB. (Georgia employs BCG childhood vaccination.) We reviewed the program's results to determine effectiveness of TST testing for early detection of new pulmonary TB cases

### METHODS:

We reviewed data from persons screened for TB in Adjara, April 2012-March 2013. TST >10mm was considered positive. TB confirmation was based on AFB+; AFB- and positive chest X-ray was considered probable TB

### RESULTS:

403 cases of pulmonary tuberculosis were registered in Adjara between April, 2012 and March, 2013, including 226 AFB+ persons. 72% of 226 were male, 54% were 20-49 years of age. 811 contacts of 203 AFB+ (90%) case-patients were identified. The remaining 23 case-patients reported having no contacts or their contacts were not found. 76 contacts from 25 AFB+ case-patients (12%) refused to undergo TST. TST+ reactions were found in 198(30%) of 658 contacts of 178 AFB+ cases. TB was confirmed in 7 of 658 contacts. Follow-up was incomplete since the public health center (PHC) was not informed how many positive contacts visited TB-clinics. Follow-up phone calls failed to find 67(34%) of 198 positive contacts; of the remaining 131, 95 visited clinicians for evaluation

### CONCLUSIONS:

TST helped to detect new cases among persons having contact with active pulmonary TB patients. Screening for contacts of TB patients may be an effective way to hasten diagnosis of TB cases. We recommended: calculating the cost of this enhanced screening program; improved communication between the TB clinic and PHC for better contact tracing

PRESENTED BY: Nona Ephadze

**Keywords:** Mantoux, tuberculin skin test, TST, pulmonary TB, screening, Georgia

ESCAIDE REFERENCE NUMBER: 20131581

## Tuberculosis incidence among immigrants in Denmark from 1992-2011- Is it time to screen?

Bolette Søborg <sup>(1)</sup>, Jan Wohlfahrt <sup>(1)</sup>, Mikael Andersson <sup>(1)</sup>, Steen Ethelberg <sup>(1)</sup>, Peter Andersen <sup>(1)</sup>, Kåre Mølbak <sup>(1)</sup>

(1) Statens Serum Institut Department of Epidemiology Research, Denmark

### BACKGROUND:

In Denmark, immigrants contribute 8% of the population, but account for 60% of annual tuberculosis (TB) cases. To determine whether post entry screening should be initiated, we estimated the risk of TB among immigrants arriving in 1992-2011.

### METHODS:

We cohorted immigrants included in the civil registration system (CRS) arriving in 1992-2011, and extracted time since entry and continent of origin. We used CRS identifiers to link cohort participants with TB cases identified through the Danish National Tuberculosis surveillance database that uses the Danish case definition that is compatible with EU case definitions. For 1997-2011, the Immigration Register provided the reason for immigration. We estimated incidence rate ratios (RRs) for TB using log-linear Poisson regression.

### RESULTS:

Out of 621, 850 immigrants who entered Denmark (median age: 23 years; interquartile range: 19-29; 50% males), we identified 2,442 TB cases (90 per 100,000 person-years, ranging from 1.16 for immigrants from North American and Oceania to 124 per 100,000 for Asians to 607 per 100,000 for Sub-Saharan Africans). Risk of TB was higher in the first 12 months (RR: 2.7, 95% confidence interval (CI): 1.8-4.2), among those arriving from Sub-Saharan Africa (RR: 103; 95%CI 77-140) and among asylum seekers (RR: 2.5, 95% CI: 2.0-3.1).

### CONCLUSIONS:

Given the risk of TB after arrival, Denmark could now consider post entry TB screening, including free treatment and follow-up, preferentially in the first twelve months after immigration, focused on immigrants from high TB-endemic countries, and with a special attention on asylum seekers.

PRESENTED BY: Steen Ethelberg

**Keywords:** Tuberculosis, screening, immigrants, incidence

ESCAIDE REFERENCE NUMBER: 20131535

## Laboratory confirmation of pediatric tuberculosis in the EU: what do routine data show us?

Andrea Sanchini<sup>(1)</sup>, Lena Fiebig<sup>(2)</sup>, Francis Drobniowski<sup>(2)</sup>, Walter Haas<sup>(3)</sup>, Elvira Richter<sup>(3)</sup>, Vera Katalinic-Jankovic<sup>(4)</sup>, Edita Pimkina<sup>(5)</sup>, Girts Skenders<sup>(6)</sup>, Daniela-Maria Cirillo<sup>(7)</sup>, Vanessa Mathys<sup>(8)</sup>, Elizabeta Bachyiska<sup>(9)</sup>, Despo Pieridou-Bagatzouni<sup>(10)</sup>, Ilona Zemanová<sup>(11)</sup>, Tiina Kummik<sup>(12)</sup>, Merja Marjamäki<sup>(13)</sup>, Sabine Rüscher-Gerdes<sup>(14)</sup>, Dimitrios Papaventsis<sup>(14)</sup>, Manca Žolnir-Dovč<sup>(15)</sup>, Nóra Szabó<sup>(16)</sup>, Diego Zallocco<sup>(7)</sup>, Maria Soledad-Jimenez<sup>(17)</sup>, Kristian Ängeby<sup>(18)</sup>, Turid Mannsåker<sup>(19)</sup>, Anabela Santos-Silva<sup>(20)</sup>, Yanina Balabanova<sup>(1)</sup>

(1) Robert Koch Institute, Germany, (2) Queen Mary College, Barts and the London School of Medicine, University of London & National Mycobacterium Reference Laboratory, Public Health England, United Kingdom, (3) National Reference Center for Mycobacteria, Forschungszentrum Borstel, Germany, (4) National Mycobacterium Reference Laboratory, Croatian National Institute of Public Health, Croatia, (5) Infectious Diseases and Tuberculosis Hospital, Affiliate of Vilnius University Hospital Santariskiu Klinikos, Lithuania, (6) Riga East University Hospital, Centre of Tuberculosis and Lung Diseases, Latvia, (7) S. Raffaele Scientific Institute, Italy, (8) National Reference Centre of Tuberculosis and Mycobacteria, Communicable & Infectious Diseases, Scientific Institute of Public Health, Belgium, (9) National Center of Infectious and Parasitic Diseases, Bulgaria, (10) National Reference Laboratory for Mycobacteria, Nicosia General Hospital, Cyprus, (11) Mycobacteriology Unit and National Reference Laboratory for Mycobacteria NIPH, Czech Republic, (12) TB Reference Laboratory, Department of Mycobacteriology, Tartu University Hospital, Estonia, (13) National Institute for Health and Welfare, THL, Finland, (14) National Reference Laboratory for Mycobacteria (NRLM), Sotiria Chest Diseases Hospital, Greece, (15) National Reference Laboratory for Mycobacteria, University Clinic for Respiratory and Allergic Diseases, Slovenia, (16) National TB Reference Laboratory, Hungary, (17) Mycobacterial Reference Laboratory, Servicio de Bacteriología, Centro Nacional de Microbiología, Instituto de Salud Carlos III, Spain, (18) Clinical Microbiology, MTC, Karolinska Institute, Karolinska University Hospital, Sweden, (19) National Reference Laboratory for Mycobacteria, Norwegian Institute of Public Health, Norway, (20) National Tuberculosis Reference Laboratory, National Institute of Health (INSA), Portugal

### BACKGROUND:

Paediatric tuberculosis (TB) is rarely laboratory confirmed due to the paucibacillarity of the disease and because children rarely produce enough diagnostic samples. In order to evaluate laboratory confirmation of paediatric TB across European laboratories we analysed the range of diagnostic tests and their performance for different type of samples.

### METHODS:

Routine laboratory data on all consecutive primary samples and reference cultures referred for diagnosis from children ( $\leq 15$  y.o.) suspected as having TB in 2007-2011 at six reference laboratories (the UK, Germany, Italy, Croatia, Latvia, Lithuania) were analysed. Per-sample analyses have been conducted, e.g. we described the types of paediatric primary samples received and we calculated sample positivity rates for Mycobacterium tuberculosis complex (MTBC) detection. Performance characteristics of rapid molecular assays (pooled due to the low numbers of tested samples) were assessed against phenotypical culture for MTBC identification.

### RESULTS:

The analysis of 10549 paediatric samples showed that non-respiratory samples were collected more frequently in Western European laboratories (Germany 49.1%, the UK 22.9%) compared to the Baltic laboratories (less than 10%). Using gastric aspirate and lymph node samples, the MTBC positivity rates were 3.5% and 6.9%, higher than using sputum samples (1.9%). Sensitivity, specificity, PPV, NPV and accuracy of pooled molecular assays were 79.2%, 93.6%, 67.1%, 96.5% and 91.6% respectively, comparable to those previously reported for the Xpert® MTB/RIF molecular assay in children.

### CONCLUSIONS:

A more intensive approach in collecting gastric aspirates or non-respiratory samples from children would likely increase paediatric TB laboratory confirmation. Additionally evaluation and optimisation of molecular diagnostic assays using different samples along with the development of alternative approaches not based on pathogen detection should be pushed forward.

PRESENTED BY: Andrea Sanchini

**Keywords:** Paediatric tuberculosis, laboratory confirmation, European Reference Laboratory Network for TB, non-respiratory samples, gastric aspirate, molecular assays

ESCAIDE REFERENCE NUMBER: 20131542

### Molecular typing as a public health tool to assess transmission of *Mycobacterium tuberculosis* strains

Xanthi Andrianou <sup>(1)</sup>, Andreas Sandgren <sup>(2)</sup>, Emma Huitric <sup>(2)</sup>, Gernot Rohde <sup>(3)</sup>, Giovanni Sotgiu <sup>(4)</sup>, Marieke J van der Werf <sup>(2)</sup>

(1) Cyprus International Institute for Environmental and Public Health, Cyprus, (2) ECDC, Sweden, (3) Department of Respiratory Medicine, Maastricht University Medical Centre, The Netherlands, (4) Epidemiology and Medical Statistics Unit, Department of Biomedical Sciences, University of Sassari – Research, Medical Education and Professional Development Unit, AOU Sassari, Italy

#### BACKGROUND:

In settings with low tuberculosis (TB) incidence molecular typing combined with conventional epidemiologic methods has been used to improve the surveillance of the disease.

#### METHODS:

We conducted a systematic review of the medical literature to evaluate: if molecular typing is an adequate tool to assess the transmission of *Mycobacterium tuberculosis* strains, and whether monitoring ongoing transmission allows the assessment of TB control programs and the progress towards the elimination of the disease. Conventional diagnostic methods that assess TB transmission by identifying epidemiologic links were used as a comparison against transmission measured by molecular typing. The search was conducted on the databases PubMed and EMBASE up to June 2012. The retrieved records were screened for studies that had public health aim, used molecular typing prospectively, and reported clustering results from molecular typing and conventional methods.

#### RESULTS:

We screened 1,604 unique records, among the 2,337 retrieved that were published since 2000. Eighteen studies met the inclusion criteria. However only for a subset of 14 studies could the reported results be quantified and thus be comparable. Among these studies, the percentage of conventionally confirmed epidemiologic links among clustered cases (based on molecular typing) ranged from 8.0% to 85.1%. Five studies found more epidemiologic links (median difference: 57; interquartile range: 273.5) after using molecular typing as an addition to conventional methods.

#### CONCLUSIONS:

Molecular typing is shown to be a valuable tool to measure transmission in addition to conventional methods. Additional evidence is needed to assess its proper incorporation into control programs and use as a tool to indicate the progress towards TB elimination. A challenge in assessing the value of molecular epidemiology is the absence of a gold standard for measuring TB transmission.

PRESENTED BY: Xanthi Andrianou

**Keywords:** Tuberculosis, molecular typing, transmission, clustering, control, molecular epidemiology

ESCAIDE REFERENCE NUMBER: 20131500

### Novel methodological approaches for disease investigation, surveillance and control

#### Use of binomial probabilities for rapid hypothesis testing in outbreaks – exemplified by a small outbreak of *Salmonella* Oranienburg in Germany in 2013

Benjamin Bluemel <sup>(1) (2)</sup>, Anja Hauri <sup>(3)</sup>, Wolfgang Rabsch <sup>(1)</sup>, Rita Prager <sup>(1)</sup>, Christina Frank <sup>(4)</sup>, Dirk Werber <sup>(4)</sup>

(1) Robert Koch Institute, Germany, (2) Postgraduate Training for Applied Epidemiology (PAE, German FETP), European Programme for Intervention Epidemiology Training (EPIET), (3) HLPUG, Germany, (4) Robert Koch-Institut, Department for infectious Disease Epidemiology, Germany

#### BACKGROUND:

In March 2013, an increase in notifications of the rare serovar *Salmonella* (S.) Oranienburg was noted in the German federal state of Hesse. During routine veterinary inspection, S. Oranienburg was isolated from an imported shipment of dog snacks delivered to Hesse in February, suggesting a hypothesis for the infection vehicle. We aimed at rapid epidemiologic evaluation whether dog and/or snack contact was associated with infection, to timely target further investigations and possibly interventions.

#### METHODS:

Cases were persons notified with autochthonous S. Oranienburg infection in weeks 8-11/2013 in Hesse or bordering states. We interviewed cases using a standard hypothesis-generating questionnaire, and calculated a range of cumulative binomial probabilities based on national and Hessian background rates of dog keeping estimated from literature. Isolates were compared using phage typing.

#### RESULTS:

Seven cases, none clustered in households, were ascertained (median age: 51 years, range: 10-60, five female, four from Hesse), none after outbreak detection. Five (71%) reported dog contact, of which four were dog keepers. Based on a 15-17% prevalence estimate for individual dog keeping, the cumulative probability that four or more of the seven cases were dog keepers by chance ranged between 1.2-1.9%. Isolates from the dog snack and two cases (one dog keeper) were available for further testing, yielding identical phage types for cases, but not for the snack isolate.

#### CONCLUSIONS:

Hypothesis of dog snacks as outbreak vehicle was strengthened epidemiologically, but not by strain typing. However, the number of available human specimens was low. Binomial probabilistic exposure evaluation was rapid (before microbiological evidence was available) and made prudent use of public health resources (no need to interview controls). The method should be included in the toolbox of outbreak investigators.

PRESENTED BY: Benjamin Bluemel

**Keywords:** Outbreaks, binomial probability, *Salmonella* Oranienburg, dogs, Germany

ESCAIDE REFERENCE NUMBER: 20131525

## The case-chaos methodology for investigating outbreaks is not an alternative to conventional case-control studies

Michael Edelstein <sup>(1)(3)</sup>, Anders Wallensten <sup>(2)</sup>, Sharon Kühlmann-Berenzon <sup>(4)</sup>

(1) Swedish Institute for Communicable Disease Control, Sweden, (2) Smittskyddsinstitutet, Sweden, (3) EPIET, Sweden

### BACKGROUND:

Case-chaos (Gillepsie et al., 2012) is an alternative to case-control studies in outbreak investigations. It relies on generating 'dummy controls' from cases by randomly reshuffling their exposures. We aimed to validate the method using Swedish outbreaks data.

### METHODS:

We identified the five most recent case-control studies from community-acquired foodborne outbreaks for which data was available. Using case-chaos, we simulated five controls per case and conducted 100 iterations to calculate odds ratios matched on case (mORs) for each exposure. We used the median as point estimate and 2.5th and 97.5th percentiles for the 95% confidence interval. We compared case-chaos mORs with their respective case-control ORs in terms of strength of association and significance. We estimated the correlation between mORs and the proportion of cases exposed to each exposure using Spearman's correlation.

### RESULTS:

The five case-control studies (four Salmonella, one E.coli) conducted in 2005-2012 included 12-96 cases and 34-126 controls each. All identified a single vehicle of infection (unadjusted OR between 4.9 and 45). Using case-control as gold standard, 3/5 case-chaos analyses identified the incriminated food item, with no statistical difference in strength of association. Case-chaos identified significant associations for 17% of 115 exposures not associated with the outcome and 29% of 17 exposures significantly associated with the outcome. The log mORs correlated with the respective proportion of cases exposed (Spearman  $\rho=0.91$ ,  $p < 0.001$ ).

### CONCLUSIONS:

Compared with case-control results, case-chaos missed the outbreak source 2/5 times and identified spurious associations between a number of exposures and outcome. Measures of association correlated with the proportion of cases exposed, providing little additional information. We recommended against using case-chaos as an alternative to case-control studies during outbreak investigations.

PRESENTED BY: Michael Edelstein

**Keywords:** Disease outbreaks, epidemiology, case-control studies, methods

ESCAIDE REFERENCE NUMBER: 20131236

## Investigating an Outbreak of Clostridium perfringens Gastroenteritis in a School: is the use of smartphone technology the future?

Benedetto Simone <sup>(1) (2)</sup>, Christina Atchison <sup>(3)</sup>, Barbara Ruiz <sup>(4)</sup>, Paul Greenop <sup>(4)</sup>, Jayshree Dave <sup>(4)</sup>, Derren Ready <sup>(4)</sup>, Helen Maguire <sup>(1) (2)</sup>, Barry Walsh <sup>(4)</sup>, Sarah Anderson <sup>(1) (2)</sup>

(1) Public Health England, United Kingdom, (2) Field Epidemiology Services (Victoria), (3) South West London Health Protection Team, Public Health England, London, United Kingdom, (4) London Borough of Richmond Upon Thames, United Kingdom

### BACKGROUND:

On 22 March 2013, the Field Epidemiology Services (Victoria) were notified that 150 of 1255 students and staff at a school (students aged 13-17) in London were ill with gastrointestinal symptoms; symptom onset peaked 8-12 hours after a lunch served in the school on 21 March.

### METHODS:

We performed a retrospective cohort study of all students and staff. We defined cases as school attenders on 20-21 March who were ill with diarrhoea, abdominal pain, nausea, vomiting on 20-23 March. We tested food, environmental and stool samples for common pathogens and bacterial toxins. We administered an online questionnaire via email, encouraging smartphone use to maximise and speed up response, to measure risk of illness for food items eaten at school on 20-21 March. We checked for confounding and effect modification. In a multivariable analysis using robust Poisson regression, variables associated with illness ( $p < 0.15$ ) were considered to generate adjusted risk ratios.

### RESULTS:

Survey response was 45% (398/897 students; 163/358 staff). Those who ate chicken balti on 21 March were 8.7 times more likely to become ill (95% confidence intervals: 4.6-16.4). Clostridium perfringens was detected in all 19 stool samples collected. Within 8 school hours of its launch, 412/561 (79%) responders had completed the survey using smartphones. Hygienic standards in the kitchen were deemed satisfactory.

### CONCLUSIONS:

We identified chicken balti as the vehicle of infection. Recommendations for the catering company included reviewing procedures to ensure adequate heat penetration in cooking processes. The investigation was done rapidly using smartphone technology and we recommend consideration of this technology in future outbreaks.

PRESENTED BY: Benedetto Simone

**Keywords:** Clostridium perfringens, schools, outbreaks, cellular phone.

ESCAIDE REFERENCE NUMBER: 20131272

## Improving the estimation of time trends surveillance by modeling number of cases and number of persons tested simultaneously: An example on Chlamydia infection in Sweden

Achilleas Tsoumanis <sup>(1)</sup>, Inga Velicko <sup>(1)</sup>, Sharon Kühlmann-Berenzon <sup>(1)</sup>

(1) Swedish Institute for Communicable Disease Control, Sweden

### BACKGROUND:

Time trends of case-based surveillance data are usually studied by modeling incidence (new cases per population). It has been shown, however, that numbers of cases and tests are often positively correlated, and thus a trend in incidence might be strongly affected by changes in the population's testing behavior or physician's testing routines. In order to circumvent this problem, we propose to model the ratio of cases over number of tests (cases ratio or CR) as outcome.

### METHODS:

Annual surveillance data for Chlamydia trachomatis (CT), from 1998 to 2005 were analyzed for the three largest counties of Sweden. We modeled cases, with population as offset, using a negative-binomial regression model with year and percentage of population tested as covariates, and CR as a Gamma generalized linear model with year as a covariate. We calculated goodness-of-fit as mean absolute percentage error.

### RESULTS:

The time trend estimate calculated from the incidence was 9% annual increase (95%CI:8%,11%) and from the CR model 6% increase (95%CI:4%,8%). The incidence model gave a mean absolute percentage error of 18% while the CR model gave a more accurate fit with 9%.

### CONCLUSIONS:

While incidence-modeled estimates assume a constant test percentage, CR takes into account the simultaneous change in cases and tests. The difference between the trend estimates of the two approaches was expected since both cases and tests increase during time but with different rates. CR model gives a more truthful representation and easier interpretation of the time trend. Therefore we recommend that future surveillance include CR as a complementary analysis together with incidence models when estimating time trends in diseases where testing data is relevant such as other sexually transmitted infections and antimicrobial resistance.

PRESENTED BY: Achilleas Tsoumanis

**Keywords:** Surveillance, trends, Chlamydia trachomatis, statistical model

ESCAIDE REFERENCE NUMBER: 20131739

## Prediction Markets: The power of the market to predict disease

Jonathan Latham <sup>(1)</sup>, Johan Giesecke <sup>(1)</sup>, Andreas Jansen <sup>(1)</sup>

(1) ECDC, Sweden

### BACKGROUND:

Prediction markets are virtual markets in which participants trade shares of contracts representing specific outcomes. Prediction markets were originally developed to forecast election results, but have since grown and have been applied in to various topics including forecasting infectious disease. Data is collected by monitoring contract price equilibriums, which are driven by buying and selling. This trading is driven by individual access to, and interpretation of situational and scientific information and knowledge. This price equilibrium has been shown to represent the collective opinion of traders.

### METHODS:

ECDC examined the theoretical premise behind prediction markets and evaluated their applicability to forecast infectious disease in Europe. This began with an in-depth literature review, and included interviews with experts, critical assessment of conditionality parameters, potential and utility.

### RESULTS:

Thirty seven active or expired infectious disease markets were identified. Disease markets had been applied to forecast epidemiological characteristics for influenza, dengue and West Nile virus. No markets dealt with outbreak prediction, and none were in a European context. Prediction markets were found to be able to rapidly gather decentralised information and developing forecasts which were accurate 2 – 4 weeks in advance. With the infrastructure in place, such markets are also dynamic and easy to deploy. Furthermore, markets are constantly broadcasting information, providing real time insight into collective scientific opinion from the trader cohort.

### CONCLUSIONS:

Prediction markets have shown themselves to be able to effectively aggregate dispersed information and generate accurate forecasts. ECDC is investing in piloting infectious disease markets for Europe, due to be launched in 2013. Potential topics include vector-borne and emerging infections, measles and topical outbreaks and events relevant to the European public health.

PRESENTED BY: Jonathan Latham

**Keywords:** Evidence-Based Practice, Evaluation Research, Europe, Hand Hygiene

ESCAIDE REFERENCE NUMBER: 20131665



## Development of a new system for identification, assessment and communication of zoonosis and food emerging risks

Vicente Martínez<sup>(1)</sup>, José María Ferrer<sup>(1)</sup>, José Miguel Pinazo<sup>(1)</sup>

(1) Ainia Technological Center, Spain

### BACKGROUND:

Emerging risks related to animal health and food safety often create great impact on the health of people, so identify before they manifest is crucial to prevent or minimize them, with this aim we have developed a new system to identify, assess and communicate emerging risks, based on hazard signals horizon scanning, scenario analysis and online communication with stakeholders.

### METHODS:

To identify new hazards or potential threats, we have developed a technology for search and automatic recovery risk signals from internet sources through Web monitoring. Hazard signals are filtered through expert consensus, archived in an online library and characterized by the development of risk scenarios, which in turn are evaluated and prioritized based on their likelihood, impact and horizon.

### RESULTS:

The operating system is currently being piloted, and we are systematically identifying new risk related with trends and weak signals. The online library is designed to search through keywords emerging risks and their risk scenarios assessed to have enough information to interpret them and carry out preventive actions.

### CONCLUSIONS:

We have demonstrated that the new system can be used to develop preventive actions against emerging risks, and transfer information to assess risks through its historic risk library. A next step is to identify the key drivers related to the risks, and along the development of foresight scenarios, determine policies and strategic plans to improve the risk management and communication.

PRESENTED BY: Vicente Martínez

**Keywords:** Animal, health, food, emerging, risk, horizon, scan, scenario.

ESCAIDE REFERENCE NUMBER: 20131677

## SHERPaxMAP – An innovative multiplex serological assay for the rapid detection and identification of emerging infections

Jessica Vanhomwegen<sup>(1)</sup>, Sylvie Paulous<sup>(1)</sup>, Philippe Despres<sup>(1)</sup>, Jean-Claude Manuguerra<sup>(1)</sup>

(1) Institut Pasteur, France

### BACKGROUND:

The great majority of emerging or re-emerging infectious diseases that pose a serious threat to human health are caused by zoonotic and arthropod-borne viruses (arboviruses). To address these microbial threats, flexible, broad range, high-throughput laboratory screening tools are essential for rapid diagnosis and large scale surveillance of emerging infections, particularly at the human-animal interface.

### METHODS:

The WHO Collaborating Centre for Reference and Research on Arboviruses and Viral Haemorrhagic Fevers, has put emphasis on the development of a sensitive, innovative multiplex serological diagnostic tool for the rapid detection of a large panel of medically important arthropod-borne infections such as dengue (DEN), Japanese Encephalitis (JE), West Nile (WN), Yellow Fever (YF), Chikungunya (CHIK), and Rift Valley Fever (RVF). The developed liquid microarray, designated as SHERPaxMAP, is based on a panel of color-coded microspheres coupled to viral antigens, for capture and detection of specific serum antibodies.

### RESULTS:

A multiplex serodiagnostic assay associating up to 25 types of antigen-coupled microspheres has been successfully used to capture specific IgM and IgG antibodies to arboviral diseases, greatly reducing the required sample volume and demonstrating enhanced sensitivity and specificity toward target antibodies as compared with classical serological methods such as ELISA. This assay has been applied on numerous occasions, including large scale serosurveys and seroepidemiological studies of human and animal populations at risk, as well as differential diagnosis of imported infections among returning travellers.

### CONCLUSIONS:

This approach allows the rapid and simultaneous detection of antibodies to a wide range of infectious pathogens in biological fluids of infected patients and animal reservoirs, thereby providing a high throughput, cost-effective, and accurate tool for detection and identification of emerging infections.

PRESENTED BY: Jessica Vanhomwegen

**Keywords:** Arbovirus, zoonosis, diagnostic, surveillance, emerging diseases

ESCAIDE REFERENCE NUMBER: 20131845

## An evidence synthesis approach to estimating the incidence of seasonal influenza in The Netherlands

Scott McDonald <sup>(1)</sup>, Anne Presanis <sup>(2)</sup>, Daniela De Angelis <sup>(2)</sup>, Wim van der Hoek <sup>(3)</sup>, Mariette Hooiveld <sup>(4)</sup>, Gé Donker <sup>(4)</sup>, Mirjam Kretzschmar <sup>(5)</sup>

(1) RIVM, The Netherlands, (2) MRC Biostatistics Unit, Institute of Public Health, United Kingdom, (3) Centre for Infectious Disease Control, National Institute for Public Health and the Environment (RIVM), Bilthoven, The Netherlands, (4) The Netherlands Institute for Health Services Research, The Netherlands, (5) Julius Centre for Health Sciences and Primary Care, University Medical Centre Utrecht, Centre for Infectious Disease Control, National Institute for Public Health and the Environment, RIVM, The Netherlands

### BACKGROUND:

Accurate estimation of the incidence of symptomatic infection with seasonal influenza is difficult because only a subset of cases are detected by national surveillance systems. We applied Bayesian evidence synthesis methods to integrate various indirect sources of data, to estimate the age-group specific annual incidence of symptomatic infection in The Netherlands over the period 2005-2007.

### METHODS:

The Netherlands population and age-group distribution for 2006 were used to define the base population. The number of influenza-like illness (ILI) cases was estimated from sentinel surveillance data, adjusted for under-ascertainment using the estimated proportion of ILI cases that do not consult a general practitioner. The estimated number of symptomatic influenza (SI) cases was based on indirect evidence from the surveillance of ILI cases and the proportions of laboratory-confirmed influenza cases in the 2004/5, 2005/6, and 2006/7 respiratory years. In scenario analysis, the number of SI cases prevented by increasing vaccination uptake within the 65+ age-group was estimated.

### RESULTS:

The overall symptomatic infection attack rate (SIAR) over the period 2005-2007 was estimated at 2.6% (95% credible interval [CI]: 2.2-3.3%); a total of 420,100 SI cases (95% CI: 351,000-546,300) was estimated to occur annually. Age-group specific SIARs were estimated for <5 year-olds at 5.5% (2.3-17.5%), for 5-14 years at 3.1% (2.0-4.9%), for 15-44 years at 2.6% (2.1-3.2%), for 45-64 years at 1.9% (1.4-2.5%), and for 65+ years at 1.7% (1.0-3.1%). Under assumed vaccination uptake increases of 5% and 15%, 1440 and 4620 SI cases would be averted.

### CONCLUSIONS:

By synthesising the available information on seasonal influenza and ILI from diverse sources, the annual extent of symptomatic infection can be derived. These estimates are useful to assess the burden of seasonal influenza and to guide vaccination policy.

PRESENTED BY: Scott McDonald

**Keywords:** Seasonal influenza; Incidence; Bayesian evidence synthesis; Vaccination

ESCAIDE REFERENCE NUMBER: 20131549

## Public Health microbiology and molecular epidemiology

### Methicillin-Resistant *Staphylococcus aureus* (MRSA) ST 398 in a rabbit meat producing farm and farm workers

Fabrizio Agnoletti <sup>(1)</sup>, Elena Mazzolini <sup>(1)</sup>, Cosetta Bacchin <sup>(1)</sup>, Elena Tonon <sup>(1)</sup>, Luca Bano <sup>(1)</sup>, Ilenia Drigo <sup>(1)</sup>

(1) Istituto Zooprofilattico Sperimentale delle Venezie, Italy

### BACKGROUND:

Since description in 1961, methicillin-resistant *Staphylococcus aureus* (MRSA) spread in the healthcare and community environment. Recently, the clone ST398, known as livestock associated MRSA (LA-MRSA), started circulating in food producing animals and farm workers especially in pig and bovine primary production. This paper describes the first LA-MRSA occurrence in meat producing rabbits and farm related persons.

### METHODS:

During 2012-2013 a survey aiming to investigate the genetic markers for *S.aureus* virulence in rabbits was conducted in 40 industrial rabbit farms, in Italy. Farms were selected by convenience according to staphylococcosis severity. In each farm 60 female breeders chosen by systematic sampling were clinically examined, between 25 and 30 were also sampled by skin swabbing and tested to detect *S.aureus*. Among all *S.aureus* ten isolates per farm were tested for MRSA by *mecA* and *mecC* gene detection. MRSA were typed with Multilocus Sequence Typing (MLST) and *spa* typing.

### RESULTS:

The rabbits of one farm (1/40) were found contaminated/infected with MRSA belonging to ST398 and *spa*-types *t*<sub>034</sub> and *t*<sub>5210</sub>. In the farm with MRSA colonized/infected rabbits, six farm workers and six farmer relatives were sampled by nasal swab and isolates from four farm workers and one farmer relative were MRSA ST398, *spa*-types *t*<sub>034</sub> or *t*<sub>5210</sub>.

### CONCLUSIONS:

The rabbits of one farm (1/40) were found contaminated/infected with MRSA belonging to ST398 and *spa*-types *t*<sub>034</sub> and *t*<sub>5210</sub>. In the farm with MRSA colonized/infected rabbits, six farm workers and six farmer relatives were sampled by nasal swab and isolates from four farm workers and one farmer relative were MRSA ST398, *spa*-types *t*<sub>034</sub> or *t*<sub>5210</sub>.

PRESENTED BY: Ilenia Drigo

**Keywords:** Methicillin, Resistant *Staphylococcus aureus* Rabbits Multilocus Sequence Typing Epidemiology Zoonoses

ESCAIDE REFERENCE NUMBER: 20131616

## High molecular weight typing with MALDI-TOF MS – A novel method for rapid typing of *Clostridium difficile*

Kristina Rizzardi <sup>(1)</sup>, Thomas Åkerlund <sup>(1)</sup>

(1) Smittskyddsintitutet, Sweden

### BACKGROUND:

*Clostridium difficile* is a common cause of diarrhea mainly in elderly hospitalized patients. A number of strain types have been identified as potential outbreak-related and molecular typing has become an important tool to identify such outbreaks. In this study we developed a MALDI-TOF method based on the high molecular weight protein profile, from intact cells, and evaluated the results against PCR ribotyping as a reference method.

### METHODS:

A MALDI-TOF MS method was developed using 150 clinical isolates belonging to the fifteen most common PCR-ribotypes found in Sweden. This method is based on the correlation between the high molecular weight (HMW) protein profile and PCR-ribotypes. The method was validated in parallel against capillary gel electrophoresis-based PCR-ribotyping using 222 unknown clinical isolates obtained from 26 Swedish clinical laboratories.

### RESULTS:

We found 24 unique HMW-profiles for the 59 different PCR-ribotypes included in the study. 14 PCR-ribotypes could be directly identified by their HMW-profile. Discriminatory peaks found by analyzing protein extractions could be adopted to further sub-divide the HMW-profiles shared by more than one PCR-ribotype. In total 25 PCR-ribotypes could be correctly identified by analyzing both HMW-profile and protein extractions.

### CONCLUSIONS:

The method developed in this study, HMW-typing, is a robust alternative to PCR-ribotyping, specifically to monitor potential hospital outbreaks. Although the resolution of HMW-typing is not as deep as for PCR-ribotyping it offers a rapid and cheap screening of the *C. difficile* PCR-ribotype variation in a clinical environment. Interestingly, the PCR ribotypes with unique HMW-profiles were more often associated with hospital outbreaks in Sweden and displayed higher resistance to various antibiotics, suggesting that HMW-profiling may be used as an extremely low-cost and rapid typing alternative for outbreak-related strains.

PRESENTED BY: Kristina Rizzardi

**Keywords:** *Clostridium difficile* PCR, ribotype MALDI, TOF Outbreak Surveillance

ESCAIDE REFERENCE NUMBER: 20131261

## Hamburger outbreak of a rare VTEC O157 in Sweden – a success in collaboration.

Camilla Sundborger <sup>(1)</sup>, Sofie Ivarsson <sup>(1)</sup>, Jan Smedjegård <sup>(2)</sup>, Catarina Nilsson <sup>(3)</sup>, Cecilia Svensson <sup>(1)</sup>, Ingela Hedenström <sup>(4)</sup>, Susanne Thistedt-Lambertz <sup>(3)</sup>, Christin Furuhausen <sup>(3)</sup>, Cecilia Jernberg <sup>(4)</sup>

(1) The Swedish Institute for Communicable Disease Control (2) County council Västmanland, Sweden, (3) National Food Agency, Sweden, (4) Smittskyddsintitutet

### BACKGROUND:

An outbreak of a rare subtype of VTEC O157 in Sweden occurred from January to May 2013. The outbreak started with two boys falling very ill and being hospitalized with bloody diarrhoea after having eaten hamburgers. A month later a woman fell ill with VTEC O157 with the same profile. In May yet another case, a girl who had eaten hamburgers, fell very ill with HUS. The rare profile had previously been seen in an outbreak in Denmark in autumn 2012 where a high proportion of cases had developed HUS.

### METHODS:

The cases were interviewed by the county medical officers (CMO) and a traceback investigation was conducted. The methods used to type the VTEC isolates were both PFGE (pulsed field gel electrophoresis) and MLVA (multiple locus variable-number tandem repeats analysis). In addition the verotoxin genes were subtyped.

### RESULTS:

Interviews by the CMO showed that the hamburgers had not been properly fried and traceback investigation showed that the hamburgers all came from the same company. The company had purchased the meat from The Netherlands. However, the meat originally came from six different production plants in four different European countries (Great Britain, Hungary, Latvia and Poland). A RASFF (Rapid Alert System for Food and Feed) notification was sent out. Isolates from all four cases had the specific rare outbreak profile, as assessed by MLVA and PFGE. A confirmed link, i.e. isolates from the hamburgers that could verify the source, could be established in three of the four cases.

### CONCLUSIONS:

The outbreak investigation was a success due to close collaboration between the CMO, the municipality, the Swedish Institute for Communicable Disease Control (SMI) and the National Food Agency.

PRESENTED BY: Cecilia Jernberg

**Keywords:** VTEC O157, Hamburger, MLVA, PFGE, subtyping  
ESCAIDE REFERENCE NUMBER: 20131782

## Emergence of Extended-Spectrum- $\beta$ -Lactamase-Producing Multiresistant Strains of *Salmonella enterica* monophasic Typhimurium phage type 138 in Spain

Maria Dolores Fernandez Garcia <sup>(1)</sup>, Irene Mata <sup>(2)</sup>, Laura Herrera <sup>(3)</sup>, Silvia Herrera-Leon <sup>(4)</sup>

(1) ECDC, Sweden, (2) Lab. Enterobacterias, CNM, ISCIII, Majadahonda, Madrid, Spain, (3) Unidad de Vigilancia. CNE, ISCIII Madrid, Spain, (4) Institute of Health Carlos III National Center for Microbiology, Spain

### BACKGROUND:

In early 2013 the Spanish National Reference Laboratory for *Salmonella* (NRLS) detected an unusual increase in resistance to cefotaxime (an extended-spectrum  $\beta$ -lactam) in monophasic variants of *Salmonella* Typhimurium belonging to phage type DT138 (MST-DT138) from human cases. We aimed to (1) analyse MST-DT138 trends in recent years in incidence and antimicrobial susceptibility, and (2) to characterise the molecular basis of the antimicrobial resistance.

### METHODS:

We analysed bacterial isolates and epidemiological data submitted from hospitals located nationwide to the NRLS from January 2006 to December 2012. We calculated annual incidence rates (IRs) of MST-DT138, analysed the resistance mechanisms in all isolates with resistance to cefotaxime by PCR, sequencing and plasmid characterization and performed PFGE analysis on all ESBL-producers isolates.

### RESULTS:

In total, 845 MST-DT138 cases were reported, increasing from 15 in 2006 (0.12 cases/100,000 pop) to 316 in 2012 (2.7 cases/100,000 pop), an increase from 1% to 20% among *S. Typhimurium* cases. Cases were distributed throughout Spain; the median age was 5 years. While 91% of isolates were resistant to ampicillin, streptomycin, sulphonamides and tetracyclines, resistance to cefotaxime was only observed from late 2011. These isolates harboured the extended-spectrum  $\beta$ -lactamase (ESBL) CTX-M-9 gene that was located in a self-conjugative plasmid. Isolates belonged to two major PFGE patterns.

### CONCLUSIONS:

Multi-resistant MST-DT138 strains with a plasmid-mediated CTX-M-9 ESBL have emerged in Spain. These clones may constitute a serious public health problem because cephalosporins are first-choice agents for treatment of serious *Salmonella* infections in children; and plasmid transfer of the CTX-M-9 gene may potentially increase the problem. This finding has now triggered a national epidemiological investigation to identify the potential source of infection.

PRESENTED BY: Maria Dolores Fernandez Garcia

**Keywords:** Monophasic *Salmonella*, CTX-M-9, incidence, multidrug resistance

ESCAIDE REFERENCE NUMBER: 20131727

## Origin, serotype, and antimicrobial resistance of *Salmonella* findings in Finland, 2007-2012

Saara Salmenlinna <sup>(1)</sup>, Aino Kyyhkynen <sup>(1)</sup>, Anni Vainio <sup>(1)</sup>, Ruska Rimhanen-Finne <sup>(2)</sup>, Anja Siitonen <sup>(1)</sup>

(1) National Institute for Health and Welfare, Finland, (2) Department of Infectious Disease Surveillance and Control, National Institute for Health and Welfare, Helsinki, Finland

### BACKGROUND:

Despite a decreasing general trend in laboratory-confirmed cases, *Salmonella* continues to be an important cause of gastrointestinal infection and disease outbreaks in Europe. We reviewed the laboratory-based *Salmonella*-surveillance data in Finland from 2007 to 2012 in order to adjust typing scheme for timely and cost-effective outbreak detection and control.

### METHODS:

Notification of *Salmonella* findings is mandatory and most isolates, including background data, were collected for serotyping and antimicrobial resistance determination.

### RESULTS:

A total of 14989 *Salmonella* cases were notified and 13314 isolates (one/person) were typed. Of all isolates, 16% originated from patients without recent travel history, 28% from travelers to WHO-European region (53 countries in Europe and surroundings) and 54% from travelers to countries outside WHO-European region. The yearly number of isolates from domestic cases stayed between 320 and 410, but that of imported cases decreased from approximately 2000 to 1500. Altogether 247 serotypes were detected. The most common serotypes were Typhimurium (33%) and Enteritidis (15%) in domestically acquired infections, and Enteritidis (35%) in imported isolates. The proportion of monophasic 4,[5],12:i:- isolates fluctuated among the isolates imported outside WHO-European region (5-13%/year), had an increasing trend within WHO-European region (from 1 to 4%), and emerged as an important serotype in domestic cases since 2011 (9-12%). Fluoroquinolone resistance among all *Salmonella* isolates remained between 17 and 23%. Multiresistance in monophasic 4,[5],12:i:- isolates increased from 48 to 82%.

### CONCLUSIONS:

Domestic *Salmonella* rate remained at the same level during this six-year period despite decreasing trend elsewhere and national *Salmonella* control program. Further typing, beyond serotyping, is primarily needed for outbreak detection. Therefore, it is currently performed to all domestic isolates, but for imported isolates only selectively and emphasizing WHO-European region.

PRESENTED BY: Saara Salmenlinna

**Keywords:** *Salmonella*, typing scheme, domestic, imported, serotype, antimicrobial resistance

ESCAIDE REFERENCE NUMBER: 20131700

## Multilocus variable-number tandem repeat analysis of *Salmonella* isolates – how genetically diverse may an outbreak strain be?

Linda Trönnberg <sup>(1)</sup>, Moa Rehn <sup>(1)</sup>, Sofie Ivarsson <sup>(1)</sup>, Cecilia Svensson <sup>(1)</sup>, Britta Björkholm <sup>(1)</sup>, Cecilia Jernberg <sup>(2)</sup>

(1) Swedish Institute for Communicable Disease Control, Sweden,

(2) Smittskyddsintitutet, Sweden

### BACKGROUND:

In late November, 2012, an increased number of monophasic *Salmonella* Typhimurium cases was reported in Sweden. Typing of strains was performed and a case-control study was undertaken to identify the source of the outbreak and prevent further cases.

### METHODS:

All monophasic *Salmonella* isolates were analysed with Multi Locus Variable Number Tandem Repeat Analysis (MLVA). Antibiotic resistance profiles were determined for eight isolates. In total, 27 cases and 34 controls answered questionnaires and could be compared regarding food exposures identified in trawling interviews, calculating crude odds ratios (OR) and ORs adjusted for age and sex.

### RESULTS:

A total of 46 domestic cases of monophasic *S.* Typhimurium were identified. Of these cases, 34 had MLVA-profile 3-13-9-N-211 and 12 cases had six different MLVA profiles very similar to the main profile. All isolates analysed for antibiotic resistance showed the same resistance pattern (ASSuT), regardless of MLVA-profile. In the case-control study, cases with the main profile who answered the questionnaire ( $n=20$ ) were more likely to have consumed pre-packed mixed salad than controls ( $n=34$ ) (adjusted OR 20.3 CI 3.4-122.7). The association was stronger when including cases with all MLVA-profiles ( $n=27$ ) in the analysis (OR 24.6 CI 4.3-140.3).

### CONCLUSIONS:

Pre-packed mixed salad was the most likely source of infection. Both the identical antibiotic resistance pattern among isolates and the results from the analytical study suggest that though in the individual isolates one locus may differ in one or a few repeat units, they all originated from one outbreak strain. Further studies on how to use small variability in genetic profiles as a tool to decide inclusion or exclusion in a specific outbreak investigation are needed.

PRESENTED BY: Linda Trönnberg

**Keywords:** *Salmonella*, MLVA analysis, case-control study, outbreak strain diversity

ESCAIDE REFERENCE NUMBER: 20131736

## Molecular surveillance at the European level: Strategy and pilot for integration of molecular typing data into EU-level surveillance and epidemic preparedness

Karin Johansson <sup>(1)</sup>, Ivo Van Walle <sup>(1)</sup>, Csaba Ködmön <sup>(1)</sup>, Jaime Martinez-Urtaza <sup>(1)</sup>, Daniel Palm <sup>(1)</sup>, Celine Gossner <sup>(1)</sup>, Marc Struelens <sup>(1)</sup>

(1) ECDC, Sweden

### BACKGROUND:

The integration of molecular typing into European level surveillance and epidemic preparedness has been debated among European stakeholders since 2007. In 2012, the European Centre for Disease Prevention and Control (ECDC) launched a roadmap identifying the priority pathogens where EU-level integration and analysis of molecular typing data could significantly inform public health actions, and a molecular surveillance pilot project where multinational typing data collection and analysis is performed for four pathogens.

### METHODS:

The objectives include supporting Member States for early detection of dispersed international outbreaks, source trace-back of an outbreak, and tackling the practical challenges of collecting and analysing molecular typing data for epidemiological investigations. The collection and coordinated analysis of molecular typing data is integrated into the European Surveillance System (TESSy), whose functionality allows management of standardised PFGE for *Salmonella*, Shigatoxin/verocytotoxin-producing *Escherichia coli* (STEC/VTEC), and *Listeria monocytogenes*, and MIRU-VNTR and spoligotyping for multidrug-resistant *Mycobacterium tuberculosis* (MDR-TB).

### RESULTS:

The pilot was launched in 2012 with 13 countries participating voluntarily for food- and waterborne pathogens and 11 for MDR-TB. Presently, molecular typing data have been collected for some 6300 *Salmonella*, 500 STEC/VTEC, 700 *Listeria* and 2400 MDR-TB isolates. Multinational clusters of cases of foodborne infection have been detected and are being followed up with the concerned countries.

### CONCLUSIONS:

The pilot outcome will be assessed in 2014. Overarching challenges to be addressed include: sampling strategies and data submission timeliness in particular for outbreak detection and investigation; linking of molecular typing and epidemiological data at the local and/or national levels; mutual understanding and cooperation between the microbiologists, epidemiologists and bioinformaticians involved. It is expected that the experiences of the pilot project will provide insight into operational solutions to meet these challenges.

PRESENTED BY: Karin Johansson

**Keywords:** Molecular Typing, Molecular Epidemiology, Cluster Analysis, Surveillance

ESCAIDE REFERENCE NUMBER: 20131281

## Outbreaks (1)

### Large outbreak of human *Salmonella* Typhimurium infections associated with consumption of contaminated raw meat – Sivas City, Turkey, August 2012

Dilber Aktas<sup>(1)</sup>, Ali Göktepe<sup>(2)</sup>, Fehminaz Temel<sup>(3)</sup>, Bao-Ping Zhu<sup>(3)</sup>, Levent Akin<sup>(4)</sup>, Belkis Levent<sup>(2)</sup>, Levent Sağlam<sup>(5)</sup>

(1) Turkey Public Health Institute-MoH, Turkey, (2) Public Health Institution FETP, Turkey, (3) World Health Organisation, Turkey, (4) Hacettepe University Faculty of Medicine, Turkey, (5) Sivas Public Health Directorate, Turkey

#### BACKGROUND:

On 16 August 2012, a gastroenteritis outbreak affecting thousands of residents was reported in Sivas City, Turkey. We investigated to determine the scope of the outbreak, identify the cause and mode of transmission, and recommend control measures.

#### METHODS:

A probable case was onset of vomiting or diarrhea during 12–28 August in case-patient's household member. In a household-matched case-control investigation, we compared exposures between 58 probable cases and 101 asymptomatic household controls. We inspected the city's four slaughtering houses for violations of good hygienic practices (GHPs). We assessed the impact of the outbreak by comparing the numbers of reported patients with ICD-10 codes A09, K52, and R11 in Sivas City reported in the surveillance database during the outbreak and non-outbreak periods. We conducted the pulsed field gel electrophoresis (PFGE) and microbiological resistance analyses to compare bacterial isolates from clinical samples and from the implicated meat.

#### RESULTS:

This outbreak caused an estimated 4227 excess gastrointestinal illnesses. Of 58 case-patients, 81% consumed raw meat during the traditional Bayram Holiday, compared with 28% of 101 household control-persons (mOR=5.7; 95% CI: 2.6–12.2). The raw meat all case-persons consumed was from the supermarkets that purchased the meat from a single slaughtering house. Clinical specimens and raw meat samples yielded *Salmonella* Typhimurium with the same PFGE and microbiological resistance (ACSSu(T) NxCipLAmc (Cfp)) patterns. Numerous violations of GHPs were observed in the implicated slaughtering house.

#### CONCLUSIONS:

This was a large outbreak of *S. Typhimurium* infection caused by consumption of raw meat, which likely had been contaminated in one slaughtering house. We recommend health education on the risks of eating raw meat, correction of violations of GHPs, and frequent supervision and training for all slaughtering houses.

PRESENTED BY: Dilber Aktas

**Keywords:** *Salmonella* typhimurium, outbreaks, foodborne diseases, meat, case-control studies

ESCAIDE REFERENCE NUMBER: 20131325

### Outbreak of rare *Salmonella* Typhimurium – linked to minced pork, Saxony-Anhalt, Germany, January to April 2013

Katja Alt<sup>(1)</sup>, Carina Helmeke<sup>(2)</sup>, Claudia Kohlstock<sup>(2)</sup>, Dirk Werber<sup>(3)</sup>, Angelika Fruth<sup>(4)</sup>, Rita Prager<sup>(4)</sup>, Wolfgang Rabsch<sup>(1)</sup>, Ioannis Karagiannis<sup>(4)</sup>, Christina Frank<sup>(3)</sup>

(1) Robert Koch Institute, Germany, (2) State Agency for Consumer Protection of Saxony-Anhalt, Germany, (3) Robert Koch-Institut, Department for infectious Disease Epidemiology, Germany, (4) Robert Koch-Institute, Branch Wernigerode, Germany

#### BACKGROUND:

In January 2013, the German National Reference Centre for Salmonellae (NRC) detected a cluster of salmonellosis cases in Saxony-Anhalt (ST), Germany, caused by novel O:4 non-agglutinating *Salmonella* (S.) Typhimurium -:- DT193 ("outbreak strain"). We aimed to identify the source of infection to contain the outbreak.

#### METHODS:

We conducted a case-control study and defined cases as German residents diagnosed with the outbreak strain from January to March 2013. For each case, we selected two controls contemporarily reported with norovirus infection, frequency-matched on residence and age-group. We interviewed participants regarding food consumption, especially pork and its source. We compared proportions using chi2-tests and calculated odds ratios (ORs) with 95% confidence intervals (95% CI) using logistic regression. Strains, including pork isolates were confirmed at the NRC.

#### RESULTS:

Seventy cases (median age 45 years, 57% males) were confirmed in Germany, 59 linked to ST. Cases (n=31) were more likely to have eaten raw minced pork from local butcherries three days before symptom onset than controls (n=28; OR adjusted for sex: 3.6; 95% CI: 1.0-13). Three pork samples yielded the outbreak strain – one from a butchery where cases obtained their pork from. Hospitalization rates among cases ≥ 60 years (84%) were significantly higher than those of *S. Typhimurium* infections (same regions and age-group) in the previous 5 years (47%, p < 0.001).

#### CONCLUSIONS:

Raw minced pork was the most likely vehicle of infection in this first reported outbreak caused by this *Salmonella* strain, responsible for high hospitalization rates among persons ≥ 60 years. Advice should be given on avoiding raw minced pork consumption especially to the elderly.

PRESENTED BY: Katja Alt

**Keywords:** *Salmonella*, outbreak, foodborne, pork, case-control study, Germany

ESCAIDE REFERENCE NUMBER: 20131263

## Outbreak of Salmonella Enteritidis phage type 1B associated with frozen pre-cooked chicken cubes, Finland, 2012

Sari Huusko <sup>(1)</sup>, Salla Toikkanen <sup>(1)</sup>, Saara Salmenlinna <sup>(1)</sup>, Annika Pihlajasaari <sup>(2)</sup>, Hanna Lundström <sup>(2)</sup>, Jelena Sögel <sup>(3)</sup>, Irina Dontšenko <sup>(4)</sup>, Tansy Peters <sup>(5)</sup>, Ruska Rimhanen-Finne <sup>(1)</sup>

(1) National Institute for Health and Welfare, Helsinki, Finland, (2) Finnish Food Safety Authorities Evira, Helsinki, Finland, (3) Veterinary and Food Board, Tallinn, Estonia, (4) Health Board, Tallinn, Estonia, (5) Public Health England, London, United Kingdom,

### BACKGROUND:

In September 2012, domestic Salmonella Enteritidis (SE) phage type (PT) 1B infections increased in Finland; strains from 13 cases had an identical PFGE-profile. Hypothesis generating interviews pointed towards ready-to-eat chicken salad from a Finnish company. At the same time Estonian authorities informed of SE PT 1B outbreak linked to chicken wrap.

### METHODS:

We defined a case as a person with laboratory-confirmed domestic SE infection (with strain characteristics: PFGE-SENT 117 or PT 1B, resistant to nalidixic acid), between 7 August and 4 October 2012. From Finnish Population Register, 10 controls were randomly selected for each case, matched by age, sex and residence. Information on exposures was collected by web-based questionnaire. We compared cases with controls for common exposures identified in Finnish and Estonian investigations by calculating odds ratios with 95% confidence intervals. We traced the origin of salad ingredients and compared PFGE-profiles of SE PT 1B strains isolated from chicken wrap, Chinese chicken cubes and from cases in Finland and in Estonia.

### RESULTS:

We identified 53 cases of which 17 were included in the analysis with 42 controls. Only consumption of chicken salad was associated with infection (OR 6.5, 95% CI 1.3-33.0). Frozen pre-cooked chicken cubes in Finnish salad and Estonian wrap originated from a Chinese production plant. A small batch of chicken cubes had been imported to Finland in August-September 2012. The patient and chicken wrap isolates were identical to a strain isolated in UK from another batch of chicken cubes produced by the plant.

### CONCLUSIONS:

Epidemiological, microbiological and traceback investigations suggest that the outbreak was associated with exposure to frozen pre-cooked chicken cubes.

PRESENTED BY: Sari Huusko

**Keywords:** Outbreak, salmonellosis, pre-cooked chicken cubes

ESCAIDE REFERENCE NUMBER: 20131487

## An outbreak of gastroenteritis in a Norwegian hotel, December 2012

Horst Bentele <sup>(1)</sup>, Jørgen V Bjørnholt <sup>(2)</sup>, Line Vold <sup>(1)</sup>, Karin Nygard <sup>(1)</sup>

(1) Norwegian Institute of Public Health, Norway (2) Norwegian Institute of Public Health, Department of Infection Control Epidemiology

### BACKGROUND:

On 11th December 2012, 40 cases of gastroenteritis among guests of one hotel were notified to the Norwegian Institute of Public Health. We aimed to identify the extent of the outbreak and its cause in order to implement control measures and avoid similar future outbreaks.

### METHODS:

We performed a cohort study including 320 hotel guests who ate at least one meal at the hotel between 7th-9th December. We defined a case as a hotel guest with onset of diarrhea and/or vomiting between 7th-16th December. We collected information on symptoms and food items using a web-based questionnaire and calculated attack rates (AR). We included food items consumed by >40% of the cohort in a logistic regression model and calculated adjusted odds ratios (aOR) and 95% confidence intervals (CI). Cases' stool specimens, environmental swabs and leftover foods were tested for gastroenteritis-causing pathogens. Kitchen staff were interviewed about ingredients and preparation of suspected food items.

### RESULTS:

Among 97 (30%) respondents, we identified 25 cases (AR=26%). In multivariable analysis, illness was associated with noodle-salad served the 7th (aOR=16.2, 95%CI: 4.6-58.0) and smoked-salmon served the 8th (aOR=5.3, 95%CI: 1.6-17.8). Stool samples of two out of four cases tested positive, one for enterotoxigenic and one for enteroinvasive E.coli. Environmental and food samples tested negative. The noodle-salad with fresh herbs was prepared on 5th December, however no samples were available for testing.

### CONCLUSIONS:

We suspect herbs in the noodle-salad, possibly contaminated during herb-production, may have been the source. However, we can't exclude faecal contamination by kitchen staff or smoked-salmon as a source. We recommended heat-treating fresh herbs prior to use, and retaining food samples for retrospective testing in the future.

PRESENTED BY: Horst Bentele

**Keywords:** Gastroenteritis, Disease Outbreaks, Diarrhea, Vomiting

ESCAIDE REFERENCE NUMBER: 20131510

## Outbreak of *Clostridium perfringens* after consumption of a minced meat dish at a staff canteen in Bavaria, Germany, 2012

Merle Böhmer<sup>(1,2)</sup>, Annette Heissenhuber<sup>(2)</sup>, Ute Messelhäusser<sup>(2)</sup>, Wolfgang Hautmann<sup>(2)</sup>

(1) Postgraduate Training for Applied Epidemiology (PAE), Robert Koch Institute, associated with EPIET, ECDC, Sweden (2) Bavarian Health and Food Safety Authority (LGL), Institute for Health, Oberschleissheim, Germany

### BACKGROUND:

On 17 August 2012, the Bavarian Health and Food Safety Authority was informed about a cluster of gastroenteritis cases (disease onset 14/15 August) among employees of a public authority. Exploratory interviews pointed to a possible association with the consumption of food from the staff canteen on 14 August. We investigated this outbreak to identify the vehicle and to implement control measures.

### METHODS:

We conducted a retrospective cohort study. The population at risk were employees who used the canteen on 14 August. Questionnaires addressing food consumption (based on the canteen's menu) were sent electronically. Cases were defined as previously healthy persons who had eaten food from the canteen and developed one or more of the following symptoms within 24 hours after food consumption: diarrhoea, abdominal pain, vomiting. Relative risks (RR) and 95% confidence intervals (CI) by exposure were calculated using Poisson regression models. Retain samples of food served were tested in the laboratory.

### RESULTS:

Of the 76 persons (median age: 38 years; 65% females) who participated in our study 17 were cases. Median incubation period was 13 hours (range: 8-20). In multivariable analysis, only consumption of a minced meat dish (MMD) was significantly associated with illness (RR 25.4; 95%-CI: 6.5-99.3;  $p < 0.001$ ; adjusted for age and sex). *Clostridium perfringens* (CP) type A (cpe-positive) was detected in a left over sample of the MMD. We found out that construction work was being undertaken in the canteen's dining hall on 14 August.

### CONCLUSIONS:

There is strong epidemiological and laboratory evidence that the MMD was the likely outbreak vehicle. Construction work might have led to problems regarding standard temperature control in the kitchen. The canteen was closed for the duration of construction work.

PRESENTED BY: Merle Böhmer

**Keywords:** *Clostridium perfringens*, gastroenteritis, outbreak, canteen, minced meat

ESCAIDE REFERENCE NUMBER: 20131559

## An outbreak of serogroup C (ST-11) Meningococcal disease in Tijuana, Mexico

Enrique Chacon-Cruz<sup>(1)</sup>, Luz Elena Espinosa-De Los Monteros<sup>(2)</sup>, Samuel Navarro-Alvarez<sup>(3)</sup>, Jose Luis Aranda-Lozano<sup>(3)</sup>, Maria Luisa Volker-Soberanes<sup>(1)</sup>, Rosa Maria Rivas-Landeros<sup>(1)</sup>, Julio A Vazquez-Moreno<sup>(4)</sup>

(1) Hospital General de Tijuana, Mexico, (2) Hospital Manuel Ge Gonzales, Mexico (3) Health Jurisdiction, Tijuana, Mexico, (4) Meningococcal National Reference Laboratory, Instituto de Salud Carlos III, Madrid, Spain

### BACKGROUND:

Invasive meningococcal disease (IMD) in Mexico is being reported as infrequent, however, in Tijuana, Mexico (a city that borders with San Diego, California, and consider the highest transited in the world), we have previously published that IMD in children is endemic. Immunization against meningococcus has not yet universally been implemented in the region.

### METHODS:

From January/30th/2013 until March/30th/2013, 19 cases of IMD by *N. meningitidis* serogroup C were diagnosed. Latex-well agglutination as well as pulse field gel electrophoresis (PFGE) and molecular geno-subtyping were performed.

### RESULTS:

Median age was of 16 years (2-47), with 73.7% > 13 years old. Median days of symptoms was of 1 day (1-4). At admission, meningitis was the main clinical presentation in all but one patient (94.7%), followed by purpura (78.9%). Overall mortality was of 7 (36.8%). Factors associated with lethality were, at admission, presence of septic shock and thrombocytopenia  $< 70,000$  ( $p < 0.02$ ). From 12 survivors, three (25%) had sequelae at discharge (hypoacusia/vertigo, motor disorders and skin scars). The attack rate was of 1.070/100,000 population (95% CI 1.055- 1.085), and even though no cluster as the source of the outbreak was identified, seven patients (36.8%) were family-related. Both PFGE and Random Amplification of Polymorphic DNA showed only one clone, and geno-subtyping identified clone ST11. Public health interventions were implementations of daily negative network, extended case studies, followed by epidemiological fences and rapid initiation of chemoprophylaxis when indicated, as well as active cases search and medical/laboratory training.

### CONCLUSIONS:

In summary, an outbreak of IMD by *N. meningitidis* serogroup C, clone ST11 occurred in Tijuana, Mexico, associated with high lethality. Routine vaccination should be considered in the region.

PRESENTED BY: Enrique Chacon-Cruz

**Keywords:** Meningococcal disease *Neisseria meningitidis* Outbreak Meningococcal outbreak

ESCAIDE REFERENCE NUMBER: 20131836



## An outbreak of hepatitis A in Budapest related to visiting a punk concert

Paulius Gradeckas <sup>(1) (2)</sup>, Agnes Csohán <sup>(2)</sup>, Katalin Krisztalovics <sup>(2)</sup>, Emese Kozma <sup>(2)</sup>

(1) European Programme for Intervention Epidemiology Training (EPIET), ECDC, Sweden, (2) National Center for Epidemiology, Department of Epidemiology, Hungary

### BACKGROUND:

In January 2013, a Budapest hospital notified the Regional Public Health office four hepatitis A cases. These cases attended a punk concert on 1 December 2012 in club. The National Centre for Epidemiology investigated the outbreak to identify the source.

### METHODS:

We conducted a case-control study to investigate the hypothesis that the outbreak was associated with using a rest room in the club or drinking an unidentified alcoholic drink. Cases were people IgM positive for hepatitis A, diagnosed after 15 December 2012, who visited the punk concert. We used snowball sampling for finding controls defined as persons that attended the concert in club X but had no hepatitis A symptoms after 15 December and who had not been previously vaccinated against it. We made an environmental inspection at the site of the outbreak. We collected information on exposures using a standardized questionnaire. We calculated odds ratios and 95% confidence intervals.

### RESULTS:

We identified 15 cases that were in the club X premises on the 1 December. We found that all cases included in the study had used the rest room in the club at least once and that frequent use of rest rooms (> 1 time) was associated with disease (OR = 11.0; 95% CI: 1.2 – 509.0). There were two cases (13%) and three controls (14%) exposed to the unidentified alcoholic drink who were drunk outside the club (OR = 1.0; 95% CI: 0.1 – 8.8).

### CONCLUSIONS:

We found that the use of rest rooms was associated with the outbreak. We suggest informing general population about the importance of hand hygiene via posters in the rest rooms of public places such as bars, clubs.

PRESENTED BY: Paulius Gradeckas

**Keywords:** Hygiene standards, hepatitis A, outbreak, event

ESCAIDE REFERENCE NUMBER: 20131472

## Low risk of transmission from an acute case of Hepatitis A in a food-handler: follow up of almost 1000 exposed individuals, London UK April 2012

Victoria Hall <sup>(1) (2)</sup>, Asha Abrahams <sup>(2)</sup>, Deborah Turbitt <sup>(2)</sup>, Simon Cathcart <sup>(2)</sup>, Helen Maguire <sup>(1)(2)</sup>, Sooria Balesegaram <sup>(2)</sup>

(1) UK Field Epidemiology Programme (EPIET associated), (2) Public Health England, United Kingdom

### BACKGROUND:

We were alerted that a hepatitis A virus (HAV) infected food-handler worked at a busy London hotel whilst infectious, before being hospitalised. HAV symptoms include diarrhoea, vomiting and jaundice. HAV outbreaks following infectious food-handlers can be prevented by HAV vaccination within 14 days of exposure. We aimed to (i) prevent secondary infection, and (ii) determine risk of such transmission.

### METHODS:

We defined as exposed individuals who: ate food prepared by the case when infectious (hotel guests 26/03/2012 – 05/04/2012); worked alongside the symptomatic case (31/03/2012 – 05/04/2012); or were hospitalised on the same ward as the symptomatic case. We defined secondary cases as laboratory confirmed (HAV IgM) or physician diagnosed HAV within 14 days of first exposure and 56 days of last exposure to the case. We arranged HAV vaccination +/- immunoglobulin for exposed staff and patients. We emailed guests advising they seek medical care if symptomatic, but did not recommend HAV vaccination as the 14-day limit had passed. We followed-up those exposed using an online or telephone-administered questionnaire and through alerting other agencies using the Early Warning Response System and International Health Regulations national focal points, to estimate secondary transmission.

### RESULTS:

987 individuals were exposed. All 83 exposed co-workers and 17 exposed patients were vaccinated and received immunoglobulin if needed. 152/887 exposed guests (23%) responded to the survey. We identified no secondary HAV infection.

### CONCLUSIONS:

We found no evidence of secondary transmission following widespread exposure. Our incident response, offering post-exposure prophylaxis to those at highest risk may have prevented secondary cases. We believe that our risk assessment and incident response was proportionate and recommend evaluation of such interventions to assess their effectiveness.

PRESENTED BY: Victoria Hall

**Keywords:** Hepatitis A, food-borne outbreaks, risk assessment, transmission

ESCAIDE REFERENCE NUMBER: 20131501

## Zoonoses

### Serological follow-up four years after acute Q fever: a preliminary analysis

Cornelia C.H. (Lieke) Wielders<sup>(1)</sup>, Gabriëlla Morroy<sup>(2)</sup>, Joris A.F. van Loenhout<sup>(2)</sup>, Ariene Rietveld<sup>(3)</sup>, Daan W. Notermans<sup>(4)</sup>, Alexander C.A.P. Leenders<sup>(5)</sup>, Wim van der Hoek<sup>(4)</sup>, Peter M. Schneeberger<sup>(4)</sup>

(1) Jeroen Bosch Hospital / RIVM, The Netherlands, (2) Academic Collaborative Centre AMPHI, Department of Primary and Community Care, Radboud University Nijmegen Medical Centre, Nijmegen, The Netherlands, (3) Department of Infectious Disease Control, Municipal Health Service Hart voor Brabant, 's-Hertogenbosch, The Netherlands, (4) Centre for Infectious Disease Control, National Institute for Public Health and the Environment (RIVM), Bilthoven, The Netherlands, (5) Department of Medical Microbiology and Infection Control, Jeroen Bosch Hospital, 's-Hertogenbosch, The Netherlands,

#### BACKGROUND:

A major Q fever epidemic occurred in The Netherlands with >3,500 notified cases from 2007 through 2009. Most patients were diagnosed in the microbiology laboratory of the Jeroen Bosch Hospital, 's-Hertogenbosch. Patients were offered standard serological follow-up after 3, 6, and 12 months.

#### METHODS:

A four-year follow-up study was conducted for the approximately 2000 patients diagnosed in the Jeroen Bosch Hospital between 2007 and 2009, aged 18 years or older and for whom a 12-month follow-up sample was available. We present the preliminary data of 884 patients diagnosed in 2007-2008, of whom 728 fulfilled the inclusion criteria. Patients were invited to complete a questionnaire on health status and risk factors for chronic Q fever. IgG and IgM phase I and II were determined by immunofluorescence assay.

#### RESULTS:

Questionnaires were received from 538 (73.9%), and serum samples from 520 (71.4%) patients. Four years after acute Q fever, IgG phase I was still positive ( $\geq 1:32$ ) in 47.5%, IgG phase II in 98.5%, IgM phase I in 12.7%, and IgM phase II in 60.9%. Median IgG phase II titre was 1:256 (interquartile range 1:128-1:512). Patients with IgG phase I  $\geq 1:1024$  were referred to the hospital for further clinical evaluation as this titre might indicate chronic Q fever. One proven, two probable, and two possible chronic Q fever patients were diagnosed according to the criteria of the Dutch consensus on chronic Q fever. All five had IgG phase I titres between 1:512 and 1:2048 at follow-up 12 months after diagnosis.

#### CONCLUSIONS:

Follow-up of 12 months after diagnosis of acute Q fever seems to be adequate for detection of chronic Q fever.

PRESENTED BY: Cornelia C.H. (Lieke) Wielders

**Keywords:** Q fever, *Coxiella burnetii*, follow-up studies, serology  
ESCAIDE REFERENCE NUMBER: 20131566

### Is wild bird exposure an underestimated risk for psittacosis? Report on an increase in cases in Sweden 2013

Moa Rehn<sup>(1)</sup>, Håkan Ringberg<sup>(2)</sup>, Arne Runehagen<sup>(2)</sup>, Björn Herrmann<sup>(3)</sup>, Björn Olsen<sup>(4)</sup>, Ann-Cathrine Pettersson<sup>(4)</sup>, Marika Hjertqvist<sup>(1)</sup>, Sharon Kühlmann-Berenzon<sup>(5)</sup>, Anders Wallensten<sup>(1)</sup>

(1) Smittskydd Skåne, Sweden, (2) Department of Communicable Disease Control, Kronoberg county, Sweden, (3) Department of Medical Sciences, Clinical Bacteriology, Uppsala University, Sweden, (4) University and regional Laboratory, Lund, (5) Swedish Institute for Communicable Disease Control

#### BACKGROUND:

Wild birds host *Chlamydia psittaci* but their role in human infections has not been widely described. Psittacosis is notifiable in Sweden, with a mean of seven cases reported yearly over the past ten years. From January-April 2013, 25 psittacosis cases were reported in southern Sweden. We investigated the outbreak and performed a matched case-control study to identify risk exposures and recommend preventive measures.

#### METHODS:

Patient information was obtained from clinical notifications. Controls were selected from the population registry, and matched on age, sex and postal code. We compared 15 cases and 51 controls regarding exposures to domestic and wild birds, using web-based and paper questionnaires. Crude and adjusted odds ratios (mOR) were obtained through conditional logistic regression. We reviewed atypical pneumonia cases in Kronoberg County, testing retrospectively for *C. psittaci*.

#### RESULTS:

Wild bird feeding in gardens was the most common bird exposure among cases initially identified. In univariate analysis, the only statistically significant risk exposure associated with psittacosis was cleaning of wild bird feeders or exposure to wild bird droppings (mOR: 10; 95% CI: 2-48). The association remained also after adjusting for domestic bird exposure, wild bird feeding and age (adjusted mOR: 26; 95% CI: 2-349). In two of four atypical pneumonia cases, serology indicated recent *C. psittaci* infection.

#### CONCLUSIONS:

Handling of wild bird feeders and droppings was the likely source of infection. We recommend using bird feeders that limit bird defecation on the feeder and protective gear when cleaning them. Our findings suggest that psittacosis is underdiagnosed, and that wild birds are a risk factor for infection. Therefore, anamnesis of wild bird exposure and testing for *C. psittaci* should be considered in atypical pneumonia cases.

PRESENTED BY: Moa Rehn

**Keywords:** Psittacosis *Chlamydia psittaci* Outbreak Zoonoses  
ESCAIDE REFERENCE NUMBER: 20131595

## Retrospective study of Human Cystic Echinococcosis in Italy based on the analysis of Hospital Discharge Records between 2001 and 2011

Diego Brundu <sup>(1)</sup>, Toni Piseddu <sup>(1)</sup>, Gabriella Masu <sup>(1)</sup> Ledda Salvatore <sup>(1)</sup>, Giovanna Masala <sup>(1)</sup>

(1) Istituto Zooprofilattico Sperimentale della Sardegna – Italian National Reference Centre for Echinococcosis (CeNRE), Italy

### BACKGROUND:

Cystic echinococcosis (CE) is an important zoonotic infection. The reporting of CE in humans is recommended as mandatory in EU. The European Centre for Disease Control highlights that in Italy there is not a surveillance system on CE. Due to the lack of official data we analyzed Hospital Discharge Records (HDRs) drawn from the National Ministry of Health.

### METHODS:

Human data were obtained from HDRs drawn from the National Ministry of Health. 15,825 HDRs were admissions of 10,237 Italian patients. The HDRs were analysed according to the patient's region and province code to evaluate average annual incidence rates of hospital cases (Alh) in administrative divisions and in rural and urban areas.

### RESULTS:

The highest Alh was registered in the Islands (7.1 cases/100,000 inhab. Sardinia), followed by the South (5.5 Basilicata) and the Centre (1.7 Latium). The analysis for trend showed a statistically significant decrease in the Alh throughout the study period in the Islands ( $r_2 = 0.96$ ,  $p < 0.001$ ), in the South ( $r_2 = 0.87$ ,  $p < 0.001$ ) and in the Centre ( $r_2 = 0.87$ ,  $p < 0.001$ ). An Alh over 2 cases/100,000 inhab. was observed in 32/110 provinces. An Alh of 12.4 cases/100,000 inhab. was recorded in Province of Nuoro. Provinces with "rural areas with comprehensive development problems" had a relative risk of CE of 5 (95% CI, 4.67 to 5.4) compared to provinces with urban areas.

### CONCLUSIONS:

A picture of the epidemiological situation in Italy was obtained showing a high Alh of CE in the South and in the Islands. CE continues to be a significant public health problem in numerous Italian's Regions. The data from the HDRs are clearly underestimates and surveys are required to determine the true CE incidence levels

PRESENTED BY: Diego Brundu

**Keywords:** Neglected diseases, Echinococcosis, Zoonosis, Epidemiology, neglected disease

ESCAIDE REFERENCE NUMBER: 20131234

## An investigation of a cluster of Anthrax cases, Wahdat District, Tajikistan, Sep 7, 2011

Mirkhamudin Kamalov <sup>(1)</sup>

(1) Administration of State Sanitary Epidemiological Surveillance, Tajikistan

### BACKGROUND:

On Sep 1, a suspected case of human cutaneous anthrax was reported to the Wahdat district surveillance department in Tajikistan. The case occurred in Aug 15. The late notification was attributed to public holidays in Aug. We carried out a descriptive field investigation to search for more cases and to identify the possible source of disease

### METHODS:

We defined a case-patient as an individual with disease manifestations clinically compatible with cutaneous anthrax and with onset date in Aug 2011. We carried out house to house active case search and reviewed animal surveillance data. We collected information from the case-patients on possible exposures to animals or animal products within 10 days of disease onset. Clinical and laboratory data was abstracted from medical records. Analysis was done by time and person attributes

### RESULTS:

We identified three additional cases that occurred during Aug 10-18. The four cases were 24-60 years old and had skin ulcers on the arms that were suggestive of anthrax. All participated in slaughtering a sick cow on Aug 8. Due to lack of lab capabilities, the cases were not laboratory confirmed. It was also revealed that the area was endemic with animal anthrax but no animal vaccination campaigns were conducted there in recent years there

### CONCLUSIONS:

This outbreak was probably caused by exposure to the sick cow during slaughtering. Anthrax surveillance is not timely and sensitive enough in Wahdat District. Health education was provided to the community when dealing with sick animals. Specific recommendations were also made to improve lab capabilities and the sensitivity and timeliness of disease surveillance. Also, veterinary services were contacted in order to improve anthrax control measures in animals

PRESENTED BY: Mirkhamudin Kamalov

**Keywords:** Anthrax, cutaneous, animals, determinants, Tajikistan

ESCAIDE REFERENCE NUMBER: 20131484

## Surveillance of Brucellosis in Portugal, 2012

Cátia Pinto <sup>(1)</sup>, José Antunes <sup>(1)</sup>, Paulo Nogueira <sup>(1)</sup>, Andreia Costa <sup>(1)</sup>

(1) Directorate General of Health, Portugal

### BACKGROUND:

Brucellosis is a zoonosis and almost all forms of human disease stem from infected animals through direct or indirect contact, such as milk and cheese. Human incidence varies with livestock density, the degree of animal endemics, socioeconomic status and dietary habits. The etiological agents of brucellosis are bacteria of the genus *Brucella*.

### METHODS:

We conducted an analysis of all cases notified in Portugal in 2012 through the National Mandatory Notifiable Diseases Surveillance System provided by the Directorate-General for Health.

### RESULTS:

Were reported 48 cases of brucellosis, 37 cases were classified as confirmed and 11 as probable. Of the confirmed cases 26 were male and 11 female. The average age of the confirmed cases was 46.5 years. The main routes of transmission were contact with animals, in 19 of the cases, and food, in 16. In 13 cases it was not possible to identify the mode of transmission involved. The main suspected vehicles were the farm animals in 16 cases and the milk in 15. The *Brucella* species, implicated in the disease, was not found in 32 cases. *Brucella Melitensis* was involved in 11 cases and *Brucella Abortus* in 5. The geographical distribution was asymmetric in the country. Of the 48 cases reported, 21 were admitted to hospital and there was one death. The incidence rate of the disease was 0.35 per 100,000 residents.

### CONCLUSIONS:

Despite a decrease in the number of the cases of brucellosis in Portugal over the last decades the disease continues to require constant attention. The district of Vila Real stood out in the national whole. The characteristics of the cases and the seasonality of the occurrences are consistent with findings in other studies.

PRESENTED BY: Cátia Pinto

**Keywords:** Brucellosis, zoonoses, surveillance, transmission

ESCAIDE REFERENCE NUMBER: 20131546

## Knowledge of brucellosis among persons living in rural Georgia – 2012

Giorgi Maghlakelidze <sup>(1)</sup>, Archil Navdarashvili <sup>(2)</sup>, Mariam Geleishvili <sup>(3)</sup>, Thomas Rush <sup>(3)</sup>, Edmond Maes <sup>(3)</sup>

(1) Central Public Health Reference Laboratory, Georgia, (2) National Center for Disease Control and Public Health, Georgia, (3) US CDC Georgia Country Office, Georgia

### BACKGROUND:

Georgia's National Center for Disease Control registered 166 new brucellosis cases in 2011 (3.7/100,000). We investigated accuracy of knowledge of symptoms and risk factors among rural populations to improve prevention and control recommendations.

### METHODS:

In May and July 2012, we conducted cross-sectional household cluster survey, among villages in two Georgian regions. Clusters of 14 households were randomly selected among villages, proportional to population size, to estimate 50% prevalence with a precision of  $\pm 5\%$ . Personal interviews assessed knowledge of brucellosis sources, transmission routes, symptoms, risk factors.

### RESULTS:

We interviewed 936 households in Kvemo Kartli and Kakheti regions. 43% of respondents were male. 34% had  $\geq 12$  years education. 392 (42%) were native-Georgian speakers. 591 (63%) households owned livestock. Self-reported (yes/no) knowledge of disease was 1.3 times higher among livestock owners (Prevalence rate ratio (PRR)=1.3, 95% CI 1.2–1.5). Only 0.8% knew 5 brucellosis symptoms; 51% did not know any symptoms. Most recognized symptoms were: joint pain (46%), fever (42%). 0.3% knew major infection routes; 17% did not know any. Many knew one to three potential sources: raw milk, 369(62%); cheese 239(40%); raw meat 236(40%). Persons with  $\geq 12$  years of education were 1.4 times more knowledgeable about brucellosis than less-educated (PRR=1.4, CI 1.3–1.6). 393(76%) reported access to veterinary-care but only 20 reported regular veterinary contact. 153 vaccinated their animals against brucellosis. 528 (57%) produced or ate fresh cheese; 59(7%) consumed raw milk.

### CONCLUSIONS:

Only half of the population reported at least one brucellosis symptom correctly. We recommended development and implementation of health education messages, based on this survey. Health education messages should be targeted within high risk geographic areas in dominant language groups (Georgian, Azeri).

PRESENTED BY: Giorgi Maghlakelidze

**Keywords:** brucellosis, cluster survey, KAP survey, Georgia.

ESCAIDE REFERENCE NUMBER: 20131689

## Survey of Knowledge, Attitude and Practice (KAP) on brucellosis in Gakh Region, Azerbaijan 2012

Etibar Zeynalov<sup>(1)</sup>, Mezhahir Shixiyev<sup>(2)</sup>, Mariam Geleishvili<sup>(3)</sup>, Edmond Maes<sup>(3)</sup>

(1) State Veterinary Services of Azerbaijan, Azerbaijan, (2) Republican Veterinary Laboratory, Azerbaijan, (3) US CDC Georgia Country Office

### BACKGROUND:

In Azerbaijan, 5,236 human cases, and over 35,000 animal cases of brucellosis were registered during 2000-2010. We conducted a KAP survey to assess persons' knowledge of symptoms and risk factors to plan health education interventions for reducing brucellosis risk

### METHODS:

We collected information on animal ownership, knowledge about brucellosis sources, transmission routes, symptoms and risk factors. Clusters of 14 households were randomly selected among villages in Gakh and Zagatala regions, proportional to population size, to estimate 50% prevalence with a precision of +/-5%

### RESULTS:

560 households were selected; one adult from each household was interviewed. 253 (45.3%) of participants were men; 117(24.2%) respondents had >12 years education; 385(69.9%) of households owned livestock. 370(69.4%) were involved in livestock care. 333 of 385 reported brucellosis vaccination of livestock. 368 (96.8%) persons had access to veterinary services. 53(13.7%) cared for their own sick livestock, 336 (87.3%) consulted a veterinarian in last year. 178 of 370 slaughtered their own livestock, 318 slaughtered livestock in own yard. 33 used a special place in village for slaughtering; 169 used butchers for slaughtering. 182 persons of 370 used personal protection during slaughtering. 270(49.4%) of 547 respondents stated: "I know something about brucellosis". No differences in brucellosis knowledge were found by gender or type of livestock kept. Knowledge about animal and human brucellosis symptoms and transmission through dairy products among persons with education >12 years was 1.5 times higher (PRR=1.4 95% CI 1.2-1.7) than in those with less education

### CONCLUSIONS:

A majority of households raised livestock but less than half of respondents had any information about brucellosis. We recommend increasing public awareness about brucellosis through health educational messages based on results of this survey

PRESENTED BY: Etibar Zeynalov

**Keywords:** Brucellosis, cluster survey, KAP survey, Azerbaijan  
ESCAIDE REFERENCE NUMBER: 20131682

## Knowledge, behaviours and perceptions influencing health

### Factors associated with non-compliance with recommendations on hand hygiene in the period 2005 – 2012

Javier Silva Contreras<sup>(1)</sup>, Vicente García Román<sup>(2)</sup>, Isidra Tenza Iglesias<sup>(2)</sup>, Ana Carolina Martín Ruiz<sup>(2)</sup>, Concepción García González<sup>(2)</sup>, Marina Fuster Pérez<sup>(2)</sup>, Javier Conesa Peñuela<sup>(2)</sup>, José Sánchez Payá<sup>(2)</sup>, Cesar Osvaldo Villanueva Ruiz<sup>(2)</sup>

(1) Alicante General University Hospital, Spain, (2) Preventive Medicine Service, HGUA, Spain

### BACKGROUND:

The aim is to study the factors associated with non-compliance with the recommendations of Hand Hygiene (HH) on a tertiary hospital in the period 2005-2012.

### METHODS:

We conducted 24 cross-sectional observational studies on the practice of HH and are grouped annually. We included the opportunities of realization of HH by direct observation in the period 2005-2012. The outcome variable was completion of the HH and the explanatory variables: year (2005-2012), sex, age (<35, ≥ 35 years), availability of alcoholic solution in pocket format (ASP), attendance area (critical care, medical, surgical), type of activity (before, after contact with the patient) and patient with precautions contact. We calculated the frequency of performance of HH and studied their association with different explanatory variables. We used a multivariate logistic regression model, calculating the adjusted Odds Ratio (aOR) with confidence intervals at 95%.

### RESULTS:

The overall compliance of the global recommendations on the HH was 53.1%. When performing multivariate model yields were obtained the following adjusted OR 2006: 0.4 (0.4-0.5) 2007: 0.4 (0.4-0.5) 2008: 0.4 (0.4-0.5); 2009: 0.4 (0.4-0.5) 2010: 0.5 (0.4-0.5) 2011 0.4 (0.3 to 0.4); 2012: 0.4 (0.4 to 0.4); man: 1.4 (1.3-1.5); under 35 years: 1.2 (1.1-1.3), ASP: 2.1 (2.0-2.2); medical attendance area: 1.7 (1.6-1.8); surgical attendance area: 2.0 (1.9-2.2); activity before patient contact: 2.4 (2.3-2.5), and patients with contact precautions: 0.7 (0.6-0.8).

### CONCLUSIONS:

The unavailability of ASP and an activity before contact with the patient, showed greater magnitude of association with non-compliance with the recommendations on HH. The development of health policies that encourage the use of ASP is the only guarantee their availability at the time and point of use.

PRESENTED BY: José Sánchez Payá

**Keywords:** Hand Hygiene, Hydroalcoholic solution, Health Policy, Universal Precautions  
ESCAIDE REFERENCE NUMBER: 20131773

## Global assesment improvement program hand hygiene in the period 2005 – 2012

Vicente García Román <sup>(1)</sup>, Cesar Osvaldo Villanueva Ruiz <sup>(1)</sup>, José Luis Mendoza García <sup>(2)</sup>, Ma. José Molina Gomez <sup>(1)</sup>, Javier Silva Contreras <sup>(2)</sup>, Marina Fuster Pérez <sup>(2)</sup>, Ana Carolina Martín Ruiz <sup>(1)</sup>, José Sánchez Payá <sup>(1)</sup>

(1) Preventive Medicine Service, HGUA, Spain, (2) Alicante General University Hospital, Spain

### BACKGROUND:

The objective is to evaluate a program to improve the recommendations on hand hygiene (HH) during the period 2005-2012.

### METHODS:

Intervention: sharing clinical sessions and leaflets (approximately 3000 per year) with information about indications and HH methodology, guideline adherence of HH and frequency of cross infections. Process Indicators: Consumption Hydroalcoholic Solutions (CAS) in ml/stay; Guideline Adherence (GA) of HH recommendations (measured by direct observation from repeated cross-sectional studies over time grouped annually) Hydroalcoholic solution pocket format (ASP) (percentage of workers who use it). Indicators result: Patients with Cross Infection Prevalence (PIP) (EPINE studies) and Incidence of cross *Acinetobacter baumannii* infections per 10,000 days of stay (IAB). To study the association between process and outcome indicators over time we used the Spearman correlation coefficient.

### RESULTS:

Between 2005 and 2012, CAS increased from 7.5 to 35.4 ml / stay, FG of HH from 31% to 59.4%, use ASP 5.5% to 42.8%, PIP 9.1% to 6.9% and the IAB from 3.3 to 1.2 cases. For PIP, the correlation was  $r = -0.9$  with the CAS,  $r = -0.9$  with the FG and  $r = -0.9$  with the use ASP. For IAB, the correlation was  $r = -0.8$  with the CAS,  $r = -0.7$  with FG and  $r = -0.7$  with the use ASP.

### CONCLUSIONS:

Between the CAS, the FG of HH, use of ASP and the PIP, a very good inverse correlation exists. And with the IAB, there are a good inverse correlation.

PRESENTED BY: José Sánchez Payá

**Keywords:** Hand Hygiene, Cross Infection, Hydroalcoholic solution, Guideline Adherence

ESCAIDE REFERENCE NUMBER: 20131781

## Congenital infections prevention knowledge and practices among pregnant women, in Romania

Mircea Ioan Popa <sup>(1)</sup>, Gabriela Loredana Popa <sup>(1)</sup>, Eugenia Neagu <sup>(1)</sup>, Andreia Nita <sup>(1)</sup>,

(1) "Carol Davila" University of Medicine and Pharmacy, Romania

### BACKGROUND:

Congenital infections represent a worldwide problem and its importance has been recognized for more than half a century. In 2010 World Health Organization renewed its commitment to have eliminated rubella and have prevented rubella congenital syndrome by 2015. The purpose of this study is to evaluate the level of information among pregnant women in Romania regarding congenital infections.

### METHODS:

We developed a survey consisting of 35 questions and interviewed 280 pregnant women regarding their knowledge on toxoplasmosis, listeriosis and rubella. The questionnaire had 6 parts; it took approximately 30 minutes to complete. 203 out of 280 questionnaires were applied in 3 maternity hospitals in Bucharest. The survey data were analyzed using EpiInfo software. The sample size was computed with a 95% confidence level and 0.01 standard error for a population of 200.000 pregnant women, and was determined to be 185.

### RESULTS:

67.5% of the pregnant women surveyed had heard about toxoplasmosis, 47.1% about listeriosis and 88.7% about rubella. Most of the respondents did not know the preventive measures; 33.7% knew that consuming undercooked meat is a way of getting toxoplasmosis; only 25% knew that they must not consume unpasteurized dairy products to prevent listeriosis and about 40% did not know that vaccination is the way of preventing rubella. Behaviour during pregnancy assessed overall, does not promote prevention of congenital infections.

### CONCLUSIONS:

Our results indicate a low level of awareness among pregnant women regarding toxoplasmosis, listeriosis and rubella. There is an urgent imperative for the education of pregnant women and women of childbearing age concerning congenital infections. Prevention of congenital infections should be a national priority and all women of childbearing age and pregnant women should be informed about it.

PRESENTED BY: Mircea Ioan Popa

**Keywords:** Congenital infections, knowledge, pregnant women

ESCAIDE REFERENCE NUMBER: 20131751

## Recent European trends on injecting drug use through the treatment demand indicator

Ana Sarasa Renedo <sup>(1)</sup>, Linda Montanari <sup>(2)</sup>, Maria Jose Bravo <sup>(1)</sup>, Bruno Guarita <sup>(2)</sup>, Luis de la Fuente <sup>(1)</sup>, Gregorio Barrio <sup>(3)</sup>

(1) National Epidemiology Centre, Carlos III Health Institute, Spain, (2) European Monitoring Centre for Drugs and Drug Addiction, Portugal, (3) National School of Health, Carlos III Health Institute, Portugal

### BACKGROUND:

Most reports show a decreasing trend in drug injection across Europe. However, in certain countries these trends could be stable or increasing. The treatment demand indicator (TDI) is an indicator collected at national level and further aggregated at European level in the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA). TDI includes information about current and lifetime drug injection, among other. We aimed to estimate trends of drug injection in 30 European countries (EU-28, Norway and Turkey) during 2000-2011.

### METHODS:

Study subjects were clients admitted to treatment for their drug use for the first time in their lives in Europe-30. Three main outcomes were studied: absolute number of current drug injectors (during 30 days prior to admission), percentage of current drug injectors over first admissions, and average number of current drug injectors per notifying centre to address possible changes in notification. Data were aggregated for Western Europe (WE), Eastern Europe (EE) and Europe-30. Recent trends (2007-2011) were estimated using Joinpoint regression software and the Average Annual Percent Change (AAPC) was used to summarise changes in trends.

### RESULTS:

The trend in the absolute number of current injectors significantly decreased in Europe-30 (-3.9%; 95%CI:-6.4,-1.4) and in WE (-5.3%; 95%CI:-8.4,-2.0) whereas no statistically significant trend was observed for EE (0.4%; 95%CI:-1.5,2.3). This was also the case for percentages of current injectors (Europe-30: -7.5%; 95%CI:-9.6,-5.4; WE: -11.1%, 95%CI:-14.6,-7.5; EE: 4%, 95%CI:-10.1,20.2). Average number of current injectors per notifying centre significantly decreased in all groups (Europe-30: -9.2%;95%CI:-14.6,-3.3 WE: -8.6%;95%CI:-11.8,-5.3; EE: -9.8%;95%CI:-16.1,-3.1).

### CONCLUSIONS:

Drug injection seems to be decreasing throughout Europe-30. This has positive implications regarding health problems such as HIV and HCV transmission or overdose events.

PRESENTED BY: Ana Sarasa Renedo

**Keywords:** Substance Abuse, Intravenous Substance-Related Disorders, Substance Abuse Treatment Centers, Drug Overdose, Needle Sharing Trends

ESCAIDE REFERENCE NUMBER: 20131793

## Promotion of immunization for health professionals in Europe (HProlImmune): content analysis of 47 focus groups among seven European countries

Vasilios Raftopoulos <sup>(1)</sup>, Agoritsa Baka <sup>(2)</sup>, Pania Karnaki <sup>(3)</sup>, Nadia Dalma <sup>(3)</sup>, Ursula Dietrich <sup>(4)</sup>, Valeria Alfonsi <sup>(5)</sup>, Carmen Montano <sup>(6)</sup>, Maria Cristina Rota <sup>(6)</sup>, Silvia Declich <sup>(6)</sup>, Barbara de Mei <sup>(6)</sup>, Chiara Cattaneo <sup>(6)</sup>, Costas Christophi <sup>(7)</sup>, Martha Paisi <sup>(8)</sup>, Liubove Murauskiene <sup>(9)</sup>, Marija Veniute <sup>(8)</sup>, Dorota Szosland <sup>(9)</sup>, Daniela Pitigoi <sup>(10)</sup>, Liliana Preotescu <sup>(11)</sup>, Maria Tseroni <sup>(12)</sup>, Athena Linos <sup>(13)</sup>

(1) Cyprus University of Technology, (2) Hellenic Center for Disease Control and Prevention, Greece, (3) Institute of Preventive Medicine Environmental and Occupational Health, Greece, (4) Public Health Sachsen und Sachsen-Anhalt, Greece, (5) Istituto Superiore di Sanità (ISS), Rome, Italy, (6) Istituto Superiore di Sanità, Italy, (7) Mokymu Tyrimu ir Vystymo Centras, Lithuania, (8) Nofer Institute of Occupational Medicine, (10) Cantacuzino Institute, Bucharest, (11) National Institute of Infectious Diseases, Romania, (12) National Hellenic Nurses Association, Greece, (13) Institute of Preventive Medicine Environmental and Occupational Health – Prolepsis, Greece

### BACKGROUND:

Within the framework of the European project “Promoting immunizations for HCWs in Europe” HCWs’ attitudes, organisational and attitudinal barriers and enablers towards immunization were explored in Greece, Italy, Germany, Cyprus, Romania, Poland, and Lithuania to guide the development of a toolkit to increase vaccination coverage in HCWs.

### METHODS:

Focus groups were conducted with 282 HCWs – nurses, physicians, infection control personnel, public health personnel and policy makers. Grounded theory guided research while content analysis methodology led the extraction of results.

### RESULTS:

HCWs’ immunization knowledge was high while discussions emphasized the importance of vaccines in the context of their work. Most were familiar with booster immunization programs. Dominant barriers included: lack of perceived need, concern about effectiveness, delayed availability and distribution, insufficient information on benefits, and general lack of preventive strategies. Lack of authority commitment, different immunization schedules in EU countries and the absence of hospital epidemiologists were also mentioned. The anti-vaccination movement following the H1N1 pandemic experience was considered a cause of controversial beliefs among HCWs. Dominant immunization enablers included: perceived benefits for personal and patient protection, influence of educational programs, importance of occupational physicians, National Seasonal Campaigns and the role of infection control personnel. Finally, a significant segment of HCWs highlighted that immunizations should be mandatory in health care facilities.

### CONCLUSIONS:

Findings indicate the importance of clear immunization policy and guidelines as well as the key role of hospital epidemiologists, occupational physicians and infectious control personnel. Guidelines for addressing these issues should be included in the toolkit as well as information concerning effectiveness and side effects of recommended vaccines and guidance on practical and organizational aspects of vaccine delivery within a hospital context.

PRESENTED BY: Vasilios Raftopoulos

**Keywords:** Immunization, Vaccination, Healthcare workers, Prevention & control

ESCAIDE REFERENCE NUMBER: 20131818

## Knowledge, behaviours and attitudes regarding human papillomavirus (HPV) infection and its prevention in female students in Patras, West Greece

Eleni Jelastopulu <sup>(1)</sup>, Anna Plota <sup>(2)</sup>, Christos Bartsokas <sup>(1)</sup>, Panagiotis Plotas <sup>(1)</sup>, Konstantinos Poulas <sup>(3)</sup>

(1) Department of Public Health, School of Medicine, University of Patras, Greece, (2) Postgraduate Programme Medicinal Chemistry, University of Patras, Greece, (3) Department of Pharmaceutical Marketing, School of Pharmacy, University of Patras, Greece

### BACKGROUND:

The risk of developing cervical cancer is mainly related to the Human papillomavirus (HPV) infection and for several years there are in addition to effective screening methods prophylactic vaccines available. The purpose of this study was to assess the knowledge and attitudes towards HPV infection and vaccination, Papanicolaou testing, and cervical cancer among female students at the Technological Educational Institute (TEI) at Patras, West-Greece.

### METHODS:

A cross-sectional study was conducted in May 2013 among 505 females, who studied at the TEI Patras. Data were recorded based on a 24-items questionnaire including questions regarding their attitudes and knowledge related to cervical cancer development and prevention.

### RESULTS:

A total of 505 students were interviewed, mean age was 21.2 years old. Knowledge of existing cervical cancer prevention was 89.5%, whereas knowledge of HPV, its relation with cervical cancer and mode of transmission was 63.5%, 48.5% and 60.8%, respectively. However only 8.9% were aware that vaccination can prevent HPV and only 22.6% were vaccinated. 79.1% are highly concerned about cervical cancer and more than 50% screen routinely at least every year for cervical cancer. The great majority (82.5%) is aware that Papanicolaou testing should begin after the initiation of sexual activity. Having symptoms if infected with HPV believe 62%, whereas 4.2% stated having no symptoms. Finally, 80.2% agreed that uptake of cervical screening is needed even when being vaccinated.

### CONCLUSIONS:

Knowledge of HPV infection, Papanicolaou testing and acceptance of HPV vaccination in young female students of a higher educational institute are insufficient. The results indicate the need and importance of planning and conducting informative campaigns with respect to education of HPV, cervical cancer, effectiveness of prevention and benefits of vaccination.

PRESENTED BY: Eleni Jelastopulu

**Keywords:** Cervical cancer, HPV, vaccination, screening, Papanicolaou testing

ESCAIDE REFERENCE NUMBER: 20131699

## Structural barriers and socioeconomic factors are associated with incomplete childhood vaccination: a cross-sectional study in Greece, 2012

Danai Pervanidou <sup>(1)</sup>, Dimitris Papamichail <sup>(2)</sup>, Kostas Danis <sup>(1)(3)</sup>, Theodora Stavrou <sup>(4)</sup>, Dimitris Laggas <sup>(2)</sup>, Magda Gavana <sup>(5)</sup>, Takis Panagiotopoulos <sup>(2)</sup>

(1) Hellenic Centre for Disease Control and Prevention, (2) National School of Public Health, Greece, (3) European Programme for Intervention Epidemiology Training (EPIET), European Centre for Disease Prevention and Control (ECDC), (4) Ministry of Health, Greece, (5) Medical Faculty, Aristotle University of Thessaloniki, Greece

### BACKGROUND:

To improve vaccine coverage (VC), factors influencing immunization status of children need to be identified and addressed. In 2012, we conducted a cross-sectional study among 6 year-old school-children and their parents/guardians to identify predictors of complete vaccination status.

### METHODS:

We stratified the country into four regions and randomly selected school-classes (clusters) with probability proportional to the child-population size of each region. We asked all pupils of the selected clusters to provide their vaccination booklet and their parents/guardians to complete a questionnaire regarding beliefs and attitudes towards immunization. Children were considered fully-vaccinated if they had received all vaccinations according to the Greek National Vaccination Programme. We calculated adjusted-Prevalence Ratios (aPR) and 95% Confidence Internals (95%CI) allowing for the stratification and the clustering, using binomial regression.

### RESULTS:

Of all 1,046 (84%) participant children in 79 selected school-classes, 63% (95%CI 58-67) were fully-vaccinated. Parental positive opinion regarding immunization was not associated with complete vaccination status of their children (PR=0.95; 95%CI:0.77-1.2). Children were less likely to be fully-vaccinated i) if they had  $\geq 2$  other siblings (aPR=0.68; 95%CI:0.51-0.90), ii) if they were Roma (aPR=0.44; 95%CI:0.15-0.99) and immigrants (aPR=0.82; 95%CI 0.67-1.00) and iii) if their parents had  $< 9$  years of formal education (aPR=0.77; 95%CI:0.69-0.86). Complete VC was lower in children of parents/guardians who perceived long distance to immunization site as a major barrier to immunization (aPR=0.80; 95%CI:0.72-0.90).

### CONCLUSIONS:

Structural barriers and socioeconomic factors rather than parental attitudes towards immunization were associated with incomplete vaccination. Comprehensive approaches are warranted to overcome these barriers and improve vaccine coverage in high-risk groups identified in this study.

PRESENTED BY: Danai Pervanidou

**Keywords:** Vaccination coverage, Attitudes, Socioeconomic, Greece; cross-sectional

ESCAIDE REFERENCE NUMBER: 20131769



## Surveillance systems

### Sentinel surveillance of Community Acquired Pneumonia in Puglia Region, Italy: evaluation of the system's performance, January – May 2013

Vanessa Cozza <sup>(1)</sup>, Francesca Fortunato <sup>(2)</sup>, Anna Sallustio <sup>(3)</sup>, Maria Chironna <sup>(1)</sup>, Domenico Martinelli <sup>(2)</sup>, Biagio Pedalino <sup>(2)</sup>, Rosa Prato <sup>(2)</sup>

(1) Regional Epidemiological Observatory of Apulia, Italy, (2) University of Foggia, Italy, (3) Department of Biomedical Sciences and Human Oncology, University of Bari, Italy

#### BACKGROUND:

*Streptococcus pneumoniae* is the most commonly identifiable cause of Community Acquired Pneumonia (CAP) resulting in hospitalization and death in the elderly worldwide. In January 2013, we implemented a two-year active sentinel-surveillance to describe the epidemiology of CAP in adults aged >64 years in Puglia Region, Italy, and to assess the impact of 13-valent pneumococcal conjugated vaccine (PCV13), introduced in November 2011 in this age group. Five months after its implementation, we performed an interim evaluation to assess if the system performance needed improvement.

#### METHODS:

Thirty sentinel physicians (GPs and pneumologists) identify patients with CAP signs and/or symptoms and collect: i) informed consent, ii) clinical information and pneumococcal vaccination history, iii) nasopharyngeal swabs, sputum and/or blood specimens for *S. pneumoniae* identification and PCR genotyping. We assessed data quality and completeness by analyzing a set of five variables. We assessed timeliness as the interval between date of specimen collection and delivery to the regional reference laboratory and between date of informed consent and laboratory results.

#### RESULTS:

Between January-May 2013, 62 CAP cases were reported. Information on date of birth, date of specimen collection and place of residence was available for 62 (100%) cases; on risk factors for 56 (90%) and on vaccination history for 12 (19%) cases (11 reported from GPs). Median shipment delay for specimens was 2 days (range 1-8). Median interval between informed consent and laboratory result was 5 days (range 3-27).

#### CONCLUSIONS:

The system achieved a satisfactory level of completeness for demographic variables and timeliness. The form has been adapted, allowing pneumologists to provide information on the referring GP. We can thus contact the GP to improve completeness on vaccination history.

PRESENTED BY: Vanessa Cozza

**Keywords:** Community Acquired Pneumonia Surveillance system Data quality Completeness Timeliness

ESCAIDE REFERENCE NUMBER: 20131528

### Evaluating the completeness of the invasive pneumococcal diseases surveillance system in Denmark, 2010-2011

Frédérique Dorléans <sup>(1)</sup>, Kåre Mølbak <sup>(2)</sup>, Marianne Voldstedlund <sup>(2)</sup>, Tine Dalby <sup>(3)</sup>, Jens Nielsen <sup>(3)</sup>, Camilla Hiul Suppli <sup>(2)</sup>, Catherine Collin Bjerre <sup>(2)</sup>, Zitta Barrella Harboe <sup>(3)</sup>, Steen Hoffmann <sup>(3)</sup>, Hans-Christian Slotved <sup>(3)</sup>, Helle B. Konradsen <sup>(3)</sup>, Peter Andersen <sup>(1)</sup>, Palle Valentiner-Branth <sup>(1)</sup>

(1) Statens Serum Institut, Denmark, (2) Statens Serum Institut, Department of Infectious Diseases Epidemiology, Copenhagen, Denmark, (3) Statens Serum Institut, Department of Diagnostics and Infection Control, Copenhagen, Denmark,

#### BACKGROUND:

In 2000-2005, invasive pneumococcal diseases (IPD) caused an average of 187 deaths annually in Denmark. In 2007, Denmark introduced the pneumococcal conjugated vaccine as part of the childhood immunization programme. To assess the ability of the IPD surveillance system to capture cases, we estimated the completeness of its different components, including a national microbiological database (MIBA) launched in 2010.

#### METHODS:

We defined IPD case as a positive culture for *Streptococcus pneumoniae* from cerebrospinal fluid (meningitis) or blood (bacteremia). From 1 January 2010 to 31 December 2011, we linked databases using the Danish national personal identifier to conduct a capture-recapture analysis in order to estimate (a) the total number of IPD cases (maximum likelihood estimator) and (b) the estimated completeness and 95% confidence interval (CI) for each data source. We compared MIBA with (1) the database of the national *Neisseria* and *Streptococcus* Reference laboratory (NSR-laboratory) and (2) the database of clinical notifications of IPD. Reporting meningitis in all age groups and bacteremia in children less than 5 years old and sending isolates for all cases in Denmark to NSR-laboratory for serotyping are mandatory.

#### RESULTS:

Capture-recapture analysis between MIBA and NSR-laboratory databases estimated a total number of 2021 IPD (95% CI: 2015-2027) with respective completeness of 94% (95%CI: 88-100) and 93% (95%CI: 87-99). Capture-recapture between MIBA and clinical notifications database estimated a total of 237 IPD cases (95% CI: 233-240) with respective completeness of 89% (95% CI: 86-93) and 90% (95% CI: 86-93).

#### CONCLUSIONS:

The newly operating MIBA, the clinical notification and the NSR-laboratory databases show a high proportion in capturing IPD cases, therefore allowing effective monitoring of incidence trends, impact of vaccination and occurrence of serotype replacement.

PRESENTED BY: Frédérique Dorléans

**Keywords:** Invasive pneumococcal diseases Completeness Capture, recapture study National microbiological database

ESCAIDE REFERENCE NUMBER: 20131567

## Evaluation of the Czech surveillance system for invasive pneumococcal disease (IPD)

Nina Stock <sup>(1)</sup>, Jana Kozáková <sup>(2)</sup>, Marek Malý <sup>(2)</sup>, Hana Orlíková <sup>(2)</sup>, Pavla Křížová <sup>(2)</sup>

(1) National Institute of Public Health, Czech Republic, (2) Institute of Public Health, Czech Republic

### BACKGROUND:

*Streptococcus pneumoniae* is the causing agent of invasive pneumococcal disease (IPD), typically characterized as sepsis, meningitis or pneumonia. The IPD case definition requires laboratory confirmation of *S. pneumoniae* from normally sterile sites. Estimated annual worldwide number of deaths caused by *S. pneumoniae* is 1.6 million. The pneumococcal conjugate vaccine (PCV) has been introduced in the routine immunization programs of infants in many countries. With regard to its introduction in the Czech Republic in 2010, a national surveillance system for IPD was implemented in 2008 and further improved in 2011. In this study, we evaluate the development of the Czech IPD surveillance from 2010 to 2012.

### METHODS:

The Czech IPD surveillance system is based on two reporting sources: an epidemiological reporting system (EPIDAT) and a laboratory based system (NRL). We estimated the sensitivity of each reporting system alone as well as the sensitivity of the overall surveillance by capture-recapture analyses. Additionally we performed stratification by age group, region, sex and outcome.

### RESULTS:

The sensitivity of the overall IPD surveillance revealed a substantial increase from 81% in 2010 to 98% in 2012. The introduction of quarterly report reminders sent from the NRL to regional epidemiologists since 2011 especially influenced the EPIDAT reporting which started with a sensitivity of 31% in 2010 and reached 87% in 2012. Stratification shows variation in the sensitivity particularly according to region.

### CONCLUSIONS:

The Czech IPD surveillance improved considerably over the last three years. Due to positive dependency of the reporting sources, the presented sensitivity is most probably overestimated and reflects the upper limit of the completeness of reported cases. Further studies are needed to estimate the real incidence of IPD cases in the population.

PRESENTED BY: Nina Stock

**Keywords:** Invasive pneumococcal disease *Streptococcus pneumoniae* Surveillance Capture, recapture

ESCAIDE REFERENCE NUMBER: 20131825

## Reporting timeliness of human *Salmonella* surveillance and evaluation of nowcasting for real-time estimation of outbreak cases, France 2007-2011

Gabrielle Jones <sup>(1)</sup>, Simon Le Hello <sup>(2)</sup>, Nathalie Jourdan-da Silva <sup>(3)</sup>, Véronique Vaillant <sup>(3)</sup>, Henriette de Valk <sup>(3)</sup>, François-Xavier Weill <sup>(2)</sup>, Le Strat Yann <sup>(3)</sup>

(1) Conservatoire national des arts et métiers, France (2) Institut Pasteur, National Reference Centre for *Salmonella*, France, (3) Institut de Veille Sanitaire, France

### BACKGROUND:

Reporting delays in surveillance systems can make early detection of outbreaks and assessment of their progression difficult. Nowcasting, which uses known delays to correct surveillance data and estimate in real-time the actual number of cases during an outbreak, presents a potentially suitable estimation method.

### METHODS:

Reporting timeliness of French human *Salmonella* surveillance was evaluated using laboratory confirmed cases isolated from 2007-2011 and extracted from the surveillance database (maintained by a voluntary network of medical laboratories and headed by the National Reference Center for *Salmonella*). Three intervals were defined: transport delay, analysis delay and total reporting delay. We calculated the median delays and generated the cumulative delay distribution of interval. Variables were tested for an association with reporting delays using a multivariable generalized linear model. Nowcasting was assessed on four *Salmonella* outbreaks occurring during the study period. The length of time included in the historic data was varied.

### RESULTS:

The median total reporting delay was 14d (7d for transport delay and 6d for analysis delay). Rare serotypes, geographic zone and sample isolation on Sunday were most strongly associated with increased delays. Nowcasting resulted in a global coverage probability superior to 80% for three of four outbreaks. Varying the length of time of historic data improved performance up to a point. Optimal performance occurred using between four and six months of historic data.

### CONCLUSIONS:

Nowcasting is a promising method for application to *Salmonella* outbreaks. Correcting surveillance data for known reporting delays allows us to estimate the actual number of cases and better interpret outbreak trends and evaluate the impact of control measures. More robust validation of the method may be necessary to develop a standard protocol for outbreak investigations.

PRESENTED BY: Gabrielle Jones

**Keywords:** Reporting delays, *Salmonella*, surveillance, nowcasting, estimation techniques

ESCAIDE REFERENCE NUMBER: 20131561

## Hepatitis C surveillance evaluation in Poland in 2011: case classification accuracy

Rysard Tomialoic <sup>(1)</sup>, Małgorzata Stępień <sup>(2)</sup>, Natalia Parda <sup>(2)</sup>, Magdalena Rosinska <sup>(3)</sup>

(1) National Institute of Public Health in Poland, Poland, (2) Department of Epidemiology, National Institute of Public Health

### BACKGROUND:

In 2009, Poland introduced a new case definition for hepatitis C virus infection (HCV), based on EU criteria that require confirmatory laboratory assay (positive HCV RNA or immunoblot test). To evaluate HCV infection surveillance, we investigated the application of this definition.

### METHODS:

We analyzed cases reported in 2011, including clinical and laboratory data necessary for case classification. We classified cases according to the definition criteria. For each region, we calculated the positive predictive value (PPV) and negative predictive value (NPV) of the classification by local epidemiologists using the national classification as a gold standard. We used logistic regression to calculate region-adjusted odds ratios (ORs) and 95% confidence intervals [95%CI] to investigate factors associated with misclassification, including circumstances of diagnoses and reporting delay (i.e., interval between notification and confirmation in days).

### RESULTS:

Of 2,609 reported cases, local epidemiologists correctly classified 2,462 (PPV: 97% and NPV: 85%). However, of 16 regions, PPV was  $\leq$ 95% in 2 and NPV was  $\leq$ 85% (lowest value: 13%) in 3. Compared with cases identified during routine outpatient screening or self-initiated testing, patients diagnosed while donating blood (OR: 2.1, 1.2-3.8), identified during hospitalization (OR: 1.8, 1.1-3.0) and those investigated because of symptoms (OR: 1.7, 1.0-2.8) were more likely to be classified accurately. Cases notified  $>$ 4 months after confirmatory testing were 2.7 times more likely to be misclassified than cases reported prior to confirmation [95%CI: 1.3-5.6].

### CONCLUSIONS:

Difficulties persist with HCV infection case definition in some regions of Poland, making data less comparable. Reporting delay increased probability of errors. We recommended supplemental training along with follow-up to update reports, especially for those identified during routine outpatient screening and self-initiated testing.

PRESENTED BY: Rysard Tomialoic

**Keywords:** Hepatitis C, surveillance evaluation, case definition, positive predictive value, negative predictive value

ESCAIDE REFERENCE NUMBER: 20131508

## External Quality Assurance schemes for pertussis are important to ensure accurate reporting of diagnosis and typing data

Norman Fry <sup>(1)</sup>, Kevin Markey <sup>(2)</sup>, Alex Douglas-Bardsley <sup>(2)</sup>, Jason Hockley <sup>(2)</sup>, Qiushui He <sup>(3)</sup>, Dorothy Xing <sup>(2)</sup>, Assimoula Economopoulou <sup>(4)</sup>

(1) Public Health England, United Kingdom (2) National Institute for Biological Standards and Control, United Kingdom, (3) National Institute for Health and Welfare, Finland, (4) ECDC, Sweden

### BACKGROUND:

Pertussis (whooping cough) remains endemic worldwide and is an important public health issue. Recently there has been a marked increase in reported cases despite high vaccination rates. Laboratory diagnosis and typing of *Bordetella pertussis* are important for treatment, prevention, public health action and surveillance. External Quality Assurance (EQA) programmes are essential to ensure accurate reporting and continual laboratory improvement.

### METHODS:

A collaborative study was organised (2011-2013). Three EQAs were performed; PCR, serological diagnosis, and *Bordetella* identification and typing. Panels of purified genomic *Bordetella* DNA (10 samples); freeze-dried sera containing different concentrations of anti-pertussis toxin IgG (5 samples), and agar slopes including *Bordetella* strains (8 samples) were distributed to participating European National Reference Laboratories (1 per country) with full instructions.

### RESULTS:

Data were submitted by 21 laboratories (for PCR and serology EQAs) and 16 laboratories (for *Bordetella* identification and typing EQA). Real-time *Bordetella* PCR assays (both in-house and commercial) demonstrated greater sensitivity than conventional PCR assays. In the serology EQA (using in-house ELISAs, commercial kits or a multiplex immunoassay) all participants identified the negative control and where possible using a four logistic parameter model, ranked the samples in same order of increasing anti-PT IgG concentration. In the *Bordetella* identification and typing EQA, identification of *B. pertussis* using a combination of methods and genotyping of *B. pertussis* was excellent.

### CONCLUSIONS:

Participation in EQA studies allows independent evaluation of individual laboratory performance, identification of problem areas and identification of training needs. Publications including EQA reports, technical and guidance documents for these methodologies have been commissioned by the ECDC and are available from the ECDC website (<http://www.ecdc.europa.eu/>) or are in progress.

PRESENTED BY: Assimoula Economopoulou

**Keywords:** Pertussis, PCR, serology, typing, EQA

ESCAIDE REFERENCE NUMBER: 20131554

## Improved data reporting from the National Reference Centers surveillance network based on the TESSy model

Mathias Leroy <sup>(1)</sup>

(1) WIV-ISP, Belgium

### BACKGROUND:

Surveillance of infectious diseases is important for monitoring disease trends and detecting outbreaks. Public health measures are taken based on these information. Until recently, Belgian laboratories with experience for a particular infectious disease provided this surveillance information on voluntary basis without financial support and lacking a legal frame. The quantity and quality of the reported data was poor and uneven. Controls on submitted data were missing. Interpretation was complicated and required sometimes to re-contact laboratories or other data providers.

### METHODS:

With the advent of the European Surveillance System (TESSy) in 2008, the Scientific Institute of Public Health seized the opportunity to implement the National Reference Centers (NRC's) network to improve the surveillance system. Following the TESSy data submission process, we developed a web application and implemented strict data flow procedures to prevent errors and inconsistencies. The whole new data flow is described here.

### RESULTS:

The new system resulted in an increased data standardisation (including variable names and variable values), timeliness and utility. Databases are now centralised and thus more accessible and useable by the stakeholders. Awareness of the importance of data quality was echoed all along the dataflow, up to the laboratories.

### CONCLUSIONS:

The use of TESSy as a model was of great help to improve data collection at the national level. It gave a good example of quality checks and procedures that are more and more necessary to implement with electronic reporting systems. In the future, the reporting delay can still be shortened by implementing automated extraction from the LIMS (machine to machine data reporting). Other surveillance networks, whether for infectious diseases or not, should follow this example very soon.

PRESENTED BY: Mathias Leroy

**Keywords:** Surveillance network, data quality, data flow, tetsy, Belgium

ESCAIDE REFERENCE NUMBER: 20131278

# Poster Abstracts – Poster Session C

Poster Session C 10.45 – 12.15 Thurs 7

## Surveillance

### Assessment of the epidemiological value of group A streptococcal outbreaks logged in the incident reporting system for England

Theresa Lamagni <sup>(1)</sup>, Rebecca Guy <sup>(1)</sup>, Rebecca Cordery <sup>(1)</sup>, Sooria Balasegaram <sup>(2)</sup>, Androulla Efstratiou <sup>(1)</sup>

(1) Public Health England, United Kingdom, (2) Field Epidemiology Services Public Health England, United Kingdom

#### BACKGROUND:

Following the introduction of a national outbreak and incident logging system (HPZone), records relating to group A streptococcal (GAS) infection were extracted for assessment of their contribution to our understanding of epidemiological patterns of disease.

#### METHODS:

Records of streptococcal outbreaks recorded by Health Protection Team (HPT) staff across England were extracted from HPZone. Analyses were restricted to 'outbreaks' and 'clusters' occurring between 2010 and 2012 where *S. pyogenes* or unspiciated streptococci were confirmed or suspected as the aetiological agent.

#### RESULTS:

A total of 327 outbreaks and clusters of streptococcal infection were logged between 2010-12. Of these, 293 identified GAS as the infectious agent. Review of case details for the remainder identified 26 as GAS related creating a total of 319 outbreaks for further analysis. Numbers of outbreaks logged varied substantially across the country from 1 (Essex) to 30 (Kent). The most common settings were schools (124; 40%), nurseries (76; 25%), hospitals (57; 19%) and care homes (24; 8%). Standardised clinical data identified 120 (40%) outbreaks as 'rash/exanthem' suggestive of scarlet fever (114 were in schools or nurseries) whilst 118 (39%) were logged as 'other' presentations. The number of symptomatic cases was given for 30 outbreaks (median 3 cases), 2 of which logged a single case only, and 5 of which noted 1 or more fatalities.

#### CONCLUSIONS:

HPZone has the potential to provide a valuable augmentation to case-based surveillance as a means to assess and monitor the burden of GAS infection and related public health interventions. Numbers of outbreaks logged suggest variations in reporting practice. We recommend refinements to provide additional clinical classifications and to encourage completion of case information to add value to incidents logged.

PRESENTED BY: Theresa Lamagni

**Keywords:** Streptococcus pyogenes; Epidemiological monitoring; Disease outbreaks; England.  
ESCAIDE REFERENCE NUMBER: 20131457

### Geotagging hepatitis A Virus: a dynamic tool for Public Health surveillance

Rita De Sousa <sup>(1)</sup>, Harry Vennema <sup>(2)</sup>, Linda Verhoef <sup>(2)</sup>, Annelies Kroneman <sup>(2)</sup>, Mariska Petrignani <sup>(3)</sup>, Jussi Sane <sup>(2) (4)</sup>, Marion Koopmans <sup>(2) (5)</sup>

(1) RIVM, Bilthoven, The Netherlands, (2) National Institute for Public Health and the Environment (RIVM), Bilthoven, The Netherlands, (3) Municipal Health Service, Rotterdam, The Netherlands, (4) European Programme for Intervention Epidemiology Training (EPIET), ECDC, Sweden (5) Erasmus Medical Centre, Rotterdam, The Netherlands

#### BACKGROUND:

The international hepatitis A virus (HAV) sequence database, a continuing project, formed within the Foodborne virus Network and coordinated by RIVM, is an important tool for Public Health surveillance. Our aim in this study was to analyse the suitability of the currently available hepatitis A database for detection of diffuse international foodborne outbreaks.

#### METHODS:

HAV database was analysed for geographic representation and coverage, as well as availability of background data. The database contains sequences provided by different countries and from GenBank, supplemented with background. Sequence data from countries with high and very high level of endemicity, are used to determine effect of sample size and the target sequence region on observed diversity and reliability of clustering.

#### RESULTS:

Currently the international HAV database contains 5021 sequences, with 2920 entries corresponding to 89 suspected countries of infection, with high and very high level of endemicity. The sampling years range from 1972 to 2013. The different target regions and lengths of the sequences in the database reflect different protocols used for genotyping worldwide. For 2193 entries (75%), the most likely country of infection was known and was considered an endemic region. This selection of sequences was used to provide a geographic geotagging of HAV diversity. We will discuss the use of this database and phylogenetic analysis in investigations of recent international HAV outbreaks.

#### CONCLUSIONS:

While information on country of infection was quite complete, the lack of international standardisation of targets for HAV sequencing limits its use. Nevertheless, sequence analyses played an important role in exploring clues in recent HAV outbreaks. Geographic representation and coverage need to be increased to improve applicability of the database for support of public health investigations.

PRESENTED BY: Rita De Sousa

**Keywords:** Hepatitis A virus, Geotagging, Surveillance, Genotyping, HAV Network  
ESCAIDE REFERENCE NUMBER: 20131757

## Under ascertainment of Hepatitis B and C in Europe

Erika Duffell <sup>(1)</sup>, Marita van de Laar <sup>(1)</sup>

(1) ECDC, Sweden

### BACKGROUND:

In 2011, ECDC implemented enhanced surveillance for hepatitis B and C across EU/EEA countries. We aimed to validate this data to highlight possible limitations and identify solutions for increasing its usefulness.

### METHODS:

Countries submitted 2011 hepatitis B and C notification data to ECDC. Data were analysed descriptively by country and compared with findings from a recent review of seroprevalence surveys across European countries.

### RESULTS:

Of 17025 hepatitis B cases reported from 28 countries, 2812(16.5%) were reported as acute, 11557(67.9%) chronic and 2312(13.6%) classified as 'unknown'. Fourteen countries provided data on acute cases only. Rates of acute cases were highest in east European countries and chronic cases showed marked variations with rates highest in the north. For hepatitis C, 29896 cases were reported from 26 countries. Data were poorly differentiated with 24337(81.4%) classified as 'unknown', 398(1.3%) acute and 2913(9.7%) chronic. Five countries provided data on acute cases only. Among countries reporting both acute and chronic cases there was a strong geographical trend with overall rates highest in northern Europe and lowest in the South. Estimates from seroprevalence surveys indicate countries in north-western Europe have a low prevalence (2%) of hepatitis B and C whilst those in southern/south-eastern Europe have a higher prevalence (2-22%). Information was lacking for many countries.

### CONCLUSIONS:

Hepatitis B and C cases are underascertained through notification data in Europe, especially in southern European countries. Discrepancy between seroprevalence results and notifications highlights the limitations of surveillance data which is more reflective of testing and surveillance practices than real disease occurrence. Improved understanding of testing and surveillance policies will aid interpretation of surveillance data to provide better information for planning services and consideration should be given to alternative epidemiological methods such as prevalence surveys and sentinel surveillance.

PRESENTED BY: Erika Duffell

**Keywords:** Hepatitis B, hepatitis C, epidemiology, surveillance  
ESCAIDE REFERENCE NUMBER: 20131643

## Internet-based surveillance provides a useful and timely warning of norovirus season

Michael Edelstein <sup>(1)</sup>, Inga Zetterqvist <sup>(1)(2)</sup>, Anders Wallensten <sup>(3)</sup>, Anette Hulth <sup>(2)</sup>

(1) Swedish Institute for Communicable Disease Control, Sweden,  
(2) EPIET, ECDC, Sweden (3) Smittskyddsinstitutet, Sweden

### BACKGROUND:

Norovirus outbreaks can severely disrupt healthcare systems, but timely detection can help hospitals prepare. Laboratory-based surveillance suffers from time delay and under-ascertainment. We evaluated whether an internet-based surveillance system (websök) that uses data from a healthcare search engine (vårdguiden.se) could improve norovirus surveillance and response in Sweden.

### METHODS:

We compared Vårdguiden.se users' socio-demographic characteristics with the general Swedish population in 2012. We cross-correlated the search pattern for the term "winter vomiting disease" to laboratory notification data between 2005-2013 after standardization, smoothing and adjustment for lag and trend. We fitted a background activity baseline and compared the week for which websök and laboratory data crossed the epidemic threshold (upper 95% confidence interval of the baseline) in 2005-2013. We surveyed infection control teams online in all Swedish counties about their perception of websök-derived information and its potential use.

### RESULTS:

Vårdguiden.se users were more likely to be female ( $p < 0.001$ ), university educated ( $p < 0.001$ ) and living in Stockholm ( $p < 0.001$ ) than the general Swedish population. Websök correlated with laboratory data (correlation coefficient=0.86) and detected the onset of the norovirus season earlier than laboratory-based surveillance (median lag: 2 weeks, range: 0-8). 16/21 (76%) infection control teams answered the survey. 9 (56%) considered websök as a complement to laboratory-based data rather than an independent surveillance tool and 11 (69%) believed an early warning would guide infection control plans.

### CONCLUSIONS:

Websök provides surveillance data that detect the onset of the norovirus season as reliably as laboratory data, but two weeks earlier on average. Use of Websök as part of routine surveillance activities would help infection control teams in better preparing for the norovirus season each year.

PRESENTED BY: Michael Edelstein

**Keywords:** Norovirus, surveillance, outbreaks, nosocomial infections  
ESCAIDE REFERENCE NUMBER: 20131237

### Case-control investigation of human cutaneous anthrax in the Gakh Region of Azerbaijan, October, 2012

Sabina Ibrahimova <sup>(1)</sup>, Rita Ismailova <sup>(1)</sup>, Mezhahir Shixiyev <sup>(2)</sup>, Etibar Zeynalov <sup>(3)</sup>

(1) Republican Anti Plague Station, Azerbaijan, (2) Republican Veterinary Laboratory, Azerbaijan, (3) State Veterinary Services of Azerbaijan, Azerbaijan

#### BACKGROUND:

The Gakh district of Azerbaijan reported 14 confirmed and probable human cutaneous anthrax cases and 1 case in cattle between August and September 2012. We investigated to identify risk factors.

#### METHODS:

We conducted a gender matched case-control study with 3 controls per case in the Gakh District. We collected exposure information one month before disease onset for cases and matched controls. Lab confirmation was based on PCR.

#### RESULTS:

Six of 14 case-patients were female; ages of case-patients ranged from 25 to 74 years (mean=42); ages of control-persons ranged from 23 to 67 years (mean=29). 86% of cases were PCR-confirmed. 93 % of cases and 95 % of controls were animal owners. 29% of cases and 7% of controls had contact with sick animals (OR=5.2; 95% CI: 0.9-27). 36% of cases and 3% of controls were engaged in slaughter of animals (OR=20.6; 95% CI: 2.1-199). 57% of cases and 22% of controls were engaged in butchering (OR=4.7; 95% CI: 1.3-17). 57% of cases handled and transported meat, compared to 24% of controls. (OR=4.2). 79% of cases and 38% of controls slaughtered their own cattle (OR=5.9). Contact with animal products (e.g., meat, bone, hide) or their preparation was associated with disease (OR=24; 95%CI: 4.5-129), as was consuming raw or undercooked meat (OR=2.9, 95%CI: 1.1-7.4).

#### CONCLUSIONS:

We conclude that infection was significantly higher among people with contact with sick animals, particularly animal slaughtering and processing or transporting animal meat or products. Due to limited data, we could not reliably estimate the single most important risk; however, experience in Georgia indicated animal slaughtering as the primary risk factor. Investigation results are being incorporated into health education to reduce risk of future outbreaks.

PRESENTED BY: Sabina Ibrahimova

**Keywords:** Human cutaneous anthrax, Azerbaijan, animal care, animal slaughtering

ESCAIDE REFERENCE NUMBER: 20131784

### Evaluation of Intensive Care Unit Surveillance for Emerging Infections, London, England 2011-2013

Gavin Dabrera <sup>(1)</sup>, Bengu Said, Hilary Kirkbride <sup>(2)</sup>, USII Collaborating Group <sup>(2)</sup>

(1) Health Protection Agency, United Kingdom, (2) Public Health England, United Kingdom

#### BACKGROUND:

Undiagnosed Serious Infectious Illness (USII) surveillance was developed ahead of the London 2012 games to detect emerging infection(EI) clusters, and operated fully from 11th July 2011. USII cases were Intensive Care Unit (ICU) inpatients with suspected infectious illness and negative initial microbiological investigations. Nineteen ICUs near games venues reported USII cases electronically, with clinical and exposure data (e.g. travel); this was reviewed prospectively to identify clusters of cases with similar characteristics. ICUs submitted a fortnightly nil report if no cases were identified. Later diagnosis with known infections triggered case denotification. We evaluated the USII system after 18months' full operation to determine its positive predictive value (PPV), timeliness, completeness and acceptability.

#### METHODS:

We obtained case data between 11th July 2011 – 10th January 2013 from surveillance records in password-protected Excel spreadsheets. We calculated PPV (proportion of reported USII cases which were not denotified), median reporting time (days between ICU admission and reporting) and reporting completeness (average fortnightly response rate for case- and nil reports) . The surveillance team assessed system acceptability among ICU clinicians using a five point Likert scale questionnaire and qualitative group discussions, during ICU visits.

#### RESULTS:

Thirty-four cases (including 12 denotifications) were reported. The PPV was 65% and median reporting time was 7.5 days [range 1-52]. Reporting completeness was 66%. Clinicians stated high acceptability for surveillance.

#### CONCLUSIONS:

The reporting times reflect investigations undertaken before making a USII diagnosis; however, diagnosis of uncommon infections and therefore denotification can occur later, producing the observed PPV. Overall, the system was acceptable to participants and reporting was sufficiently complete to fulfil the original purpose of cluster surveillance. As EIs are an ongoing threat, USII surveillance should expand to more ICUs to detect future clusters.

PRESENTED BY: Gavin Dabrera

**Keywords:** Communicable Diseases, Emerging; Intensive Care; surveillance;

ESCAIDE REFERENCE NUMBER: 20131302

## Building a multivariate model to estimate and prospectively monitor excess mortality associated with influenza epidemics and extreme temperature events in Portugal.

Emanuel Rodrigues <sup>(1)</sup>, Baltazar Nunes <sup>(1)</sup>, Jorge Marques <sup>(1)</sup>, Ausenda Machado <sup>(1)</sup> Carlos Dias <sup>(1)</sup>

(1) Instituto Nacional de Saúde Dr Ricardo Jorge, Lisbon, Portugal

### BACKGROUND:

As observed in several European countries, in the winter of 2011/12 Portuguese mortality surveillance system detected an excess mortality in elderly population that was concomitant with an influenza epidemic and a cold spell. In order to estimate the impact of specific event contribution a multivariate model was developed.

### METHODS:

We used an additive Poisson regression model, with mortality rate as outcome, season specific ILI rate above baseline, extreme temperatures events (cold wave: less than 5°C; heat wave: above 30°C), trend and season components as independent variables. All cause mortality data (weeks 26/2007 to 20/2012) was extracted from the national mortality surveillance system. Excess mortality associated to influenza epidemic and cold spell was obtained by summing specific events components of the model during the excess period.

### RESULTS:

We observed a mortality excess period between weeks 2 to 11/2012. Within this period the total estimated mortality excess was 3994, 97% due to influenza epidemics (AH3) and extreme cold event. Looking into specific event contribution, 75% (2978; CI95%: 2773-3185) was associated to influenza epidemic, 22% to extreme cold (889; CI95%: 801-978) and 3% unexplained. Results also showed that the multivariate model can be used for prospectively monitoring excess mortality, by setting the extreme temperatures and influenza epidemics covariates at zero and projecting the baseline for the future.

### CONCLUSIONS:

An excess 3994 deaths was observed during 2012 winter, 75% attributable to influenza and 22% to extreme cold temperatures. The multivariate model allowed us to estimate excess mortality associated to different events and to project a baseline for mortality monitoring. This approach may be a more suitable method to build baselines to prospectively detect excess mortality since no data is removed from the mortality time series

PRESENTED BY: Ausenda Machado

**Keywords:** Epidemiological Monitoring, Influenza, model, prevention

ESCAIDE REFERENCE NUMBER: 20131822

## Congenital rubella surveillance in the European Union: Current status and future perspective of harmonized practices to monitor elimination -Results from a multi-country survey, 2012

Carmen Montano <sup>(1)</sup>, Cristina Giambi <sup>(2)</sup>, Lucia Pastore Celentano <sup>(3)</sup>, Tarik Derrough <sup>(3)</sup>

(1) Epiet training - ECDC, and Istituto Superiore di Sanità (ISS), Rome Italy, (2) Istituto Superiore di Sanità, Italy, (3) ECDC, Sweden

### BACKGROUND:

The elimination of rubella and prevention of congenital rubella syndrome (CRS) by 2015 are established WHO European Region's goals. Surveillance data is essential to monitor the achievement of this goal and CRS incidence data are not available at European level. We surveyed 27 EU Member States plus two EEA countries (Norway and Iceland) to describe existing CRS surveillance at national level in view of planned EU-wide enhanced CRS surveillance.

### METHODS:

In June-September 2012, we surveyed 29 European Centre for Disease Prevention and Control (ECDC) country contact points for rubella to collect information on characteristics and coverage of surveillance systems, case definitions, variables collected, data collection frequency, analysis and dissemination, reference laboratories, epidemiological investigation and follow up of cases.

### RESULTS:

The response rate was 100%; 28/29 countries (97%) had national CRS surveillance. The systems were mainly mandatory (26/28, 93%), comprehensive (27/28, 96%) and case-based (27/28, 96%). Eight countries (29%) had active surveillance and six (21%) required zero-reporting. Reports originated from general practitioners (23/28, 82%), hospitals (21/28, 75%) and laboratories (18/28, 64%). Twenty-four countries (86%) adopted the EU case definition. Twenty-three countries (82%) investigated the source of infection but only 13 (46%) collected information on the follow-up of asymptomatic infections. All the countries had identified a reference laboratory for congenital rubella: 27 at national level and one at sub-national level; genotyping was performed in 15 countries.

### CONCLUSIONS:

Collection of congenital rubella incidence data at ECDC level seems to be feasible because surveillance systems for congenital rubella syndrome are in place in all countries but one. Coordination of these systems by ECDC would allow introduction of common indicators and harmonization of laboratory procedures to ensure data comparability between countries, to support the WHO elimination goal.

PRESENTED BY: Carmen Montano

**Keywords:** Congenital rubella, surveillance, Europe

ESCAIDE REFERENCE NUMBER: 20131571



## Measles & mumps

### Correlation between sensitivity (using the two-source capture-recapture method estimates) and knowledge of health workers in case-based measles surveillance in Oyo State, Nigeria, January 2011- June, 2012

Peter Adewuyi <sup>(1)</sup>, Akin Fatiregun <sup>(2)</sup>, Patrick Nguku <sup>(3)</sup>, Ike-Oluwapo Ajayi <sup>(4)</sup>, Funmilayo Fawole <sup>(5)</sup>

(1) Nigeria Field Epidemiology and Laboratory Training Program, Nigeria, (2) EMS Department, University of Ibadan, Nigeria, (3) Nigerian field epidemiology, Nigeria, (4) University of Ibadan Oyo State, Nigeria, (5) Nigerian Field Epidemiology and Laboratory Training Programme, Nigeria

#### BACKGROUND:

Measles is a highly contagious disease. A sensitive surveillance system is essential to monitoring progress towards measles elimination. We investigated to determine if there is a relationship between sensitivity of surveillance and knowledge of health workers.

#### METHODS:

A cross-sectional study was conducted. Cluster sampling technique was used to divide Oyo State into 33 clusters of Local Government Areas (LGAs). Six clusters were selected by simple random method. Seventy five health facilities and their health workers were studied. The primary and secondary data sources were LGA records and health facility records, respectively. Data were collected on socio-demographic characteristics and knowledge of health workers using structured questionnaire. The two source capture recapture method was used to estimate true number of suspected measles cases from which sensitivity of surveillance was calculated. Maximum obtainable score for knowledge was 16 and score of  $\geq 12$  was rated as high knowledge. Descriptive analysis was done, level of significance was at 95% C.I and  $p = 0.05$ . Pearson's correlation was determined.

#### RESULTS:

Estimated suspected measles cases were 3,825 [95% C.I (2,363, 5,286)]. Overall sensitivity was 11.7%. Mean age of respondent was  $39.0 \pm 8$  years. Of the 75 health workers 52 (69%) are females, 64 (85%) have spent  $>1$  year as a health workers, 66 (89%) are married and 39 (52%) are nurses. Fifty- Three (75%) had high knowledge score. There was a significant positive correlation between sensitivity of surveillance and knowledge score ( $r = 0.038$ ,  $p = 0.0002$ ).

#### CONCLUSIONS:

An increase in knowledge of health workers was associated with a more sensitive case-based measles surveillance in Oyo State. We recommend training and re-training of health workers so that the surveillance system can produce a more sensitive system.

PRESENTED BY: Elizabeth Adedire

**Keywords:** Measles, surveillance, case-based, sensitivity, capture recapture.

ESCAIDE REFERENCE NUMBER: 20131555

### Outbreak of measles at the children's department of the University Hospital of Uppsala, Sweden

Johan Hedlund <sup>(1)</sup>, Mats Ericsson <sup>(1)</sup>, Bodil Ardung <sup>(1)</sup>, Inger Andersson von Rosen <sup>(1)</sup>

(1) Department of Communicable Disease Control and Prevention, Uppsala County Council, Sweden

#### BACKGROUND:

Measles is unusual in Sweden due to a good coverage of the national immunization program for children which started in 1982. Today the symptoms of measles are not commonly recognized by health-care personnel and contagious cases can easily be missed. We describe an outbreak of measles in relation to the children's department of the University Hospital of Uppsala, Sweden which involved a total of 10 persons.

#### METHODS:

By ordinary surveillance and management of measles cases, an epicentre of the outbreak was linked to two days, and all medical records (total 177) at the outpatients clinic for those days was retrospectively reviewed to find further cases.

#### RESULTS:

An unvaccinated man and a woman vaccinated once, both working at the hospital where admitted to the infection ward. During the following week three children are diagnosed, all unvaccinated. The five cases had all been at the children's hospital on the same days. Medical records were reviewed for these days. Findings revealed that an unvaccinated teenage girl with Systemic lupus erythematosus was admitted to the children's department during the days in question. Her symptoms were typical of measles, but these had been interpreted as due to her underlying disease combined with a respiratory infection and drug rashes. Another two unvaccinated children who had visited the children's department was diagnosed with measles, and a further two secondary cases to these, one man vaccinated twice and a 3-year-old child vaccinated once.

#### CONCLUSIONS:

Despite good vaccination coverage, if presented at a hospital, measles may easily spread among immune suppressed and non vaccinated. Although rarely seen, measles must always be considered as a differential diagnosis among rash-patients, even if previously vaccinated. Vaccinations of the Health-care personnel should be promoted

PRESENTED BY: Johan Hedlund

**Keywords:** Measles, vaccination, hospital infections, surveillance, case finding

ESCAIDE REFERENCE NUMBER: 20131715

## Key findings of the measles epidemic, Romania, 2011-2013

Zaharia Alina Daniela <sup>(1)</sup>, Adriana Pistol <sup>(1)</sup>

(1) National Institute of Public Health – NCCDSC, Romania

### BACKGROUND:

Since 2011 Romania has experienced a nationwide measles epidemic, even if since 1979 measles vaccination was introduced. A second dose of measles vaccine was introduced in 1994. In present, measles-mumps-rubella vaccination is recommended for children aged 12-15 months and 6-7 years-old. Our objective is to describe the epidemiological characteristics of the epidemic in order to identify the particularly affected groups.

### METHODS:

We performed descriptive analysis of the data collected by the national measles surveillance system on a standardized form using the national case definition; measles related complications and reported vaccination status were included. Incidence was calculated using the July 1, 2011 population.

### RESULTS:

Since January 2011 till March 2013, a total number of 11 705 measles cases were notified, 47.4% laboratory-confirmed and 47.1% probable cases (documented epidemiological link). The highest incidence was in March 2012 (4.12 per 100000 inhabitants) decreasing slowly till March 2013 (0.19 per 100000 inhabitants). Male/female ratio was 1.07. Cases median age was 3 years (min 0, max 81). The highest incidence (1119.09 per 100000 inhabitants (95%CI 1106-1134)) was in infants not eligible for vaccination (<1 year old), followed by 1-4 year-olds (523.13 per 100000 inhabitants, (95%CI 518-528)). Unvaccinated cases represented 64.54% from the total (excluding not eligible children). Pneumonia (37%) and encephalitis (0.34%) were reported as measles related complications. Case fatality rate was 0.02%.

### CONCLUSIONS:

Our analysis shows that the current outbreak is primarily driven by unvaccinated individuals in the general population and this has resulted in cases amongst groups not eligible for protection. In order to increase vaccination coverage, population disease awareness and public health authorities' commitment are essential.

PRESENTED BY: Zaharia Alina Daniela

**Keywords:** Measles, epidemic, vaccination, case fatality rate.

ESCAIDE REFERENCE NUMBER: 20131667

## Why young adults? Estimating measles vaccination coverage in 20-34 year old Germans in order to verify progress towards WHO eradication goals

Melanie Schuster <sup>(1)</sup>, Florian Burckhardt <sup>(2)</sup>, Thomas Stelzer <sup>(3)</sup>, Stefan Bent <sup>(3)</sup>

(1) Department of Immunization, Vaccines and Biologicals (IVB), WHO Geneva, Switzerland, (2) X-Men, United Kingdom, (3) Landesuntersuchungsamt Rheinland Pfalz, Germany

### BACKGROUND:

Recent European outbreaks specifically affected young adults. WHO Europe measles elimination strategy recommends sustaining 95% two doses vaccine coverage. However, vaccination status (VS) of young adults is largely unknown. We conducted a representative survey among 20-34 year olds in the Federal German State of Rhineland-Palatinate to assess coverage.

### METHODS:

We calculated the required sample size for stratified random sampling across 36 counties using proportional allocation. Local council registries randomly chose participants distributed proportionally between sex and age groups. We mailed a self-administered questionnaire with pre-paid return envelopes and an offer to participate online. Prior to calculating coverage we used logistic regression to examine the effect of age (20-24y; 25-29y; 30-34y) and sex on a) response and b) VS.

### RESULTS:

465 persons out of 1,637 responded. Age did not vary significantly among responders and non-responders, yet more women (293) responded than men (172) (OR=2.1;CI=1.7-2.6). The 20-24y age group was almost ten (eight) times more likely to be vaccinated with at least one (two) dose(s) of measles vaccination compared to the 30-34y age group (1+ dose: OR:9.8;p<0.001;CI:2.9-33.4; 2 doses: OR:8.3;p<0.001;CI:4.8-14.3) and the 25-29y age group was twice as likely compared to the 30-34y age group to be vaccinated with two doses (OR:2.0;p=0.007;CI:1.2-3.2). There was no statistically significant association between sex and VS (1+ dose: OR:1.9;p=0.062;CI:0.9-3.7; 2 doses:OR:1.5;p=0.101;CI:0.9-2.3). Vaccination coverage was 90% (CI:87%-93%) for at least one and 56% (CI:51%-61%) for two doses for 20-34y.

### CONCLUSIONS:

The WHO goal cannot be achieved without targeted supplemental immunisation activities (SIA) for young adults and especially the 30-34 year old. SIAs could include actively checking adults' VS upon any GP visit or approaching the adult population at work through their occupational health services.

PRESENTED BY: Florian Burckhardt

**Keywords:** Measles, Vaccination, Vaccination coverage, Online survey, young adults

ESCAIDE REFERENCE NUMBER: 20131684

## Epidemiology of Measles in a Country With High MMR Uptake

Sarah Magowan <sup>(1)</sup>, Richard Smithson <sup>(2)</sup>, Joy Murphy <sup>(2)</sup>, Conall McCaughey <sup>(3)</sup>

(1) Royal Belfast Hospital For Sick Children, United Kingdom, (2) Public Health Agency, N.Ireland, (3) Regional Virus Laboratory, Royal Victoria Hospital Belfast, United Kingdom

### BACKGROUND:

Recent years have seen significant measles outbreaks in various European countries demonstrating how easily this virus can spread in sub-optimally vaccinated populations. This paper describes the epidemiology of measles in Northern Ireland, a country with high MMR uptake but with constant exposure to areas where measles was occurring.

### METHODS:

Surveillance data from the Public Health Agency was used to obtain the number of measles cases, both reported and confirmed, in N.Ireland from 2000 – February 2013 and to determine the uptake of the MMR vaccine over this thirteen year period. Outbreak reports were used to obtain further details of any outbreaks that occurred.

### RESULTS:

There have been 45 laboratory confirmed measles cases from 2000 to early 2013. Three small outbreaks, occurring since December 2009, accounted for 34 of these cases. All 3 outbreaks had a number of common features: the index case was an unvaccinated non-resident who “imported” measles from another country where an outbreak was occurring; there was limited onward spread within the index case’s community; there was very little further spread beyond that to the wider community. The remaining 11 cases were mostly sporadic, mainly imported, with virtually no onward spread. From January 1999 – December 2012 the annual average uptake by 5 years of MMR 1 ranged from 94.6% to 97.3% and MMR 2 was 85.2% to 91.3%.

### CONCLUSIONS:

Measles continues to cause large outbreaks in areas with suboptimal vaccine uptake. High levels of international travel mean it will inevitably be imported even in areas of high uptake. However high vaccine uptake and a rapid public health response can greatly limit further spread.

PRESENTED BY: Sarah Magowan

**Keywords:** Measles, MMR, vaccine, outbreak, epidemiology

ESCAIDE REFERENCE NUMBER: 20131532

## Mumps increase among University students, Flanders 2012-2013: evidence of poor vaccine effectiveness in this cohort

Indra Linina <sup>(1)</sup>, Toon Braeye <sup>(1)</sup>

(1) Scientific Institute of Public Health, Belgium

### BACKGROUND:

The current increase in mumps notifications in Belgium is mainly affecting young adults; 68% of whom received 2-doses of measles-mumps-rubella (MMR) vaccine. We conducted a retrospective cohort study at one of the most affected universities, the Catholic University of Leuven (KUL), to estimate incidence, MMR vaccine effectiveness and to detect potential risk factors.

### METHODS:

We defined a case as anyone with self-reported parotitis, between September 2012 and March 2013. We distributed web-based questionnaires to a random sample of students. We calculated the two-dose vaccine effectiveness by comparing the risks in students vaccinated twice with those vaccinated once (based on vaccination records). We estimated risk ratios (RR) to identify risk factors. Information on circulating genotypes was collected from the National Reference Centre.

### RESULTS:

Of all 765 participants, 47 (6%; 95%CI 4%-8%) met the case-definition; all reported being vaccinated with at least one MMR dose. The two-dose vaccine effectiveness was 69% (95%CI -24% to 92%). Students vaccinated within the last 10 years were less likely (RR 0.33; 95%CI 0.11-1.0) to develop mumps. The risk of mumps was higher (RR 3.6, 95%CI 1.8-7.0) among the 9 cases working in a bar. All 16 samples collected at the KUL were genotype G5.

### CONCLUSIONS:

Incidence of self-reported mumps was high in this vaccinated population. The lower risk of mumps in students that were more recently vaccinated, suggests that vaccine effectiveness may be waning over time. Ensuring high 2-dose vaccination coverage remains important, although reasons for low vaccine effectiveness should be further explored. As the risk of mumps was higher in students working in a bar, we recommend that advice should be given to cases on avoiding social activities whilst infectious.

PRESENTED BY: Indra Linina

**Keywords:** Outbreak, vaccine preventable diseases, mumps, vaccine effectiveness.

ESCAIDE REFERENCE NUMBER: 20131224

## Epidemiology of three seasons of mumps outbreak in The Netherlands, 2009-2012

Jussi Sane <sup>(1) (2)</sup>, Sigrid Gouma <sup>(3)(4)</sup>, Daphne Gijsselaar <sup>(3)(4)</sup>, Jeroen Cremer <sup>(3)(4)</sup>, Marion Koopmans <sup>(1) (2)</sup>, Hester de Melker <sup>(3)</sup>, Rob van Binnendijk <sup>(3)</sup>, Susan Hahne <sup>(3)</sup>

(1) National Institute for Public Health and the Environment (RIVM), Bilthoven, The Netherlands, (2) European Programme for Intervention Epidemiology Training (EPIET), ECDC, Stockholm, Sweden (3) Erasmus Medical Centre, Rotterdam, The Netherlands, (4) Centre for Infectious Disease Control, Bilthoven, The Netherlands, (5) RIVM, The Netherlands

### BACKGROUND:

In The Netherlands, a country-wide mumps epidemic has been ongoing since December 2009. We evaluated epidemiological and laboratory surveillance data to characterise the morbidity, understand who is at risk, and develop hypotheses about its cause.

### METHODS:

We used data on mumps cases notified to the Dutch national surveillance between 1 September 2009 and 31 August 2012. We described the outbreak in time, place and person and assessed trend over time by using chi-square test. To characterize circulating strains, genotyping targeting small hydrophobic protein was performed on clinical specimens submitted to the National Institute for Public Health and the Environment.

### RESULTS:

During the three-year period, 1,557 cases of mumps were notified in The Netherlands; 1,254 (80.5%) were laboratory confirmed. Most cases were males (59%), aged 18-25 (67.9%) and vaccinated twice with MMR vaccine (67.7%). Orchitis was the most frequently reported complication (n=109, 12.4% of men). Three distinct epidemic seasons occurred during the outbreak. The proportion of cases in age groups 13 to 17 ( $p=0.003$ ) and in persons older than 25 ( $p=0.042$ ) increased over the three seasons, whereas the number of mumps cases decreased in persons aged 18 to 25 ( $p<0.001$ ). Over time, proportionally more cases were reported from non-university cities ( $p<0.001$ ). The majority (97.5%) of the identified strains were G5 subtype variants NLD1 and NLD2. Eventually, G5-NLD2 became the dominant variant.

### CONCLUSIONS:

The Netherlands faced three seasons of mumps outbreaks that occurred primarily among vaccinated students pointing towards inadequate vaccine effectiveness. Change in age and geographical distribution over time may reflect increased immunity in the predominantly affected student population due to intense exposure to circulating mumps virus. The change in subtype distribution may reflect selective advantage of the NLD2 variant.

PRESENTED BY: Jussi Sane

Keywords: Mumps, outbreak, surveillance, The Netherlands.

ESCAIDE REFERENCE NUMBER: 20131750

## HCAI – Healthcare-associated infections

### Cluster Investigation of Acquired Neonatal Intestinal Disease in a Neonatal Intensive Care Unit at a Tertiary Hospital, Alberta, Canada

Louis Wong <sup>(1)</sup>, Natalie Bocking <sup>(2)</sup>, Larry Svenson <sup>(3)</sup>, Vanita Sahni <sup>(3)</sup>, Kate Snedeker <sup>(4)</sup>, Adrienne Macdonald <sup>(4)</sup>, Samantha Woolsey <sup>(5)</sup>, Heather Chinnery <sup>(6)</sup>, Barb Kamstra <sup>(6)</sup>, Melba Athaide <sup>(6)</sup>, Khalid Aziz <sup>(6)</sup>, Manoj Kumar <sup>(6)</sup>, Uma Chandran <sup>(3)</sup>, A. Mark Joffe <sup>(3)(7)</sup>

(1) Public Health Agency of Canada, Canada, (2) Canadian Field Epidemiology Program, Public Health Agency of Canada, Canada, (3) Surveillance and Assessment Branch, Alberta Health, Canada, (4) Population and Public Health, Alberta Health Services, Canada, (5) Infection Prevention and Control, Alberta Health Services, Canada, (6) Neonatal Intensive Care Unit, Royal Alexandra Hospital, Canada, (7) Infection Prevention and Control, Royal Alexandra Hospital; Department of Medicine, University of Alberta, Canada

### BACKGROUND:

Bloody stools in neonates represent a spectrum of clinical disease and etiologies including viral enteritis and necrotizing enterocolitis (NEC), referred to collectively as acquired neonatal intestinal disease (ANID). In September 2012, a neonatal intensive care unit (NICU) experienced a cluster of ANID with atypical clinical features and age distribution. The NICU routinely collects morbidity and mortality data for NEC in neonates less than 33 weeks gestational age with limited information for older neonates.

### METHODS:

Cases were identified prospectively from 15 September 2012 and retrospectively to 1 August 2012. A case was an infant admitted to the NICU for 72 hours or more prior to symptom onset and presented with one or more episodes of frank bloody stools, and/or radiologic changes of pneumatosis intestinalis or free air, and/or surgical or histological findings of enterocolitis. A chart review collected demographic and risk factor information. Social and spatial connections were assessed through network analysis.

### RESULTS:

Forty-three confirmed cases, including two deaths, were identified between 1 August 2012 and 1 February 2013. The median gestational age at birth was 32 weeks and the mean birth weight was 1854g. No causative organism was identified in spite of extensive microbiological testing. Thirty cases overlapped in time and space in the 2 weeks prior to symptom onset. The median connection between a case and a nurse was two. In total, 133 nurses had contact with at least one case.

### CONCLUSIONS:

This investigation was similar to other ANID investigations in that no explanatory cause was identified. However, it highlights the importance of ongoing surveillance with baseline mortality and morbidity rates for all infants to detect trends of ANID and other emerging issues in the NICU population.

PRESENTED BY: Louis Wong

Keywords: Intestinal diseases, neonatal intensive care units, hospital infections, neonate, epidemiology

ESCAIDE REFERENCE NUMBER: 20131458

## Evidence-based intervention program reduced overall CLABSI rates in Neonatal Intensive Care Unit

Luz Maria Vilca Yengle<sup>(1)</sup>, Inmaculada Albero Andres<sup>(2)(3)</sup>, Ana Maria Planes Reig<sup>(2)(4)</sup>, Carmen Ribes Bautista<sup>(2)(5)</sup>, Felix Castillo Salinas<sup>(2)(5)</sup>, Magda Campins<sup>(2)</sup>

(1) Epidemiology and Public Health Research Group, Vall d'Hebron Research Institute, Barcelona, Spain, (2) Hospital Universitari Vall d'Hebron, Barcelona, Spain, (3) Preventive Medicine and Epidemiology Department, (4) Microbiology Department, (5) NICU, Pediatrics Department

### BACKGROUND:

Central line-associated bloodstream infections (CLABSIs) are the most common hospital-acquired infection in the neonatal intensive care units (NICU). CLABSI in NICU are the result of interaction of several risk factors, related both to clinical care practices and special characteristics of the patient population representing a major challenge in the management of NICU patients. We sought to confirm whether adopting a standardized intervention program reduces NICU CLABSI rates.

### METHODS:

An intervention program based on a central line insertion and care bundles were implemented in 2009 in a level III NICU of a large hospital in Barcelona, Spain. It consisted of performing hand hygiene before inserting central lines, using maximal barrier precautions during central line insertion, disinfecting skin with appropriate antiseptic (2% chlorhexidine), avoidance of femoral vein for central venous access and daily review of ongoing catheter necessity with prompt removal when no longer essential. Additionally, a central-line insertion checklist was also used. From 2009 to 2011, the infection control team identified prospectively CLABSI cases from microbiology laboratory and analysis of medical records using National Healthcare Safety Network definitions. Overall CLABSI rates were calculated and stratified by birth-weight.

### RESULTS:

In 2009, overall CLABSI rates were 9.89 x 1000 central line-days, and in 2010 and 2011 they were 8.01 and 5.05, respectively. The CLABSI rates showed a 44% reduction between the first and last year of the study ( $p<0.01$ ). Newborns with a birth-weight  $>2500$  g showed the most important decrease in CLABSI rates (9.1 x 1000 central line-days in 2009 and 3.1 in 2011) ( $p<0.02$ ).

### CONCLUSIONS:

The intervention program based on a central-line bundle and central-line insertion checklist lead to a significant and sustained decrease in CLABSI rates in our NICU.

PRESENTED BY: Luz Maria Vilca Yengle

**Keywords:** Central line, associated bloodstream infections Neonatal Intensive care Units Care bundles

ESCAIDE REFERENCE NUMBER: 20131718

## Impact of an intervention program to prevent surgical wound infection in pediatric cardiac surgery

Magda Campins<sup>(1)</sup>, Jaume Izquierdo Blasco<sup>(1)(2)</sup>, Inmaculada Albero Andres<sup>(1)(3)</sup>, Pere Soler Palacin<sup>(1)(4)</sup>, Raul Abella<sup>(1)(5)</sup>, Joan Balcells<sup>(1)(6)</sup>, Felix Castillo Salinas<sup>(1)(7)</sup>, Luz Maria Vilca Yengle<sup>(8)</sup>, Joan Sanchez-de-Toledo<sup>(1)(9)</sup>

(1) Hospital Universitari Vall d'Hebron, Barcelona, Spain, (2) Pediatrics Department, (3) Preventive Medicine and Epidemiology Department, (4) Pediatric Infectious Diseases and Immunodeficiencies Unit, Pediatrics Department, (5) Cardiac Surgery, Pediatrics Department, (6) PICU, Pediatrics Department, (7) NICU, Pediatrics Department, (8) Epidemiology and Public Health Research Group, Vall d'Hebron Research Institute, Barcelona, Spain, (9) Cardiology, Pediatrics Department

### BACKGROUND:

Surgical wound infection (SWI) is associated with significant morbidity and mortality in the post-operative period after pediatric heart surgery. This study aims to assess the results of an intervention program designed to reduce the incidence of SWI.

### METHODS:

ASWI intervention program including evidence based non-pharmacologic strategies before, during and after surgery and protocolized antibiotic prophylaxis was implemented in a tertiary university hospital located in Barcelona, Spain. Between July 2011 and July 2012, all patients aged  $<16$  years who had open-heart surgery were followed prospectively by the infection control team to identify SWI cases. The SWI incidence rate was calculated and associated risk factors were analyzed. Results were compared with those obtained between June 2009 and March 2010, prior to the implementation of this program.

### RESULTS:

One hundred and fifty-six patients were included during the study period. Three neonates developed SWI, representing a SWI rate of 1.92% (CI95%: 0.4-5.52). An 83% (CI95%: 34-95) reduction was observed compared to the period prior to the implementation of the program (10.9%; CI95%: 4.7-18.8). Variables associated with infection risk were: 1) age (14 days vs 2.3 years;  $p<0.01$ ); 2) hospitalization unit (3 cases in neonatal intensive care unit vs 0 in pediatric intensive care unit;  $p<0.01$ ); and 3) preoperative hospital stay (14 vs 1 day;  $p<0.03$ ).

### CONCLUSIONS:

This evidence-based SWI prevention program significantly reduced the SWI rate in pediatric patients undergoing open-heart surgery at our center.

PRESENTED BY: Magda Campins Marti

**Keywords:** Pediatrics Infection heart defects Congenital Surgery

ESCAIDE REFERENCE NUMBER: 20131730

## A case-control study to investigate risk factors for post-craniotomy surgical site infections due to *Propionibacterium acnes*, England, 2011

Caoimhe McKerr<sup>(1)</sup>, Nadia Inglis<sup>(1)</sup>, Nic Coetzee<sup>(2)</sup>, Krishna Banavathi<sup>(2)</sup>, Rupert Price<sup>(2)</sup>, Neville Verlander<sup>(1)</sup>, Obaghe Edeghere<sup>(1)</sup>

(1) Public Health England, United Kingdom, (2) University Hospital of North Staffordshire NHS Trust, United Kingdom

### BACKGROUND:

*Propionibacterium acnes* a skin commensal that has been reported in case-series as a cause of surgical site infection (SSI) following neurosurgical operations. Between February and November 2011, 15 deep-seated SSIs with *P. acnes* were reported from craniotomy patients in a hospital in the West Midlands. We conducted a case control study to identify risk factors for infection, and to inform possible infection control measures

### METHODS:

Cases were those who developed a microbiologically confirmed deep or organ space SSI caused by *P. acnes* following craniotomy in 2011. Four controls per case were selected randomly from patients with a history of an index craniotomy in 2011 who had not developed any SSI. We collected data from medical notes on individual and surgical variables using a bespoke questionnaire. We calculated adjusted odds ratios (OR) with 95% confidence intervals (CI), using logistic regression.

### RESULTS:

Fifteen cases and 65 controls were recruited. Of cases, 67% (n=10) were male; ages ranged from 22-89 (median:65) years. The average length of time between index and secondary surgery was 44 days. All cases had to undergo re-operation. Cases were more likely than controls to have had a dural implant used as a sealant after operation (OR 14.6; 95%CI 0.95-∞).

### CONCLUSIONS:

This is the largest reported cluster of *P. acnes* infections in neurosurgery patients to be reported in the UK. SSIs with *P. acnes* after craniotomy lead to increased hospital stay and re-operation. The use of dural implants as sealants was a risk factor for infection.

PRESENTED BY: Caoimhe McKerr

**Keywords:** *P. acnes*, *Propionibacterium*, surgical site infection, neurosurgery, craniotomy

ESCAIDE REFERENCE NUMBER: 20131459

## The importance of enhanced screening activities experienced during a large hospital outbreak of KPC-2 *Klebsiella pneumoniae*, Germany 2010-2012

Tanja Ducombe<sup>(1)(2)</sup>, Arne C. Rodloff<sup>(3)</sup>, Christophe Luebbert<sup>(4)</sup>, Tim Eckmanns<sup>(1)</sup>

(1) Robert Koch Institute, Germany (2) ECDC, Sweden (3) Institute for Medical Microbiology and Epidemiology of Infectious Diseases, University Hospital of Leipzig, Leipzig, Germany, (4) Division of Infectious Diseases and Tropical Medicine, Clinic of Gastroenterology and Rheumatology, University Hospital Leipzig, Germany

### BACKGROUND:

During a hospital outbreak of multiresistant KPC-2 *Klebsiella pneumoniae*, 72 cases were identified between 28 June 2010 and 31 July 2012. At first KPC isolation 22 (31%) presented a clinical infection and 50 (69%) were colonized, of which 11 were detected following enhanced screening activities in June 2012. We aimed to describe screening challenges and estimate their potential impact on the extent of the outbreak.

### METHODS:

We abstracted patient and laboratory records of the 72 KPC cases. We calculated the proportion of cases screened, defined as testing for KPC in rectal material, 14 days prior to and at first KPC isolation. Further, we described the occurrence of intermittent negative culture test results after first KPC isolation. Based on published data, we estimated the extent of the epidemic by applying arbitrarily a monthly ratio of 1 infected case on 2 colonized and a 3-month forward average mean.

### RESULTS:

Of the 72 KPC cases, 28 (39%) were screened during the investigated time interval, of these 24 tested KPC positive in rectal material. Of 15 cases exposed to previous room cohabitation with another case, 9 (60%) were screened. Intermittent negative tests occurred in 14 (48%) of 29 cases with at least two follow-up examinations. Starting from the initial 22 cases with infection, we estimated additional 39 undetected cases, adding to a total number of 111.

### CONCLUSIONS:

Although cases were mostly long-stay patients, screening performance was low. Late and undetected cases, acting as "silent transmitters", contributed to the prolongation of this outbreak. New cases were steadily reported until April 2013. We recommend enhanced screening activities since the early stage of an outbreak and to continue screening among patients with negative results.

PRESENTED BY: Tanja Ducombe

**Keywords:** KPC, health-care associated infections, screening, outbreak,

ESCAIDE REFERENCE NUMBER: 20131758

## 9 years of Surveillance for Healthcare Associated Infections in Long-term Care Facilities in Norway: What gets measured gets done?

Horst Bentele<sup>(1)</sup>, Oliver Kacelnik<sup>(2)</sup>, Hanne Merete Eriksen<sup>(2)</sup>, Jørgen V Bjørnholt<sup>(2)</sup>

(1) Norwegian Institute of Public Health, Norway, (2) Norwegian Institute of Public Health, Department of Infection Control Epidemiology, Norway

### BACKGROUND:

Since 2002, the Norwegian Institute of Public Health has invited long-term-care-facilities (LTCFs) to conduct surveillance for healthcare associated infections (HAI) in the form of two point-prevalence surveys (PPS) every year. We collected baseline prevalence data and investigated whether frequency of participation had an effect on HAIs prevalence.

### METHODS:

We collated data from the 943 Norwegian LTCFs (N=991) who had participated at least once in a PSS between 2004-2012, calculated the frequency of participation and the mean prevalence of urinary tract-infections (UTI), lower respiratory tract-infections (LRTI), skin-infections (SI) and surgical site-infections (SSI) per LTCF. We stratified LTCFs by frequency of participation (cut-off: 50% of 18 PPS) and compared the mean prevalence of each infection per LTCF grouping by high and low frequency of participation for the whole period in each strata using chi2-test

### RESULTS:

Although 943 LTCF participated at least once between 2004-12, 718/943 (76%) participated in  $\geq$ 50% of the surveys. UTIs were the most frequent (mean prevalence per LTCF: 4.2%, 95%CI 3.8-4.6), followed by LRTIs (1.6%, 95%CI 1.2-2.0), SIs (1.6%, 95%CI 1.2-2.0) and SSIs (0.4%, 95%CI 0.1-0.8). LTCFs with high participation frequency ( $\geq$ 9) had lower mean prevalences of the four HAIs, compared to LTCFs with low participation frequency, (UTI: 3.5% vs 4.3%,  $p < 0.001$ ; LRTI: 1.5% vs 1.7%,  $p < 0.001$ ; SI: 1.5% vs 1.6%,  $p < 0.001$ ; and SII: 0.3% vs 0.4%,  $p < 0.001$ ).

### CONCLUSIONS:

Higher participation frequency of LTCFs in PPS was associated with lower prevalence of HAIs, possibly through more focus on HAIs following the surveys or because LTCFs with effective HAI control measures might be more likely to participate in surveillance. We recommend continuous participation in PPS to gain surveillance data useful for formulating control measures and detecting problems.

PRESENTED BY: Horst Bentele

**Keywords:** Nosocomial Infections; Infection Control; Health Impact Assessment; Health Care Surveys;  
ESCAIDE REFERENCE NUMBER: 20131518

## International health

### Combined assessment of lymphatic filariasis transmission and hepatitis B prevalence among children in primary schools in Wallis and Futuna, November 2012

Lorenzo Pezzoli<sup>(1)</sup>, Jean Pierre Mathelin<sup>(2)</sup>, Karen Hennesey<sup>(3)</sup>, Padmasiri Aratchige<sup>(3)</sup>, Jayaprakash Valiakollerli<sup>(3)</sup>, Sung Hye Kim<sup>(3)</sup>

(1) Epidemiology consultant, UK (2) Public Health Agency, Wallis and Futuna, (3) World Health Organization, Western Pacific Regional Office, Philippines (4) WHO Division of Pacific Technical Support

### BACKGROUND:

The French overseas territory of the Wallis and Futuna Islands (WAF) in the South Pacific, conducted a combined survey to determine whether transmission of lymphatic filariasis (LF) has ceased and to estimate prevalence of Hepatitis B (HB).

### METHODS:

The survey targeted all 1,014 primary school students of 13 elementary schools in WAF. Children of all five grades were tested for circulating filarial antigen (CFA) and only 4th and 5th grade students for HB virus surface antigen (HBsAg). We tested whether CFA prevalence was lower than 1% (i.e. the number of positives should have not exceeded the first integer below 0.01 times the number of children tested) and estimated HBsAg prevalence with 95% confidence intervals (CI). We also calculated coverage of the three HB vaccine doses and assessed vaccination timeliness using the Kaplan-Meier analysis.

### RESULTS:

Three children out of 935 tested for CFA resulted positive. This was below the critical cut-off of 9 (i.e. first integer  $0.01 \times 935$ ). Five children out of 469 were found HBsAg positive. HBsAg prevalence was 1.08% (95% CI: 0.14-2.03%). Coverage for the three doses of HB vaccination was 95.5, 95.5, and 94.2%, respectively. Timely coverage was lower, with respectively 78.5, 49.0, and 63.3% of children vaccinated according to the schedule in place in 1992-2005

### CONCLUSIONS:

WAF probably reached the goal of LF elimination ( $< 1\%$ ) and HB control ( $< 2\%$ ). It is now recommended to continue post mass drug administration surveillance for the next five years to ensure that LF has been eliminated as a public health problem, and to increase HB vaccination efforts, especially regarding timeliness of vaccination. Combining HB and LF in the survey was useful for evidence-based decision-making in a remote and resource-limited setting.

PRESENTED BY: Lorenzo Pezzoli

**Keywords:** Lymphatic Filariasis, Hepatitis B, Immunization, Wallis and Futuna;  
ESCAIDE REFERENCE NUMBER: 20131636

## Large food-borne outbreak linked to shrimps consumption in Antananarivo, Madagascar, December 2011

Brigitte Rafenoharisoa <sup>(1)</sup>, Harimahefa Razafimandimby <sup>(1)</sup>, Radonandrianina Randriamiarana <sup>(2)</sup>, Miraho Felaniaina Rajemiarinoelisoa <sup>(2)</sup>, Thomas Seyler <sup>(3)</sup>, Armand Eugène Randrianarivo-Solofoniaina <sup>(2)</sup>

(1) Ministry of Health – FETP-OI fellow, Madagascar, (2) Ministry of Health, Madagascar, (3) Indian Ocean Commission, UVS-SEGA, FETP Coordinator, Mauritius

### BACKGROUND:

In December 2011, several guests of a ceremony of 1500 people in Antananarivo, Madagascar, presented with gastroenteritis. Twenty were hospitalised. We conducted an investigation in order to describe the outbreak, identify the source, the vehicle and propose control measures.

### METHODS:

We conducted a cohort study among the guests of the ceremony. A case was a guest who presented at least two of the following symptoms in the six days following the ceremony: fever, vomiting, diarrhoea, abdominal pain, nausea. We administered a standardised questionnaire, including questions on food items consumed. We calculated food-specific attack rates and adjusted relative risk (RR) using binomial regression. We performed microbiological analysis on food samples and stool samples from hospitalised cases. We conducted a site visit of the kitchen and interviewed the catering staff.

### RESULTS:

We included 309 guests in the cohort. The attack rate was 56% (173/309). Ten cases were hospitalised. The epidemic curve indicated a common point source. Median incubation period was 18 hours. Diarrhoea (98%), abdominal pain (86%) and fever (52%) were the most frequent symptoms. The risk of being a case was higher among those who had consumed food items containing shrimps (RR=1.8 [95%CI: 1.2-2.6]). There was a dose-response effect. We found *Salmonella typhimurium* and coagulase-positive staphylococcus in food samples (cake, pâté, quiche). There was no shrimp left-over.

### CONCLUSIONS:

This is the first documented cohort study following a food-poisoning outbreak in Madagascar. More than one pathogen might have caused this large-scale point source outbreak. Our results suggest that shrimps were the most likely vehicle. A disruption in the cold chain during transportation probably favoured the growth of pathogens. We trained the catering staff in safe food-handling practices.

PRESENTED BY: Saïdou Ben Ali Mbaé

**Keywords:** Food-poisoning, outbreak, cohort, Madagascar, shrimp

ESCAIDE REFERENCE NUMBER: 20131712

## Household and individual risk factors for plague in Ankazobe, Madagascar, 2012

Harimahefa Razafimandimby <sup>(1)</sup>, Minoarisoa Rajerison <sup>(2)</sup>, Perlinot Herindrainy <sup>(2)</sup>, Samuel Andrianalimanana <sup>(2)</sup>, Christophe Rogier <sup>(2)</sup>, Thomas Seyler <sup>(3)</sup>

(1) Ministry of Health – FETP-OI fellow, Madagascar, (2) Institut Pasteur de Madagascar, Madagascar, (3) Indian Ocean Commission, UVS-SEGA, FETP Coordinator, Madagascar

### BACKGROUND:

Plague is endemic in Madagascar where localised outbreaks occur every year. Several plague cases were reported in Ankazobe district, April 2012. We investigated the outbreak in order to identify risk factors and implement control measures.

### METHODS:

For case finding in affected villages, we defined a suspected case as a person with symptoms compatible with plague (including sudden onset of fever and swollen painful lymph nodes) between 1 April and 12 May 2012. We used *Yersinia pestis* F1 antigen detection, serology and bacteriology for biological confirmation. People without symptoms but with positive serology were considered as asymptomatic cases. We conducted a case-control study including confirmed, suspected and asymptomatic cases. For each household with a case, we randomly selected three households free of cases and included all individuals as controls. We administered a questionnaire face-to-face to collect individual and household exposures. We computed crude and adjusted-OR and 95%CI using a GEE population-averaged model.

### RESULTS:

We included 29 cases and 163 controls. Four cases died. Among cases, sex ratio was 1.1 and median age was 31 years. Cases were older (>19y) than controls (OR=1.8 95%CI[1.0-3.2]). Cases reported flea bites as frequently as controls (OR=0.8 95%CI[0.3-2.1]). Households with a case were more likely to have a dog (adjusted-OR=3.1 95%CI[0.9-10.9]) and more likely to be overcrowded (adjusted-OR=12.2 CI[1.8-83.8]).

### CONCLUSIONS:

Cases and contacts were treated. Vector control and awareness campaign were conducted. Overcrowding at the household level could reflect favourable micro-epidemiological conditions for plague transmission. The association between plague and the presence of a dog in the household has already been documented. We are implementing the same protocol for other plague outbreaks. We will pool the data to improve our knowledge of the disease.

PRESENTED BY: Saïdou Ben Ali Mbaé

**Keywords:** Plague outbreak, Madagascar, Case-control, Risk factors

ESCAIDE REFERENCE NUMBER: 20131763



## An Outbreak investigation of Epidemic Typhus in Awi zonal prison, Awi, Amhara Regional State, Ethiopia, March 2012

Abadit Niguse <sup>(1)</sup>, Belay Beyene <sup>(2)</sup>, Masaki Ota <sup>(2)</sup>, Mer'awi Aragaw <sup>(3)</sup>

(1) Amhara Regional Health Bureau, Ethiopia, (2) JICA Amhara Region Infectious Disease Surveillance Project, Ethiopia, (3) Federal Ministry of Health, Ethiopia

### BACKGROUND:

In March 2012, an outbreak of epidemic typhus was reported from a prison in Awi zone, Ethiopia. A descriptive epidemiology was conducted to characterize cases of epidemic typhus in Awi Zonal prison, Amhara Regional State, Ethiopia.

### METHODS:

A case was defined as suspected case with Weil-Felix reaction of the proteus strain OX-19 with fourfold rise in titer or single titer equal to or greater than 320 in the second week of illnesses. A line list and case register log book of the prisoners were reviewed and 36 blood samples were collected for laboratory confirmation. Analysis was done using EPI Info version 3.5.1.

### RESULTS:

A total of 178 cases and no death were reported from March 3-15, 2012. All 36 cases tested were found positive for OX-19 antibody using Weil-flex test. The rest were diagnosed based on clinical signs and symptoms. The overall attack rate was 23%. The majority of cases (96%) were male and 25.7% were in age group of 25-29 years old and the median age was 29 years old.

### CONCLUSIONS:

The outbreak of epidemic typhus at Awi Zonal prison reminded the health authority about importance of good sanitation, personal hygiene and minimizing overcrowding in an institution like a prison. Since epidemic typhus is not directly spread from person-to-person rather by lice with *Rickettsia*, delousing of exposed prisoners was recommended to prevent reemergence of louse-borne diseases.

PRESENTED BY: Abadit Niguse

**Keywords:** Epidemic Typhus, epidemiology, infectious disease outbreaks, Ethiopia

ESCAIDE REFERENCE NUMBER: 20131545

## Preparing the local health care organisation for the 22nd World Scout Jamboree, Sweden 2011, and the resulting outcome with respect to communicable diseases

Mattias Waldeck <sup>(1)</sup>, Anna Apelqvist <sup>(2)</sup>, Åsa Lundgren <sup>(3)</sup>, Lena Malmström <sup>(4)</sup>, Bo Selander <sup>(5)</sup>

(1) Regional Office of Communicable Disease Control and Prevention, Skåne County, Sweden, (2) Department of Orthopedics, Hässeholm-Kristianstad-Ystad Hospitals, Sweden, (3) Department of Infectious Diseases, Central Hospital Kristianstad, Sweden, (4) Center for Patient Education, Central Hospital Kristianstad, Sweden, (5) Department of Pediatrics, Central Hospital Kristianstad, Sweden

### BACKGROUND:

The 22nd World Scout Jamboree (WSJ 2011), a 12day multicultural summer camp with 40,061 participants from 146 nations, was arranged outside Kristianstad in Skåne County, Sweden in July 2011. Another 31,645 people visited the camp. Local national scout camps were arranged in nearby municipalities and an exchange with overnight stays between scouts in WSJ 2011 and the national scout camps were organized.

### METHODS:

Planning was performed in cooperation with Central Hospital in Kristianstad, the Regional Office of Communicable Disease Control and Prevention, the health care organisation of the WSJ 2011 and Kristianstad municipality. Routines for screening for multiresistant bacteria when attending Swedish health care were established. Participants were prior the camp, due to on-going measles outbreak in Europe, recommended measles vaccination if not immune. The supply of vaccines and immunoglobulins against measles and hepatitis A was investigated and secured. An additional 10 hospital beds were opened, an increase with 5%. Training for an outbreak during the camp was performed at the local hospital. Primary health care was provided by the Medical Service of the scout camp.

### RESULTS:

Forty camp participants were hospitalized on 48 occasions. Seventeen were due to infectious diseases of which 12 were cases of gastroenteritis. No outbreaks of measles or hepatitis A were observed in Sweden following the camp.

### CONCLUSIONS:

Properly dimensioned and efficiently running health care at the camp and good collaboration and communication with the local hospital was determinant of the outcome. Gastroenteritis being the most probable threat to major disease outbreak was largely prevented with good hygiene and food handling routines at the camp. No effect regarding infectious diseases was observed on the civil society during or after WSJ 2011 in Sweden.

PRESENTED BY: Mattias Waldeck

**Keywords:** Preventive measures, delivery of health care, communicable diseases, mass gathering

ESCAIDE REFERENCE NUMBER: 20131833

## Contact tracing of passengers after exposure to measles on an international flight

Christophe Bayer<sup>(1)</sup>, Astrid Milde-Busch<sup>(1)</sup>, Dorothea Matysiak-Klose<sup>(1)</sup>, Maria an der Heiden<sup>(1)</sup>, Tim Eckmanns<sup>(1)</sup>, Benedikt Greutelaers<sup>(1)</sup>

(1) Robert Koch Institute, Germany

### BACKGROUND:

In summer 2012 a 10-year-old unvaccinated child with symptoms of measles (rash and fever) traveled on an 11 hour flight to Germany. Three days after arrival the responsible public health authorities were informed. European risk assessment guidelines for diseases transmitted on aircraft (RAGIDA) recommend contact tracing and information of all passengers up to 12 days, post-exposure prophylaxis (PEP) using vaccination up to 3 days (non-immune passengers without contraindications) and immunoglobulin-PEP (immunocompromised, pregnant and passengers less than 1-year-old) up to 6 days following the flight. The study's objective was to assess the timely traceability of contacts.

### METHODS:

Contacts were defined as all passengers travelling in the plane with the measles case. German health authorities attempted to trace all contacts using the flight's passenger manifest. For contacts residing outside Germany the respective countries' health authorities were informed.

### RESULTS:

On day 4 after the flight the passenger manifest was received. It included the passengers' names linked to the respective tour operators' but no personal contact details. Of 344 total passengers (103 German, 241 other nationalities) 52 (15%) were successfully reached (German 32 (31%); other nationalities 20 (8 %)). If reported (n = 25), the time between exposure and information of contacts ranged between 4 and 16 days (median 5 days), 21 contacts (84%) were reached within the time window allowing for immunoglobulin-PEP. One contact received PEP. No case of secondary infection was reported.

### CONCLUSIONS:

Only few contacts could be traced. The provided passenger manifest was of limited use. Unless measles cases with relevant travel history are notified earlier and the passenger manifest's quality of information is improved, the value of conducting a laborious contact tracing remains questionable.

PRESENTED BY: Christophe Bayer

**Keywords:** Infectious disease contact tracing, measles, air travel, post-exposure prophylaxis

ESCAIDE REFERENCE NUMBER: 20131711

## Risk assessment guidance for infectious diseases on aircraft (RAGIDA) – are we up to date?

Katrin Leitmeyer<sup>(1)</sup>, Lara Payne Hallström<sup>(1)</sup>, Niklas Danielsson<sup>(1)</sup>, Paloma Carrillo Santisteve<sup>(1)</sup>

(1) ECDC, Sweden

### BACKGROUND:

The outbreaks of SARS in 2003 and pandemic influenza A(H1N1) in 2009 illustrate the importance of air travel for the spread of infectious diseases. In order to assist national public health authorities in EU Member States (MS) to assess the risks associated with exposure to infectious agents on board aircrafts, the European Centre for Disease prevention and Control (ECDC) published in 2009 an operational Risk Assessment Guidance for Diseases transmitted on Aircraft (RAGIDA). We aimed to assess the relevance, completeness and performance of RAGIDA in order to guide the review and further development of this guidance document.

### METHODS:

A web-based survey was conducted in May 2013, directed to over 250 international experts including ECDC MS national and subject contact points, aviation and transport authorities and international public health organisations.

### RESULTS:

Ninety-one persons (36 %) responded from 25 EU Member States. Sixty-eight (75%) were aware of RAGIDA before the survey, with the majority (54/66, 82%) having shared or recommended the guidance. The guidance was consulted or applied in the assessment or management of a public health incident by 58% (38/65), and 45% (30/66) had used them to develop own guidance documents. Suggestions for revision included new chapters on novel Influenza and coronaviruses, as well as a syndromic approach for severe acute respiratory infections.

### CONCLUSIONS:

RAGIDA is considered a valuable evidence-based tool for assisting national public health authorities to decide on the need for and extent of contact tracing following exposure to infectious agents on aircraft. Based on the survey results, a systematic literature review and a multidisciplinary expert consultation will take place for October 2013, to update specifically the evidence for measles, tuberculosis and address the new chapters suggested by respondents.

PRESENTED BY: Katrin Leitmeyer

**Keywords:** Risk assessment, communicable disease, aircraft, Europe

ESCAIDE REFERENCE NUMBER: 20131735

## Vaccine effectiveness & safety

### Safety of quadrivalent human papillomavirus vaccine during 4 years of routine vaccination of 11-14 year-old girls in Slovenia

Maja Subelj <sup>(1)</sup>, Veronika Učakar <sup>(2)</sup>, Alenka Kraigher <sup>(1)</sup>, Irena Klavs <sup>(1)</sup>

(1) National Institute of Public Health of Slovenia, Slovenia, (2) Regional Institute of Public Health Nova Gorica, Slovenia

#### BACKGROUND:

In 2009, a 3-dose vaccination with quadrivalent human papillomavirus vaccine (HPV4) was introduced in the National Vaccination Programme in Slovenia for girls aged 11-12 years. In 2011, vaccination of 13-14 year-old girls not vaccinated at the age of 11-12 was added. Our objective was to assess the safety of this newly-introduced vaccine.

#### METHODS:

In Slovenia, physicians passively report all adverse events following immunization (AEFI) to the Registry of AEFI. We used the World Health Organization surveillance definitions for AEFI. Data collected included information on i) AEFI (symptoms, time of occurrence, duration, treatment, and outcome), ii) the affected individual, and iii) the reporter. We calculated reported rates of individuals with AEFI, using the number of distributed doses as the denominator.

#### RESULTS:

Between September 2009 and April 2013, 57,160 doses of HPV4 were distributed to vaccinate 11-14 year-old girls. Overall, 169 AEFI that occurred in 84 individuals were reported, corresponding to 14.7 individuals with AEFI/10,000 distributed doses. Five (6%) individuals had a serious AEFI (0.87/10,000 doses). However, none of the AEFI resulted in persistent or serious disability or incapacity. Forty-five (54%) AEFI occurred following administration of the first dose. Fifty (60%) individuals had only symptoms and signs of a systemic AEFI, 6 (7%) only injection site reactions, and 28 (33%) both. The most common AEFI was nausea (22%), followed by headache (13%), fever (8%) and local swelling (7%). One unexpected AEFI, a migraine episode, was reported.

#### CONCLUSIONS:

The low reported rate of serious AEFI provides reassurance that our routine HPV4 vaccination programme is safe. Continuation of AEFI surveillance following HPV4 vaccination remains essential in post-marketing monitoring of HPV4 safety.

PRESENTED BY: Maja Subelj

**Keywords:** HPV, vaccine safety, adverse event, surveillance, Slovenia  
ESCAIDE REFERENCE NUMBER: 20131434

### Combined tetanus, low dose diphtheria and acellular pertussis vaccines elicit immune responses and have a low rate of adverse events when given as a 5th dose to adolescents

Eva Netterlid <sup>(1)</sup>, Hans Hallander <sup>(1)</sup>, Lennart Nilsson <sup>(1)</sup>, Margaretha Ljungman <sup>(1)</sup>, Leif Gothefors <sup>(1)</sup>, Lennart Gustafsson <sup>(1)</sup>

(1) Swedish Institute for Communicable Disease Control (SMI), Sweden

#### BACKGROUND:

The vaccine schedule against pertussis, tetanus and diphtheria in Sweden currently involves 4 doses from 3 months to 5½ years. This will be extended to a 5th dose at age 14-16 years, starting 2016. This trial, carried out in 6 centres in Sweden, aimed to assess the safety and immunogenicity of a 5 component (Td5ap) and a single component (Td1aP) vaccine when administered to 14-15 year-old children primed at 3, 5 and boosted at 12 months and at 5½- years.

#### METHODS:

230 children were randomised into the trial and vaccinated, 115 with the Td5ap vaccine and 115 with the Td1aP vaccine. Sera were obtained pre- and post-vaccination for analysis of antibody responses to pertussis components, diphtheria toxin and tetanus toxoid using ELISA. The reactogenicity was documented on a diary card for local reactions and on a Case Report Form for general adverse reactions.

#### RESULTS:

No serious adverse events were reported and the rate of adverse events was low. Pain was the most prevalent local reaction. All adverse events and local reactions had an early onset and a short duration. The proportion of children showing a 100% antibody increase to at least 4 EU/mL for anti-PT was 87.7% for Td5ap and 95.6% for Td1aP and the anti-PT level post-vaccination was 20 EU/ml and 74 EU/ml, respectively. For diphtheria 59.5 % of the children had pre-booster antibody levels above  $\geq 0.1$  IU/mL increasing to 100% after vaccination for both vaccines. For tetanus corresponding figures were 98.2% and 100%.

#### CONCLUSIONS:

Both formulated booster vaccines, Td5ap and Td1ap, had a low rate of adverse events and elicited immune responses when used as a 5th dose at 14 to 15 years of age.

PRESENTED BY: Eva Netterlid

**Keywords:** Diphtheria-Tetanus-acellular Pertussis Vaccines Immunization, Secondary Adolescent Immunogenicity Drug Toxicity  
ESCAIDE REFERENCE NUMBER: 20131706

## Introduction of new strain of BCG vaccine in Hungary: no excess of adverse reactions caused by vaccination in 6 month follow-up period

Paulius Gradeckas<sup>(1) (2)</sup>, Zuzsanna Molnár<sup>(2)</sup>, Zsuzsanna Pauliny<sup>(3)</sup>, Krisztina Brachmann<sup>(4)</sup>, Agnes Csohán<sup>(4)</sup>

(1) European Programme for Intervention Epidemiology Training (EPIET), ECDC, Sweden, (2) Department of Epidemiology, National Center for Epidemiology, Budapest, Hungary, (3) National Center for Epidemiology, Division of Quality Control of Immunological Products, Hungary, (4) National Center for Epidemiology, Department of Quality Control of Bacterial Vaccines, Hungary

### BACKGROUND:

In 2012, Hungary started to vaccinate newborns with vaccine containing the BCG Bulgaria® strain, replacing the previously used BCG SSI® strain. The National Center for Epidemiology (NCE) estimated the frequency and nature of adverse reactions (ARs) to the vaccine BCG Bulgaria®.

### METHODS:

We enrolled volunteering physicians from 20 administrative regions in Hungary. We asked investigators to collect information on ARs following BCG vaccination recorded during healthy child visits, at the ages of 1, 2, 3 and 6 months for children born between September and November 2012. We used the WHO definitions for adverse events, based on which we designed a notification form and database. We included records having all four healthy child visits. We did a sensitivity analysis on excluded records. We followed up vaccinated children and calculated incidence of adverse reactions dividing the number of newborns with reactions by the total number of vaccinees for whom follow-up information was available.

### RESULTS:

There were 2400 vaccine doses administered containing BCG Bulgaria® from September to November 2012. After six months of follow up, we found that 2.298 (96%) of infants had a scar (normal reaction to vaccine) in the vaccination site. The most common adverse reaction detected was abscess (0.4%; 95% CI: 0.2-0.7) while other adverse reactions (bacterial infection, ulceration or lymphadenitis) were detected less commonly (0.1% each). Forty percent of ARs were noticed after the healthy child visit at 2nd month.

### CONCLUSIONS:

We found that the most ARs to BCG vaccine – abscesses and regional lymphadenitis were no more frequent than the expected proportion of 1% reported in literature. No severe local reactions were detected. We advice on continuing with BCG Bulgaria® vaccine in the future.

PRESENTED BY: Paulius Gradeckas

Keywords: Adverse reactions, BCG Bulgaria®, infants

ESCAIDE REFERENCE NUMBER: 20131474

## Decline in children pneumonia hospitalization rates after the implementation of a pneumococcal conjugate vaccine in Stockholm County

Ann Lindstrand<sup>(1) (2) (3)</sup>, Rutger Bennet<sup>(4)</sup>, Ilias Galanis<sup>(5)</sup>, Margareta Blennow<sup>(3) (2)</sup>, Lina Schollin Ask<sup>(3)</sup>, Sofia Hultman Dennison<sup>(2)</sup>, Malin Ryd Rinder<sup>(3)</sup>, Margareta Eriksson<sup>(4)</sup>, Birgitta Henriques-Normark<sup>(1) (2)</sup>, Åke Örtqvist<sup>(5)</sup>, Tobias Alfvén<sup>(2) (3)</sup>

(1) Swedish Institute for Communicable Disease Control, Sweden, (2) Karolinska Institutet, Sweden, (3) Sachs' Children's Hospital, South General Hospital, Stockholm, Sweden, (4) Astrid Lindgren Children's Hospital, Karolinska University Hospital, Solna, Sweden, (5) Department of Communicable Disease Control and Prevention, Stockholm County Council, Sweden

### BACKGROUND:

Pneumococci is the major pathogen responsible for pneumonia, accounting for approximately 1.3 million deaths in children younger than 5 years old every year. A pneumococcal conjugate vaccine (PCV) was introduced in Stockholm County in July 2007, leading to a substantial decrease in pneumococcal disease. The objective of this study was to evaluate the effect of the vaccination program on pneumococcal pneumonia hospital admissions.

### METHODS:

Retrospective hospital registry data on pneumococcal pneumonia hospitalizations, from July 2003 to June 2012, were collected for children aged 0-5 years in Stockholm County (n=3570). Segmented regression analysis was applied in order to compare the admission rates of the pre-intervention (July 2003-June 2007) and post-intervention periods (July 2008-June 2012), excluding the in-between year as a respiratory season. Generalized additive models assuming a negative binomial distribution for the monthly admission rates were used to adjust for seasonality. The same method was applied to admission rates for pyelonephritis, a disease used for comparison purposes.

### RESULTS:

For the vaccinated age group 0-2 years, an increasing pre-intervention trend (monthly rate ratio (RR):1.01; 95% confidence interval (CI):1.004-1.017) was followed by a 35% decrease at the beginning of the post-intervention period (RR:0.65; 95%CI:0.49-0.86) and a stable trend afterwards (RR:0.996; 95%CI:0.99-1.01). For children aged 2-5 years respectively, an initially stable monthly trend (RR: 1.004; 95%CI:0.996-1.012) was succeeded by a period with significantly decreasing trend (RR:0.992; 95%CI: 0.984-0.999). No significant changes were observed for pyelonephritis in either age group.

### CONCLUSIONS:

The introduction of the PCV in Stockholm County led to a clear drop in pneumococcal pneumonia hospital admission rates for children 0-2 years and to a significant decrease in trend in both age groups.

PRESENTED BY: Ilias Galanis

Keywords: Streptococcus pneumoniae, pneumonia, pneumococcal conjugate vaccine, Interrupted time series, Segmented regression

ESCAIDE REFERENCE NUMBER: 20131816

## Acellular pertussis vaccine effectiveness in children and adolescents, federal State of Brandenburg, Germany, 1995-2012

Sebastian Haller <sup>(1) (2)</sup>, Ioannis Karagiannis <sup>(3)</sup>, Claudia Siffczyk <sup>(1) (3)</sup>, Ole Wichmann <sup>(4)</sup>, Wiebke Hellenbrand <sup>(4)</sup>

(1) Robert Koch Institute, Germany, (2) Postgraduate Training for Applied Epidemiology, European Programme for Intervention Epidemiology Training (EPIET), (3) State Health Authority Brandenburg, Germany, (4) Department for Infectious Disease Epidemiology

### BACKGROUND:

Germany replaced whole-cell with high-concentration acellular pertussis-containing vaccines (3+1 doses aP by 14 months of age) in 1995 and recommended boosters with lower concentration pertussis vaccines (Tdap) for 9-17 year-olds in 2000 and for 5-6 year-olds in 2006. Pertussis incidence increased recently despite rising vaccination coverage (VC) among under five year-olds. We analyzed VC and effectiveness (VE) of routine and booster vaccination in Brandenburg to understand this increase.

### METHODS:

In a stratified case-cohort analysis, we compared the proportion of vaccinated reported pertussis cases with data on vaccination status collected among children in schools (entry and exit) and kindergarten. We stratified children born (a) in 2005-2009 aged 2-3 years, (b) in 1995-2006 aged 5-7 years, and (c) in 1995-1998 aged 15-16 years. We calculated sex-adjusted pertussis VE with and without boosters using Poisson-regression.

### RESULTS:

The VE for four doses decreased from 97% in 2-3 year olds (19 cases, 94% VC among 45,368 children) to 88% in 5-7 year olds (271 cases, 96% VC among 223,173 children) to 84% in 15-16 year olds (96 cases, 97% VC among 10,572 children). VE was higher among children 5-7 years and 15-16 years of age who had received a booster (VE 93% and 97%, respectively). However, booster VC was only 19% (29% after 2005) and 76% in these age groups, respectively.

### CONCLUSIONS:

A combination of waning immunity and poor booster VC likely explains the increased pertussis incidence in school children and adolescents in Brandenburg. Natural boosting might have contributed to the relatively high VE for 3+1 aP doses in 15-16 year-olds. We recommend increasing and monitoring coverage of the recommended preschool and adolescent boosters.

PRESENTED BY: Sebastian Haller

**Keywords:** :whooping cough, vaccine effectiveness, pertussis vaccine, case cohort study

ESCAIDE REFERENCE NUMBER: 20131579

## Seasonal influenza vaccine effectiveness in Romania: results from the case-control study 2012-2013

Daniela Pitigoi <sup>(1)</sup>, Emilia Lupulescu <sup>(1)</sup>, Viorel Alexandrescu <sup>(1)</sup>, Maria Elena Mihai <sup>(1)</sup>, Alina Elena Ivanciuc <sup>(1)</sup>, Gheorghe Necula <sup>(1)</sup>

(1) Cantacuzino Institute, National Institute of Research – Development for Microbiology and Immunology, Bucharest, Romania

### BACKGROUND:

Since the season 2008-2009, Cantacuzino Institute, Romania has been participating to the I-MOVE network (Influenza Monitoring Vaccine Effectiveness in Europe). In the season 2012-2013, we aimed at estimating the seasonal influenza vaccine effectiveness (IVE) against medically-attended influenza-like illness (ILI) laboratory-confirmed for influenza.

### METHODS:

We conducted a test negative case-control study between week 1 and 17/2013. Cases were ILI laboratory-confirmed. Controls were ILI cases testing negative for any influenza. Data collected included demographic, clinical and laboratory information, vaccination status and confounding factors. We calculated the adjusted odds ratio (OR) for vaccination using logistic regression, removing from the model covariates with  $p > 0.2$ . IVE was calculated as  $(1-OR) \times 100$  with 95% confidence interval (CI) calculated around the point estimate.

### RESULTS:

Ninety-eight (31.3%) sentinel physicians participated and 70 (71.4%) recruited at least one patient. They enrolled 200 ILI patients and 197 (98.5%) were analysed: 130 cases (one vaccinated) and 67 controls (seven vaccinated). Among cases, 52 (40.0%) were positive for A(H1N1)pdm09 (one vaccine failure), 74 (56.9%) for influenza B and 4 (3%) for A(H3N2). The adjusted IVE for age, month of swabbing, residence against any influenza was 94.5% (95% CI: 43.5; 99.0) and against influenza A(H1N1)pdm09 (N=119) was 76.9% (95% CI: -113.4, 98.5).

### CONCLUSIONS:

The results suggested a good protection of 2012-2013 seasonal vaccine, consistent with the good match between the vaccination and circulating A(H1N1) strain. The sample size and the low vaccination coverage did not allow measuring the IVE with precision or for the other vaccine strains. Participation to the I-MOVE network and its sustainability is essential.

PRESENTED BY: George Necula

**Keywords:** Influenza, vaccine effectiveness, case-control

ESCAIDE REFERENCE NUMBER: 20131629

## Herpes Zoster incidence trends under different varicella vaccination schemes in three Spanish Regions, 2005 – 2012

Giovanna Ciaravino <sup>(1) (2) (3)</sup>, Maria José Sagrado <sup>(4)</sup>, Josefa Masa <sup>(1)</sup>, Maria Victoria Martínez de Aragón <sup>(1)</sup>

(1) National Centre of Epidemiology (CNE), Instituto de Salud Carlos III (ISCIII), Madrid, Spain, (2) ECDC, Sweden (3) ISC III, Spain, (4) Spanish Field Epidemiology Training Programme (PEAC)

### BACKGROUND:

Spain introduced varicella vaccination of susceptible adolescents in 2005. As of 2006, 4 regions opted for vaccinating also toddlers, which lead to heterogeneous changes in varicella incidence trends. After vaccine introduction, Herpes Zoster (HZ) surveillance was recommended and its implementation is still ongoing. We evaluated HZ incidence trends from 2005 to 2012 in three Regions using different vaccination policies.

### METHODS:

We included HZ cases notified during 2005-2012 in Madrid (vaccinating adolescents and toddlers with one dose each); Navarra (vaccinating adolescents and toddlers with two doses each), and Murcia (vaccinating only adolescents with two doses). We calculated overall age-adjusted incidence and age-specific incidence trends by region, using negative binomial regression models.

### RESULTS:

We analyzed 63,136 HZ cases. In Madrid, we found no changes in the overall trend between 2005 and 2012 (age-adjusted IRR=1.01; CI95%:0.98-1.05), while annual incidence in those aged 15-24 years rose significantly (IRR=1.14; CI95%:1.01-1.29). In Navarra, we found a 2% annual reduction in overall incidence (age-adjusted IRR=0.98; CI95%:0.96-0.99) and a significant fall in annual incidence in those aged 0-14 years (IRR=0.94; CI95%:0.89-0.99) and 45-64 years (IRR=0.96; CI95%:0.92-0.99). In Murcia, we found an 8% annual increase across the study period (age-adjusted IRR=1.08; CI95%:1.06-1.10), with a significant increase in age-specific incidence of between 6% and 10% in all age-groups (p-value<0.001).

### CONCLUSIONS:

Over a seven-year period after varicella vaccine introduction, HZ incidence showed different trends in the three regions, decreasing in the Region vaccinating toddlers and adolescents with two doses and increasing in the Region vaccinating only adolescents. We recommend improving and consolidating HZ surveillance systems, assessing varicella vaccination coverage and carrying out further studies to understand if changes in HZ disease are linked to the introduction of varicella vaccine.

PRESENTED BY: Giovanna Ciaravino

**Keywords:** Herpes Zoster, varicella vaccination strategies, incidence trends

ESCAIDE REFERENCE NUMBER: 20131570

## Is vaccine failure investigated in EU/EEA countries?

Fortunato D'Ancona <sup>(1)</sup>, Cristina Giambi <sup>(1)</sup>, Pierluigi Lopalco <sup>(2)</sup>, Lucia Pastore Celentano <sup>(2)</sup>, Ida Czumbel <sup>(2)</sup>

(1) Istituto Superiore di Sanita', Italy, (2) ECDC, Sweden

### BACKGROUND:

Monitoring of vaccine failure (VF) is important for many reasons, including vaccine effectiveness evaluation and identification of strains/serotypes uncovered by vaccine, need of supplementary doses, problems with specific batches. Knowledge on this topic is poor. A cross-sectional survey was conducted to describe practices regarding VF monitoring in EU/EEA countries.

### METHODS:

In June 2013 the 29 EU/EEA countries were surveyed through an online questionnaire including variables monitored, definitions, attitudes and procedures to investigate VF.

### RESULTS:

26/29 countries replied. In 16 countries information on vaccination status of vaccine preventable diseases (VPD) cases is available at national level or easily retrievable through e-linkage with immunization registries (IR); this information could be retrievable only case-by-case in 9 countries and not retrievable in one. Eighteen countries report vaccination status or number of doses to TEsSy; three countries could do it. Quality of reported data for all VPDs is considered good by 10 countries. Source of vaccination status (oral/documented) could be reported by 10 countries. VF investigation is routinely conducted in 2 countries. Computerized IRs are available in 7 countries at national level, in 5 in some areas. A direct linkage of IRs with other health databases is possible in 8 countries and routinely done in 5 of them.

### CONCLUSIONS:

In more than half countries information regarding vaccination status is available at national level, with low confidence in data quality. The importance of entering information regarding vaccination status should be stressed, at least for a list of prioritized VPDs. Collection of source of information (oral/documented) would improve data quality. Procedures for monitoring VF should be adopted. The development of a computerized IR able to link with health databases is a priority.

PRESENTED BY: Fortunato D'Ancona

**Keywords:** Vaccination, Europe, Surveillance, Immunization Programs

ESCAIDE REFERENCE NUMBER: 20131768

## Vaccine preventable diseases

### Travel related cutaneous toxigenic *Corynebacterium diphtheriae* infection: the investigation and control measures. London, United Kingdom, April – May 2013

Oluwakemi Legbe <sup>(1)</sup>, Pasco Hearn <sup>(2)</sup>, Sudy Anaraki <sup>(1)</sup>, Joanne White <sup>(1)</sup>, Gayatri Amirthalingam <sup>(1)</sup>, Androulla Efstratiou <sup>(1)</sup>

(1) Public Health England, United Kingdom, (2) University College London Hospital, United Kingdom

#### BACKGROUND:

The poster will present on the investigation and control measures undertaken following the identification of a toxigenic strain of *Corynebacterium diphtheriae* var *mitis* as well as *Streptococcus pyogenes* from a skin lesion in a case with recent travel to the Democratic Republic of Congo (DRC). *C. diphtheriae* produces an exotoxin that causes local tissue necrosis and when absorbed into the bloodstream, causes toxæmia and systemic complications including paralysis. This is the second case of cutaneous toxigenic *C. diphtheriae* in the UK this year.

#### METHODS:

This patient had one dose of pre-travel vaccine and did not present with systemic signs or symptoms therefore was managed as an outpatient. However the case re-presented to a local hospital with worsening cellulitis possibly due to the co-infection and was subsequently admitted.

#### RESULTS:

Following the initial risk assessment four household contacts were identified, Health Protection and hospital staff completed a risk assessment at the hospital in order to identify whether any healthcare workers were exposed to infection. Two healthcare workers were considered as high risk and were advised self-surveillance and exclusion until negative clearance samples were obtained.

#### CONCLUSIONS:

All household contacts were given information on diphtheria and were advised to seek urgent medical attention if they experienced symptoms. In line with current guidelines all close contacts received chemoprophylaxis, were immunised and swabbed. Throat swabs taken from four close contacts were confirmed as negative, two throat swabs taken from one adult contact and the doctor who assessed the case grew *Corynebacterium*. Further testing identified the *Corynebacterium* species as *C. accolens*, a non-pathogenic *Corynebacterium*.

PRESENTED BY: Pasco Hearn

**Keywords:** Diphtheria Toxin *Corynebacterium* Diphtheria Travel related infection Pre, travel vaccination Co, infection *Streptococcus pyogenes*

ESCAIDE REFERENCE NUMBER: 20131724

### Whooping cough epidemic peak in Portugal, 2012

Cátia Pinto <sup>(1)</sup>, Andreia Cabete Portulez <sup>(1)</sup>, Paulo Nogueira <sup>(1)</sup>, Andreia Costa <sup>(1)</sup>

(1) Directorate General of Health, Portugal

#### BACKGROUND:

Whooping cough is a mandatory notifiable disease caused by *Bordetella pertussis*, which is highly communicable with a secondary attack rate of up to 90% among non-immune household contacts. Most cases of clinically recognizable disease occur in children aged 1-5 years. In Portugal, high immunization coverage decreased annual incidence to 0.4/100000 in the nineties. In 2012, several countries reported whooping cough outbreaks, particularly in infants.

#### METHODS:

The objective of this study was to describe incidence of the disease from 2005 to 2012 and epidemiologic characteristics of notified cases (2012) in Portugal. Data from the National Mandatory Notifiable Diseases Surveillance System was used, including all confirmed and probable whooping cough cases.

#### RESULTS:

In the study period 516 cases were notified, ranging from 14 in 2010 to 220 in 2012 (incidence rate 2.1/100000) with higher proportion of cases in infants under 1 year-old. Cases notified in the last year accounted for 42.6% of total cases. In 2012, 176 (80.0%) cases were in infants under 1 year-old. Among infants, 73.0% were under 3 months. Three deaths occurred in newborns and one in one infant under 2 months. Among all cases, 103 (46.8%) were not vaccinated.

#### CONCLUSIONS:

Similar to other countries, an excess of whooping cough cases occurred in Portugal in 2012 which was three times higher than previous epidemic peaks in the considered period. Infants too young to be vaccinated were particularly affected. Strategies for preventing infant mortality include immunization in pregnancy and cocooning.

PRESENTED BY: Cátia Pinto

**Keywords:** Whooping cough, communicable diseases, outbreaks, infants, newborns

ESCAIDE REFERENCE NUMBER: 20131586

## Individual contact patterns and crowding factors as determinants of pneumococcal IgG antibody concentration in The Netherlands in the pre-vaccine era

Mirjam Knol <sup>(1)</sup>, Lucienne Grundeken <sup>(2)</sup>, Liesbeth Mollema <sup>(2)</sup>, Karin Elberse <sup>(2)</sup>, Guy Berbers <sup>(2)</sup>, Hester de Melker <sup>(2)</sup>

(1) RIVM, The Netherlands

### BACKGROUND:

Pneumococcal disease is most prevalent among young children and elderly. High IgG antibody concentrations can indicate high exposure to *Streptococcus pneumoniae*. We explored the association between individual contact patterns, crowding factors, general host-related determinants and IgG antibody concentration of 13 pneumococcal serotypes in unvaccinated children and elderly.

### METHODS:

Serological testing of 7868 blood samples, obtained in a population-based study conducted in 2006-2007 in The Netherlands, was performed using a fluorescent-bead based multiplex immunoassay. Regression analysis was applied among children aged 2mo-3 years (n=642) and elderly of 65 years and older (n=1174) to assess the association between host-related determinants (individual contact patterns, frequency of day care attendance, sibling  $\leq 4$  year, occupation that involves children, age, gender, ethnicity, level of education, asthma/COPD, vaccination coverage area, urbanization rate and household size) and IgG antibody concentration of 13 pneumococcal serotypes.

### RESULTS:

For children, contact with other young children, day care attendance, and having a non-Western ethnicity (first or second generation) were positively associated with pneumococcal IgG antibody concentration. Moreover, the IgG concentration of all 13 serotypes increased with age. For elderly, contact with 5-19 year olds, male gender and low education level were positively associated with IgG antibody concentration.

### CONCLUSIONS:

This study confirmed that contact with young children and day care attendance are associated with pneumococcal IgG concentration in children in the prevaccine era. Individual contact patterns and crowding are known to be important determinants in the transmission of the pneumococcus. This study constitutes a baseline measurement from which the impact of vaccination on transmission of the bacterium in the post vaccine era can be studied in the future.

PRESENTED BY: Mirjam Knol

**Keywords:** *Streptococcus pneumoniae*, epidemiologic factors, crowding, immunoglobulin G, pneumococcal conjugate vaccine

ESCAIDE REFERENCE NUMBER: 20131588

## Pneumococcal and HIB Meningitis in infants in Bulgaria two years after introduction of mass immunization with conjugated vaccines

Mira Kojouharova <sup>(1)</sup>, Teodora Georgieva <sup>(2)</sup>, Radosveta Filipova <sup>(2)</sup>

(1) National Centre of Infectious and Parasitic Diseases, Bulgaria, (2) Ministry of Health, Bulgaria

### BACKGROUND:

*S. pneumoniae* and *H. influenzae* (Hib) were leading agents of bacterial meningitis in children in Bulgaria. This was the reason to introduce conjugated *S. pneumoniae* and Hib vaccines in the National immunization calendar in 2010. Thereafter all changes in *S. pneumoniae* and Hib meningitis epidemiology are carefully monitored.

### METHODS:

The total number and age distribution of *S. pneumoniae* and Hib meningitis cases, incidence, mortality and case fatality ratio were analyzed and the data for the pre-vaccination 2001-2010 period were compared with the data for 2011 and 2012, when infants were immunized with pneumococcal and Hib vaccines.

### RESULTS:

During the pre-vaccination period the incidence of *S. pneumoniae* and Hib meningitis in the general population was 0.48 and 0.19 per 100,000 on average, varying from 0.67 to 0.34 for *S. pneumoniae* and from 0.27 to 0.13 per 100,000 for Hib. In the most affected group of 0-1 year old children Hib and *S. pneumoniae* meningitis incidence was on average 7.20 and 4.43 per 100,000. Two years after, in 0-1 year old infants there were no cases of meningitis due to Hib and one case due to *S. pneumoniae* in non vaccinated child. The incidence rate in the general population decreased as well, reaching the level of 0.04 for Hib and 0.27 per 100,000 for *S. pneumoniae* meningitis in 2012. No deaths from Hib meningitis were registered and *S. pneumoniae* meningitis mortality rate was one of the lowest.

### CONCLUSIONS:

As a result of mandatory infant immunization significant decrease of pneumococcal and Hib meningitis incidence and mortality were achieved in Bulgaria two years after. The full direct and expected herd effects of the immunization programme are to be continuously monitored.

PRESENTED BY: Mira Kojouharova

**Keywords:** *S. pneumoniae*, *H. influenzae*, conjugated vaccines

ESCAIDE REFERENCE NUMBER: 20131652



## Congenital rubella still a relevant public health problem in Italy: national surveillance data, 2005-2012

Cristina Giambi <sup>(1)</sup>, Antonino Bella <sup>(1)(2)</sup>, Silvia Declich <sup>(1)(2)</sup>, Antonietta Filia <sup>(1)</sup>, Gloria Nacca <sup>(1)</sup>, Maria Cristina Rota <sup>(1)</sup>, Regional contact points for rubella surveillance <sup>(4)</sup>

(1) Istituto Superiore di Sanità, Italy, (2) National Centre for Epidemiology Surveillance and Health Promotion, Rome, Italy, (3) Centro Nazionale di Epidemiologia, Sorveglianza e Promozione della Salute, (4) Multiple affiliations, Italy

### BACKGROUND:

A national, mandatory, passive, case-based and exhaustive surveillance system for congenital rubella and rubella in pregnancy was implemented in Italy in 2005. We analyzed surveillance data in order to monitor progresses toward congenital rubella elimination, planned by 2015 according to the WHO global elimination plan.

### METHODS:

We performed a descriptive analysis of congenital rubella infections, infections occurred in pregnancy and their outcomes notified between 2005-2012. The system uses case definitions compatible with the 2008 EU ones.

### RESULTS:

Sixty-one confirmed cases of congenital rubella infection, 3 probable cases, 23 voluntary interruption of pregnancy and a stillbirth were notified. Two incidence peaks occurred in 2008 and 2012. In 2012 16 confirmed congenital infections were notified (3,0 per 100.000 newborns), 88% of them by a single Region. Ninety-seven confirmed infections in pregnancy were recorded; only 28% of cases had performed a rubella antibody test before pregnancy and 43% have had previous pregnancies. Outcomes of the pregnancy are unknown for 18% (17/97) of confirmed infections occurred in pregnancies and 47% (57/121) of suspected cases of congenital rubella were not followed up for a final case classification, indicating a possible underestimation of cases.

### CONCLUSIONS:

The incidence of congenital rubella is still high in Italy and it could be underestimated. Strengthening surveillance systems is necessary and an evaluation of the system completeness using alternative sources, such as hospital records, could be useful to assess underreporting. In order to protect susceptible child-bearing women from rubella infection, routine use of the currently recommended rubella blood test before pregnancy and vaccination of childbearing-age women should be encouraged further. Information campaigns should be enforced to increase awareness among population of the risk of acquiring rubella infection during pregnancy.

PRESENTED BY: Cristina Giambi

**Keywords:** Rubella, Congenital Rubella Syndrome, Disease Elimination, vaccination, surveillance

ESCAIDE REFERENCE NUMBER: 20131547

## Herpes Zoster hospitalizations in Spain after varicella vaccine introduction, 2006-2011

Maria José Sagrado <sup>(1)(2)</sup>, Giovanna Ciaravino <sup>(1)(3)</sup>, Josefa Masa <sup>(1)</sup>, Maria Victoria Martínez de Aragón <sup>(1)</sup>

(1) National Centre of Epidemiology (CNE), Instituto de Salud Carlos III (ISCIII), Madrid, Spain, (2) Spanish Field Epidemiology Training Programme (PEAC), (3) ECDC, Sweden

### BACKGROUND:

Spain introduced varicella vaccine in 2005 for susceptible adolescents (Scheme-A); four regions also adopted universal infant vaccination (scheme-B) leading to a significant decrease in varicella incidence of 65% compared with 20% in regions using scheme-A. Different models have predicted the increase of the risk of herpes zoster (HZ) due to the reduction of natural booster. We assess changes in HZ hospitalizations after 6 years of vaccine introduction in regions with different decline of incidence.

### METHODS:

We analysed HZ hospitalizations from the hospital discharges dataset during 1998-2011. We defined pre (1998-2004) and post vaccination (2006-2011) periods. Per each vaccination strategies we estimated overall hospitalizations period rate ratios (HRR) adjusted by regions and age; and age-specific period HRR, adjusted by region, using poisson regression models.

### RESULTS:

There were 13,525 cases of HZ-hospitalization for both periods. Overall HRR declined an 8% (95%CI: 3%-12%). In regions using scheme-A, HZ hospitalizations descent an 8% (95%CI=3%-13%), we found a significant drop of 29% (95%CI: 37%-20%) and 21% (95%CI: 27%-14%) in the age groups 25-44 and 45-65 respectively, and an increase of 8% (95%CI: 1%-15%) in older than 64. In regions using Scheme-B only patients over age 65 had a significant increase of 21% (95%CI: 7%-38%), in the rest age-specific groups and overall no changes were found.

### CONCLUSIONS:

After 6 years of varicella vaccination in Spain, we observed an increase of HZ hospitalizations in elderly ages in regions where the incidence have experimented a bigger reduction. These results should be interpret with caution since HZ hospitalised cases are representing severe cases. We recommend enhance HZ incidence surveillance.

PRESENTED BY: Maria José Sagrado

**Keywords:** Herpes Zoster hospitalization, varicella incidence, varicella vaccination, hospitalizations rate ratios

ESCAIDE REFERENCE NUMBER: 20131725

## Different regional vaccination policies and varicella-related hospitalizations in Italy in 2006-2011: cross sectional study utilizing national Hospital Discharge Database

Margherita Sbarbati <sup>(1)</sup>, Antonella Mattei <sup>(2)</sup>

(1) Local Health Unit of Rieti, Italy, (2) University of L'Aquila, Italy

### BACKGROUND:

Objectives of this study were to evaluate the frequency of varicella-related hospitalizations in Italy in 2006-2011, and to analyze hospitalizations rates (HR) by age and by the different vaccination policies.

### METHODS:

We performed a retrospective review of hospitalization data from Italian hospital discharge forms, provided by the Italian Ministry of Health (Ufficio VI Programmazione Sanitaria). We considered the following codes by ICD9-CM system: 0520, 0521, 0522, 0527, 0528, 0529 (primary or secondary diagnosis). Data were analyzed to obtain HR of varicella by age, and by different vaccination policies in three different Italian areas: area 1, with a vaccination mass policy (Veneto, Sicily, Puglia, Tuscany), area 2, with policy of vaccinating susceptible adolescents and at-risk population (Piedmont, Friuli Venezia Giulia, Liguria, Lazio, Campania, Basilicata, Calabria and Sardinia) and area 3 with policy of vaccination of only at-risk population (the remaining regions). The denominator for HR was calculated using resident population numbers according to the National Institute of Statistics (ISTAT).

### RESULTS:

10,483 hospitalizations for varicella were identified, 38.7% (4059) of which, with complications. The following national HR were recorded: 4.2/100,000 inhabitants in 2006, 3.1/100,000 in 2007, 3.3/100,000 in 2008 and 2.7/100,000 in 2009-2010-2011. Annual HR declined in all age groups from 0 to 34 years but remained stable in the older patients. The highest HR were in group of 1-4 years (42.2/100,000 in 2006 – 26.9/100,000 in 2011). In area 1 HR significantly declined from 6.2/100,000 in 2006 to 1.8/100,000 residents in 2011, while in the other areas they didn't change (test for trend,  $p < 0.001$ ).

### CONCLUSIONS:

This study confirms the positive impact of universal vaccination and the need to make uniform the vaccine policies in the whole country.

PRESENTED BY: Margherita Sbarbati

**Keywords:** Chickenpox, Hospitalization vaccine epidemiology  
ESCAIDE REFERENCE NUMBER: 20131638

## Invasive bacterial disease epidemiology – the current European picture

Robert Whittaker <sup>(1)</sup>, Assimoula Economopoulou <sup>(1)</sup>, Lucia Pastore Celentano <sup>(1)</sup>

(1) ECDC, Sweden

### BACKGROUND:

Invasive bacterial diseases (IBD) remain an important cause of preventable morbidity and mortality across Europe.

### METHODS:

The objective of this analysis was to describe the trends and the epidemiology of IBD in Europe in 2011. IBD include, invasive H. influenzae disease, invasive meningococcal disease (IMD) and invasive pneumococcal disease (IPD). Data were submitted to ECDC by EU/EEA Member States through The European Surveillance System.

### RESULTS:

The incidence of IBD across Europe has remained stable compared to previous years (invasive H. influenzae disease; 0.58 per 100,000, IMD; 0.77, IPD; 5.59) with higher notification rates in young children (<5 years) and the elderly ( $\geq 65$  years), and in Northern and Central European countries. For invasive H. influenzae disease, a decreasing trend in serotype b infections in young children since 2008 was observed. Rates were highest in cases aged <1 year with non-capsulated infection. There was an increasing trend in non-b/non-capsulated serotype infections in some older age groups. For IMD, 73.6% of cases were caused by serogroup B, with incidence rates highest in young children. Notification rates of serogroup C infection were highest in countries without routine MCC vaccination. There was an increasing trend in serogroup Y infections since 2008. For IPD, PCV13 serotypes 7F, 19A, 3 and 1 were the most common serotypes, although the non-vaccine serotype 6C is becoming more prominent. PCV13 serotypes caused >50% of cases.

### CONCLUSIONS:

It appears the epidemiology of IBD is changing across the continent, with non-vaccine serotypes/groups becoming more prominent, although vaccine serotypes/groups still remain an important cause of disease. Effective surveillance and vaccine policy, and vigilance with current vaccines must be maintained if we are to further reduce the burden of IBD across Europe.

PRESENTED BY: Robert Whittaker

**Keywords:** Surveillance, Epidemiology, Pneumococcal infections, Haemophilus infections, Meningococcal infections

ESCAIDE REFERENCE NUMBER: 20131509

## Outbreaks (2)

### Legionnaires disease in a Danish city, 2010-2012; is there an outbreak?

Charlotte Kjelsø <sup>(1)</sup>, Trine Vestergaard <sup>(2)</sup>, Søren Anker Uldum <sup>(1)</sup>, Anne Mazick <sup>(1)</sup>

(1) Statens Serum Institute, Denmark, (2) Region of Southern Denmark, Danish Health and Medicines Authority, Denmark

#### BACKGROUND:

Legionnaires disease (LD) is mandatorily notifiable in Denmark and outbreaks are rare. During 2012, eight cases of LD were notified in the city of Kolding, compared to an annual average of four cases in the previous three years. This led to a suspicion of an outbreak. We aimed to investigate if an actual outbreak occurred.

#### METHODS:

We extracted from the surveillance database the information on laboratory confirmed LD acquired in Denmark. We obtained population data from Statistics Denmark. To address the potential impact of laboratory practices on LD detection, we assessed tests used for LD diagnosis in diagnostic laboratories in 2000-2012. We compared isolates from patients and from water supply in Kolding in terms of serogroup and sequence type (ST).

#### RESULTS:

The annual incidence in Kolding was 1.9/100,000 in 2007-2009, and increased to 7.5/100,000 in 2010-2012. This was 5 fold higher compared to national 2010-2012 incidence of 1.6/100,000. Laboratories diagnosed LD using PCR and urinary antigen test and had not changed practices from 2000 to 2012. A unique strain, *L. pneumophila* serogroup 1 subgroup Bellingham ST931, and three different serogroup 3 STs, were found in respectively two and four of eight culture confirmed cases. These types were also all found in water supply specimens from Kolding.

#### CONCLUSIONS:

A nearly 5-fold increase in community acquired LD was found in Kolding. This high incidence could not be explained by changes in laboratory practices. In combination with findings of identical strains in both tap water and patients this suggests an outbreak of LD in Kolding city. Further investigations are needed to locate the source of infections, evaluate risk and identify and implement relevant preventive measures.

PRESENTED BY: Charlotte Kjelsø

**Keywords:** *Legionella pneumophila*, cluster analysis, molecular epidemiology, water microbiology

ESCAIDE REFERENCE NUMBER: 20131540

### An explosive outbreak of lower respiratory tract infection due to *Streptococcus pneumoniae* serotype-8 in a highly vaccinated residential care home population, England, summer 2012

Lucy H Thomas <sup>(1)</sup>, Roger Gajraj <sup>(1)</sup>, Mary PE Slack <sup>(1)</sup>, Carmen Sheppard <sup>(1)</sup>, Christian Drew <sup>(1)</sup>, Richard Pebody <sup>(1)</sup>

(1) Public Health England, United Kingdom

#### BACKGROUND:

Outbreaks of *Streptococcus pneumoniae* disease are very unusual. In August 2012, a residential home for the elderly reported an outbreak of lower respiratory tract infection (LRTI) affecting seven residents, which was subsequently found to be caused by *S. pneumoniae* serotype-8. We conducted an epidemiological investigation to characterize the outbreak and investigate potential risk factors.

#### METHODS:

We defined a probable case as LRTI in a care home resident with onset from 8th to 22nd August 2012. A confirmed case was a probable case with laboratory confirmed *S. pneumoniae* serotype-8 infection. We described the outbreak by time, place and person. In a retrospective cohort study we compared residents exposed to possible risk factors (age  $\geq 90$  years underlying comorbidities and PPV) with unexposed residents in a univariate analysis, calculating risk ratios (RR) and 95% confidence interval (95%CI). We compared the median time since PPV in cases and non-cases using the Wilcoxon rank sum test.

#### RESULTS:

We identified 15 cases, including 11 confirmed cases, among the 23 care home residents, with disease onset between 8th and 11th August (clinical attack rate 65%). Two confirmed cases died. We found no association between age  $\geq 90$  years, underlying comorbidities or history of PPV and risk of being a case. However, the median number of years since PPV was significantly higher for cases (10.2 yrs, range 7.3-17.9 yrs) than non-cases (7.2 yrs, range 6.8-12.8 yrs),  $p=0.045$ .

#### CONCLUSIONS:

A single dose of PPV more than seven years earlier failed to prevent disease in this outbreak. To prevent future outbreaks, we recommend investigating alternative strategies to the current UK schedule of a single dose of PPV at age  $\geq 65$  years.

PRESENTED BY: Lucy H Thomas

**Keywords:** Outbreak *S. pneumoniae* Pneumococcal polysaccharide vaccine

ESCAIDE REFERENCE NUMBER: 20131334

## Hepatitis A outbreak associated with frozen berries in Northern Italy, 2013

Lara Ricotta <sup>(1)</sup>, Maria del Carmen Montaño-Remacha <sup>(1)</sup> <sup>(2)</sup> <sup>(5)</sup>, Valeria Alfonsi <sup>(1)</sup>, Antonino Bella <sup>(1)</sup> <sup>(2)</sup>, Valter Carraro <sup>(3)</sup>, Silva Franchini <sup>(3)</sup>, Maria Elena Tosti <sup>(3)</sup>, Caterina Rizzo <sup>(3)</sup>, Hepatitis A Central Task Force: C Rizzo, V Alfonsi, R Bruni, L Busani, A Ciccaglione, D de Medici, S Di Pasquale, M Escher, M C Montaño-Remacha, G Scavia, M E Tosti<sup>(4)</sup>, MG Pompa, V Martini <sup>(6)</sup>, MN Losio, G Varisco, E Pavoni <sup>(7)</sup>, Istituto Zooprofilattico Sperimentale di Lombardia e Emilia Romagna, M Massaro, B Cappelletti, P Noè, A Menghi, S Guizzardi, G Plutino, D Monteleone, S Borrello <sup>(8)</sup>

(1) Istituto Superiore di Sanità (ISS), Rome, Italy, (2) National Centre for Epidemiology Surveillance and Health Promotion, Rome, Italy, (3) Department of Health Province of Trento, Italy, (4) University of Bologna, Alma Mater Studiorum, (5) European Programme for Intervention Epidemiology Training (EPIET), ECDC, Sweden, (6) Ministry of Health, DG for Prevention, V Office, (7) National Reference Centre for Emerging Risks in Food Safety, (8) Ministry of Health, DG for Hygiene, Food Safety and Nutrition), Italy

### BACKGROUND:

In May 2013, Germany, The Netherlands and Poland reported through the Epidemic Intelligence Information System for food and waterborne diseases (EPIS-FWD) and the Early Warning and Response System (EWRS) 15 cases of hepatitis A (HAV) associated with people travelling in the provinces of Trento and Bolzano (Northern Italy). The main objective of the study was to identify the vehicle of the HAV cases in the province of Trento.

### METHODS:

A matched case-control study was performed. A case was defined as a symptomatic person positive for HAV IgM with the onset of symptoms between 1st January–31st May 2013 and resident in Trento province with no other known HAV exposure. Each case was matched with 4 controls by age and residence, and contacted by telephone to interview and collect risk factors (food consumption histories, contact with a jaundice case, travel to an endemic area). The odds ratios (OR) were calculated using logistic regression.

### RESULTS:

A total of 31 cases of HAV were reported from Trento. The median age was 36 (ranging from 13 to 63) and 64.5% (20 out of 31) were males. Ninety-five controls were included. Frozen berries resulted the highest risk factor associated with the cases of HAV among all the determinants investigated (OR: 5.3; 95% confidence interval: 2.1–15.1).

### CONCLUSIONS:

Results from the case-control study showed that frozen berries were the most associated food with HAV cases. The hypothesis was strongly supported by the results of a parallel microbiological investigations conducted on food and human samples in Trento. Moreover, in Northern Italy, an unusual increase in hepatitis A cases was observed. For this reason the study will continue in the others regions involved.

PRESENTED BY: Lara Ricotta

**Keywords:** Disease outbreak, case-control study, foodborne disease, waterborne disease, hepatitis a

ESCAIDE REFERENCE NUMBER: 20131804

## Propagated Hepatitis A Outbreak in a Primary School – Malatya Province, Turkey, March 2013

Mehmet Umit Topcu <sup>(1)</sup>, Bao-Ping Zhu <sup>(2)</sup>, Fehminaz Temel <sup>(1)</sup>, M. Bahadır Sucakli <sup>(1)</sup>, M. Ali Torunoglu <sup>(1)</sup>

(1) Public Health Institution of Turkey, Turkey, (2) World Health Organisation, Turkey

### BACKGROUND:

On 1 March 2013, a primary school in Bahri village reported 8 students with nausea, vomiting, abdominal pain, and jaundice. We conducted an investigation to determine the cause and mode of transmission of the outbreak, and to recommend evidence-based control and prevention measures.

### METHODS:

We defined a probable case as onset during 03 January– 31 March, 2013 in a student of the school and in a resident of the villages where the students came from of dark urine, yellow eye-whites, or disgust of oil, plus ≥1 of the following symptoms: Malaise, fatigue, loss of appetite, diarrhea, nausea, vomiting, fever. For case-finding, we reviewed medical records at the school clinic and local hospitals. In a retrospective cohort study we interviewed all 249 students and assessed their hand-washing and other hygienic habits, and evaluated illness onset in relation to a composite hygienic score. We tested the serum samples of all probable case-students to confirm hepatitis A diagnosis.

### RESULTS:

We found 32 probable cases. The epidemic curve indicated a propagated outbreak with three generations of person-to-person transmission. The attack rates among students in the quartiles of the composite hygienic score (from best to worst) were 11.3%, 9.2%, 11.9% and 29.0%, respectively ( $\chi^2$  trends test(df=1)=4.217,  $p=0.04$ ). Environmental investigation revealed grossly unhygiene conditions in the school and in the village where the index case was identified. Of the 32 probable cases, 17 were IgM-anti-HAV positive.

### CONCLUSIONS:

This was a hepatitis A outbreak propagated by person-to-person transmission. We recommended that the school provide adequate hand-washing facilities with liquid soap in all toilet rooms, cafeteria, and classrooms, and conduct health education to the students, teachers and staff on the importance of proper hand-hygiene.

PRESENTED BY: Mehmet Umit Topcu

**Keywords:** Hepatitis A, outbreak, retrospective cohort study, hygiene

ESCAIDE REFERENCE NUMBER: 20131469

## Outbreak of suspected enteroaggregative *Escherichia coli* food poisoning associated with chutney consumption, United Kingdom, 2013

Thomas Inns <sup>(1) (2) (3)</sup>, Catherine Smith <sup>(4)</sup>, Chris Williams <sup>(1)</sup>

(1) Anglia and Essex Public Health England Centre, Public Health England, UK; Field Epidemiology Training Programme (FETP), (2) Public Health England, UK, (3) European Programme for Intervention Epidemiology Training (EPIET), ECDC, Sweden, (4) Eastern Field Epidemiology, Public Health England, UK, United Kingdom

### BACKGROUND:

On 11 June 2013, Public Health England (PHE) received reports of gastrointestinal illness from people who ate at restaurant X in Cambridge. An epidemiological investigation was undertaken to understand the cause of illness and prevent future occurrences.

### METHODS:

We conducted a retrospective cohort study among people who ate food from restaurant X between 31 May and 10 June 2013, identified through customer records. Cases were defined as persons who reported diarrhoea or abdominal pain onset between 12 hours and 7 days after eating food from the restaurant. Faecal specimens were tested for gastrointestinal pathogens by standard tests and using multiplex gastroenteritis PCR. Food samples were taken for microbiological tests.

### RESULTS:

Forty three cases were identified; 30 cases and 41 non-cases completed the questionnaire. Abdominal pain (93%) and nausea (47%) were the most common symptoms. Median incubation period was 2 days. Mean symptom duration was 8 days, 24 were still ill when questioned. In univariable analysis, chutney consumption (Risk Ratio=6.5, 95% Confidence Interval=1.7-24.4) was significantly associated with illness; 29/30 cases had consumed. All 15 faecal specimens were negative for usual gastrointestinal pathogens; one of three specimens sent for PCR identified enteroaggregative *Escherichia coli* (EAggEC). One of nine food samples indicated bacterial contamination.

### CONCLUSIONS:

This study provides strong epidemiological evidence that the outbreak was associated with consuming chutney, which contained uncooked ingredients that may have been contaminated. Microbiological evidence suggests EAggEC was the causative pathogen. We recommended that restaurant X properly wash items served uncooked. Uncooked chutneys should be considered as a potential cause of gastrointestinal illness outbreaks and PCR multiplex testing should be considered when standard tests cannot identify a pathogen.

PRESENTED BY: Thomas Inns

**Keywords:** *Escherichia coli*, Foodborne Diseases, Disease Outbreaks, Epidemiology

ESCAIDE REFERENCE NUMBER: 20131692

## A Staphylococcal food-borne outbreak following a wedding party, Rasht District, Tajikistan, July, 2011

Mirkhamudin Kamalov <sup>(1)</sup>

(1) Administration of State Sanitary Epidemiological Surveillance, Tajikistan

### BACKGROUND:

During July 16-17, 2011, 53 patients with gastroenteritis were reported to Rasht surveillance department in Tajikistan. Of those, 21 attended a wedding party in a local household, and 32 were their relatives who did not attend. We conducted a retrospective cohort study to identify the source of disease in order to prevent future outbreaks

### METHODS:

The study population was subjects who attended the party (n=44). Cases were defined as having  $\geq$  two episodes of diarrhea or vomiting during July 16-17 (n=21). Clinical data and information on food items eaten were collected through personal interviews. Samples of vomitus from case-patients and food leftovers were tested for microbial pathogens. The host household was inspected. Disease attack rates were calculated and compared among those who ate and did not eat specific food items

### RESULTS:

The epidemic curve indicated a point source outbreak with an incubation period of one to five hours following the party. The highest attack rates, 60% (20), were for samsa (fried dough and meat) and cake, both eaten by 95% (20) of the case-patients. In univariate analysis, cake and samsa were significantly associated with disease (Relative Risk=6.8, 95% CI 1.0-44.1 for both). High correlation between samsa and the cake precluded studying the independent effect of each food item on disease risk. Vomitus and cake leftover tested positive for *Staphylococcus aureus*. Poor sanitary conditions were observed in the household where food was prepared and served

### CONCLUSIONS:

This outbreak was caused by food (cake and samsa) contaminated with *Staphylococcus aureus*, possibly due to improper food handling and storage. All food items were home-made. Health education on proper food-handling practices was provided to the local community

PRESENTED BY: Mirkhamudin Kamalov

**Keywords:** Outbreak, staphylococcal, Rasht, Tajikistan

ESCAIDE REFERENCE NUMBER: 20131482

## Large outbreak of *Shigella sonnei* infection associated with consumption of contaminated tap-water – Terme District, Samsun Province, Turkey, September 2012

Selmur Topal<sup>(1)</sup>, Huseyin Celik<sup>(1)</sup>, Senol Yilmaz<sup>(1)</sup>, Erdinc Ozoglu<sup>(2)</sup>, Okan Karaoglanoglu<sup>(2)</sup>, Bao-Ping Zhu<sup>(3)</sup>, Fehminaz Temel<sup>(1)</sup>, Levent Akin<sup>(4)</sup>, M.Bahadir Sucakli<sup>(1)</sup>, Mehmet Ali Torunoglu<sup>(1)</sup>

(1) Public Health Institution of Turkey, Turkey, (2) Provincial Health Directorate of Samsun, Turkey, (3) World Health Organisation, Turkey, (4) Hacettepe University Faculty of Medicine, Turkey

### BACKGROUND:

On 25 September 2012, enteric disease surveillance detected a gastroenteritis outbreak affecting thousands of residents in Terme District, Samsun Province, Turkey. We investigated the outbreak to determine its scope, source, and mode of transmission, and to recommend control measures.

### METHODS:

A suspected case was diagnosis with a gastroenteritis-related ICD10 code (A09, R11, or K52) in a Samsun City resident during 24-27 September; a probable case was a suspected case with onset of diarrhea ( $\geq 3$ /day) or vomiting plus  $\geq 2$  of the following symptoms: abdominal pain, nausea, perceived fever. We reviewed medical records for case-finding. In a case-control study, we compared exposures during 15-24 September of randomly selected probable case-patients and 1:1 matched neighborhood controls. We collected water samples for laboratory testing and inspected the water distribution system for potential risk of contamination.

### RESULTS:

We found 4050 suspected cases (attack rate: 9.2%). Of 119 probable case-patients, 65% had drunk unboiled tap-water during 15-24 September, compared with 50% of 119 control-persons (OR<sub>matched</sub>=1.9; 95% CI: 1.1-3.5), whereas 39% of case-patients and 54% of control-persons had drunk bottled water (OR<sub>matched</sub>=0.51, 95% CI: 0.29-0.90). Of 33 stool specimens collected, 27 were positive for *Shigella sonnei*; of 40 samples collected at various points in the water distribution system, total coliform was found in 18 samples (range: 47-500); *E. coli* was found in 4 samples (range: 5-20); peripheral water samples had unsatisfactory chlorine levels. Environmental investigation revealed that the pipeline was cracked near the water source prior to the outbreak.

### CONCLUSIONS:

This was a large outbreak of *S. sonnei* infection caused by contamination of tap-water. We recommended that the water treatment system be thoroughly inspected and repaired, and chlorine levels be regularly monitored.

PRESENTED BY: Selmur Topal

**Keywords:** *Shigella sonnei*, Outbreaks, Drinking Water, Case-Control Studies

ESCAIDE REFERENCE NUMBER: 20131355

## Sexually transmitted infection

### Reduction in attendance at sexual health clinics observed during London 2012 Olympics and Paralympics

Victoria Hall<sup>(1)</sup>, Andre Charlett<sup>(2)</sup>, Gwenda Hughes<sup>(2)</sup>, Gary Brook<sup>(3)</sup>, Cath Mercer<sup>(4)</sup>, Jackie Cassel<sup>(5)</sup>, Helen Maguire<sup>(6)</sup>, Katherine Coyne<sup>(7)</sup>, Paul Crook<sup>(6)</sup>

(1) UK Field Epidemiology Programme (EPIET associated), Public Health England, United Kingdom, (2) Public Health England, United Kingdom, (3) Central Middlesex Hospital, London, United Kingdom, (4) University College London, United Kingdom, (5) Brighton and Sussex Medical School, United Kingdom, (6) Field Epidemiology Services Public Health England, United Kingdom, (7) Homerton University Hospital, London, United Kingdom

### BACKGROUND:

Predicting the impact on services is essential for managing mass-gathering events. Previous small-scale studies suggest attendance at sexual-health clinics can change during mass-gathering events, but this has not been systematically assessed. We tested whether attendance at sexual-health clinics located where events were held (London and Weymouth) was affected by the 2012 Olympics and Paralympics.

### METHODS:

We used interrupted time-series analysis using a linear regression model of the number of weekly first episode attendances at London (n=34) and Weymouth (n=1) Genitourinary-Medicine (GUM) Clinics between 2009 and 2012. We included the following variables: quadratic time trend, categorical-month, bank-holiday, clinic-closures. We tested for the effect of the Olympics during the overall Olympic-period (9 wks, 16/07/2012 – 17/09/2012) and specific periods (3wks Olympics, 2wks Paralympics, one week either side of the Games).

### RESULTS:

Our model estimated that significantly fewer weekly attendances occurred during the Olympic-period than expected (-480; 95% CI -845 to -115). This totalled to 4323 fewer attendances over the 9 weeks, 4.3% less than expected. Further analysis with the specific Olympic variable suggests that this reduction occurred in the three weeks of the Olympic Games, with significantly fewer weekly attendances (n=-725, 95% CI -1307 to -143); a reduction of 6.5%, whereas no significant difference was observed in the Paralympic weeks or the weeks immediately before or after the Games.

### CONCLUSIONS:

The 2012 Olympics and Paralympics did not result in a surge in attendance at London and Weymouth GUM clinics. Instead we observed a modest but significant decrease in attendance over the Olympic-period, with the decrease occurring during the three weeks of the Olympic Games. These findings will assist those planning sexual health services in future mass-gatherings.

PRESENTED BY: Victoria Hall

**Keywords:** Mass-gatherings, Sexual health, time-series analysis, health service research

ESCAIDE REFERENCE NUMBER: 20131495

## Low prevalence of genital infections with chlamydia trachomatis, gonorrhoea and trichomonas in clients of public HIV counselling institutions in North Rhine-Westphalia, Germany: Preliminary results of the STI-HIT study

Viviane Bremer<sup>(1)</sup>, Klaus Jansen<sup>(1)</sup>, Gyde Steffen<sup>(1)</sup>, Sarma Navina<sup>(1)</sup>, Stine Nielsen<sup>(1)</sup>, Andreas Lucht<sup>(2)</sup>, Dieter Münstermann<sup>(2)</sup>, Carsten Tiemann<sup>(2)</sup>

(1) Robert Koch-Institute, Germany, (2) Labor Krone, Bad Salzuffen, Germany

### BACKGROUND:

Local public health authorities (LPHA) in Germany offer anonymous HIV tests. Clients asking for an HIV test may be at risk for sexually transmitted infections (STI) such as Chlamydia (CT), gonococci (NG) or trichomonas (TV). We measured CT, NG and TV prevalence in LPHA clients to evaluate whether these tests should be routinely offered to clients.

### METHODS:

LPHA in North Rhine-Westphalia screened clients for CT, NG and TV with self-collected vaginal swabs and urine samples, using Transcription-mediated amplification (APTIMA Combo 2®; APTIMA® Trichomonas vaginalis-Assay). We collected information on sociodemographics, sexual behaviour, HIV testing history and clinical symptoms. We calculated Prevalence Ratios (PR) and 95% confidence intervals (CI95%).

### RESULTS:

Data collection started 16.11.2012. As of 28.06.2013, 1226 men, 1008 women and 5 transgender were enrolled. Median age was 30 years; 73.9% were born in Germany. Participants reported a median of 2 sexual partners within last six months. Overall 51.6% never had a prior HIV test. Main reasons for HIV test were sexual contact to person with unknown HIV status (48.8%), new partner (26.6%), and sex work (8.4%). Ninety (4.0%) participants tested positive for CT, 11 (0.5%) for NG, and 12 (0.5%) for TV; 6/11 NG and 10/12 TV infections were in sex workers. Prevalence for any STI was highest in women (PR=2.0; CI95% 1.4-2.9), 20-29 year-olds compared to participants aged 40 or more (PR=4.3; CI95% 2.1-8.9), foreign-born participants (PR=1.9; CI95% 1.3-2.8), sex workers (PR=3.0; CI95% 2.0-4.5) and participants with symptoms (PR=1.8; CI95% 1.2-2.7).

### CONCLUSIONS:

LPHA clients appear not to be at high risk for NG or TV. Routine CT testing should be offered to LPHA clients, independent of symptoms. Sex workers should also be screened for NG and TV.

PRESENTED BY: Viviane Bremer

**Keywords:** STI, HIV test, sex workers, self-collected swabs, chlamydia trachomatis, gonorrhoea

ESCAIDE REFERENCE NUMBER: 20131611

## Comparison of the prevalence of Chlamydia trachomatis infection in pregnant women and other population groups in Georgia, 2011

Ketevan Galdavadze<sup>(1)</sup>, Nana Mebonia<sup>(1)</sup>, Naile Malakmadze<sup>(2)</sup>, George Galdava<sup>(3)</sup>

(1) National Center for Disease Control and Public Health of Georgia, (2) Northrop Grumman Corp., Atlanta, USA, United States, (3) STI Scientific Research Institute, Georgia

### BACKGROUND:

The prevalence of Chlamydia trachomatis (CT) infection is 6.8% among sexually active females aged 14-19 years in USA. Our goal was to estimate CT prevalence in pregnant women and other population groups in Georgia.

### METHODS:

Laboratory based survey was conducted among population groups selected from 3 different sites in Tbilisi (capitol): 1) male and female patients with clinical symptoms of sexually transmitted infections (STI; vaginal or urethral discharge, lower abdominal pain, and discomfort during urination) visiting the STI Scientific Research Institute, 2) pregnant women visiting prenatal clinic, and 3) asymptomatic male and female students from the State Medical University. The study duration: July, 2011-March, 2012. Study participants were selected sequentially to reach a quota. Urine samples were collected from all participants and tested for CT by Polymerase Chain Reaction (PCR). Consent from parents was obtained from participants younger than 18.

### RESULTS:

A total of 618 participants were tested for CT with an age range of 14-65. The overall prevalence of CT was 4.2% (95% CI=2.8%-6.2%) and varied in the study groups from 1.3% (95% CI= 0.2%-4.7%) in students (n=152), to 5.0% (95% CI= 2.8%-8.1%) in pregnant women (n=300) and 5.5% (95% CI= 2.5%-10.1%) in patients with clinical symptoms (n=166). All CT positive persons were aged 14 to 44 years regardless of study groups. Among the group with STI symptoms, only males had CT infection detected. Among students, only females had CT infection detected.

### CONCLUSIONS:

Prevalence of CT was higher among pregnant women compared to student group but similar to patients with clinical symptoms. We recommend screening for CT infection of women as part of family planning and during pregnancy.

PRESENTED BY: Ketevan Galdavadze

**Keywords:** Chlamydia trachomatis, prevalence, Sexually Transmitted Infection (STI), Polymerase Chain Reaction (PCR).

ESCAIDE REFERENCE NUMBER: 20131653

## Gonorrhoea in Ireland: Men who have sex with men (MSM) and young heterosexuals are most affected

Margaret Fitzgerald <sup>(1)</sup>, Derval Igoe <sup>(2)</sup>, Fiona Lyons <sup>(3)</sup>, Grainne Courtney <sup>(3)</sup>, Susan Clarke <sup>(4)</sup>, Mick Quinlan <sup>(4)</sup>, Sarah Doyle <sup>(5)</sup>, Mary O'Riordan <sup>(2)</sup>, Niamh Murphy <sup>(6)</sup>, Rachel Howard <sup>(7)</sup>, Jack Lambert <sup>(7)</sup>, Fiona Mulcahy <sup>(3)</sup>, Sara Woods <sup>(8)</sup>, Margaret M Fitzgerald <sup>(9)</sup>, Fionnuala Cooney <sup>(9)</sup>

(1) ECDC EPIET Programme, Health Protection Surveillance Centre, Ireland, (2) Health Protection Surveillance Centre, Dublin, Ireland, (3) GUIDE, St. James's Hospital, Dublin, Ireland, (4) Gay Men's Health Service, Dublin, Ireland, (5) Health Service Executive: South-East, Kilkenny, Ireland, (6) Student Health Services, Trinity College, Dublin, Ireland, (7) Mater Hospital, Dublin, Ireland, (8) National Virus Reference Laboratory, University College Dublin, Ireland, (9) Health Service Executive: East, Dublin, Ireland

### BACKGROUND:

In 2012, gonorrhoea notifications increased by 33% in Ireland. This trend continued into 2013, particularly in the East and South-East. A Gonorrhoea Outbreak Control Team was established to investigate the increase. The objective of this study was to determine the characteristics of the cases to guide control efforts.

### METHODS:

We retrospectively collected additional (enhanced) information from STI clinics and clinicians on laboratory-confirmed gonorrhoea cases notified in the East and South-East regions between January-March 2013. This included data on sexual orientation, contacts, country of birth, clinical presentation, and laboratory results. We calculated odds ratios (OR) and 95% confidence intervals (CI) to examine associations among cases.

### RESULTS:

We obtained data on 223 (96%) notifications. Men who have sex with men (MSM) accounted for 56% of cases. Median age was 29 years (range: 19-56) for MSM and 23 years (range: 15-55) for heterosexuals ( $p < 0.001$ ). Compared with heterosexuals, MSM cases were more likely to be born outside Ireland (OR=6.7, 95%CI 2.9-15.0), diagnosed by screening (OR=6.4, 95%CI: 2.9-15.0), HIV positive (13% vs 0%,  $P=0.001$ ), had an STI in the last 12 months (OR=3.4, 95%CI: 1.1-14.3) but were less likely to have attended primary care (OR=0.17, 95%CI: 0.08-0.35), be symptomatic (OR=0.24, 95%CI: 0.13-0.44) or have urogenital infection (OR=0.05, 95%CI 0.02-0.12). Heterosexual-female cases were more likely than heterosexual-males to be <25 years (OR=4.7; 95%CI: 1.6-14.6) and have one sexual partner in the previous three months (OR=4.3, 95%CI: 1.5-12.9).

### CONCLUSIONS:

MSM and young heterosexuals accounted for most of the gonorrhoea cases. Our findings are being used in ongoing MSM sexual health campaigns and in a new campaign for young heterosexuals and will be used to inform an e-learning STI module for GPs regarding gonorrhoea diagnosis and treatment.

PRESENTED BY: Margaret Fitzgerald

**Keywords:** Gonorrhoea, sexually transmitted infections, MSM, heterosexuals, public health

ESCAIDE REFERENCE NUMBER: 20131702

## Increases in syphilis in Europe: who should we be targeting for prevention?

Gianfranco Spiteri <sup>(1)</sup>, Marita van de Laar <sup>(1)</sup>

(1) ECDC, Sweden

### BACKGROUND:

European surveillance data suggest that syphilis trends are stable overall. Trends, however, vary greatly within the European Union. Surveillance data were analysed to identify which countries are reporting increasing trends and most important risk groups involved.

### METHODS:

Surveillance data collected annually at European level were analysed to identify countries reporting increases of syphilis notifications between 2008 and 2011. Differences in rates of reporting in 2008 and 2011 were analysed by age-group, gender and mode of transmission for those countries reporting increasing rates.

### RESULTS:

Out of the 23 countries reporting data from comprehensive surveillance, 14 reported increasing syphilis notification rates between 2008 and 2011. These countries accounted for 50% of reported cases in 2011; among them, the overall rate increased from 3.1 to 3.9 per 100 000. Among countries reporting increasing rates, age-specific rates increased by 44% among those below 25 years of age and by 25% among those aged 25 years or over. While rates were highest among 35-44 year-olds in 2008 (7.2 per 100 000), in 2011, the highest rates were observed among 25-34 year-olds (9.0 per 100 000). Rates increased similarly among both genders (males: 22%; females: 24%), but remained highest among males (males: 8.2 per 100 000; females: 1.2 per 100 000). The proportion among all cases of men who have sex with men (MSM) remained stable (57-58%), but sexual orientation was reported only for 19% of cases.

### CONCLUSIONS:

Although transmission among MSM does not appear to have increased among these 14 countries with increasing rates, high rates among males and high levels of MSM transmission suggest that prevention efforts should focus on MSM. Young adults also need to be increasingly targeted for syphilis prevention.

PRESENTED BY: Gianfranco Spiteri

**Keywords:** Syphilis Europe MSM STI

ESCAIDE REFERENCE NUMBER: 20131754



## External Quality Assessment (EQA) for Syphilis Serology in the Czech Republic, 2013

Nina Stock <sup>(1)</sup>, Barbora Macková <sup>(1)</sup>, Pavla Krizova <sup>(1)</sup>, Hana Zákoucká <sup>(1)</sup>

(1) National Institute of Public Health, Czech Republic

### BACKGROUND:

The Czech Republic is one of the EU countries with the highest reported increase of syphilis cases between 2006 and 2010. Syphilis is a sexually transmitted disease caused by *Treponema pallidum* and the diagnosis is mainly based on treponemal and non-treponemal serological tests. In order to assure the diagnostic quality as basis for enhanced surveillance and the control of the disease, a national EQA for serological syphilis diagnostic was performed.

### METHODS:

Overall 174 laboratories, including 52 blood banks and 122 microbiological laboratories, were assessed in a double-blinded EQA. The test panel consisted of one negative and four positive serum samples for treponemal and non-treponemal antibodies. Microbiological laboratories were evaluated for the correct detection of both types of antibodies, including quantification of non-treponemal antibodies, blood banks only for the qualitative detection of treponemal antibodies. The analysis included the evaluation of test results in relation to the different test systems in use.

### RESULTS:

Of the tested laboratories, 82% produced results in concordance with expected results for all serum samples. For the detection of non-treponemal antibodies RPR (rapid-plasma-reagin) (97%) and VDRL (venereal-disease-research-laboratory) tests (3%) were used, showing overall 84% concurrent results for quantitative and 90% for qualitative analysis. The detection of treponemal antibodies was performed by TPHA/TPPA (treponema-pallidum-hemagglutination/particle-agglutination-assay) tests (39%), ELISA (27%), chemiluminescence tests (27%) or FTA-Abs (fluorescent-treponemal-antibody-absorption) and Western Blot tests (6%). Discordances in treponemal specific tests were rare (4%) and only observed in TPHA/TPPA and ELISA systems.

### CONCLUSIONS:

Based on EQA results, the diagnostic of syphilis in participating laboratories is generally reliable in the Czech Republic. 95% of laboratories succeeded in this EQA. Laboratories with insufficient results should repeat the tests and ask for training to improve their practice.

PRESENTED BY: Nina Stock

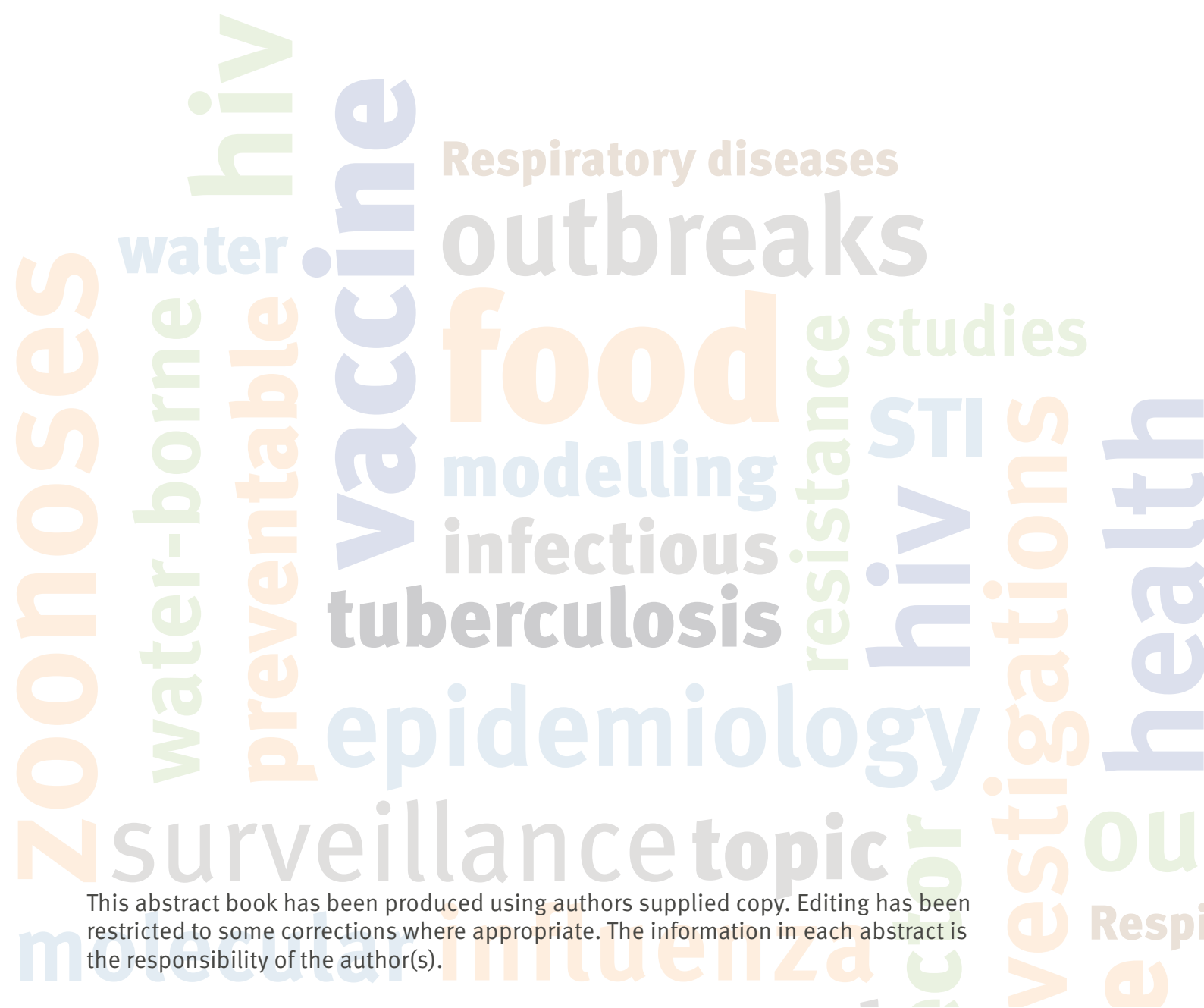
**Keywords:** EQA Czech Republic Syphilis *Treponema pallidum* Serology

ESCAIDE REFERENCE NUMBER: 20131830



## Plenary Session C: Late Breaker Abstracts

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# Plenary Session C – Late Breaker Abstracts

Plenary Session C 09.00 – 10.15 Wed 6

Plenary Session C – Late Breaker Abstracts

## An outbreak of *Cryptosporidium hominis* following river flooding in the city of Halle

Maximilian Gertler <sup>(1) (2) (3)</sup>, Hendrik Wilking <sup>(1)</sup>, Matthias Duerr <sup>(4)</sup>, Dirk Werber <sup>(1)</sup>, Irmgard Feuerpfeil <sup>(5)</sup>, Sven Poppert <sup>(6)</sup>, Mona Askar <sup>(1)</sup>, Christina Frank <sup>(1)</sup>, Christine Groeger <sup>(4)</sup>, Peter Renner <sup>(5)</sup>, Egbert Tannich <sup>(6)</sup>, Klaus Stark <sup>(1)</sup>

(1) Robert Koch-Institut, Department for infectious Disease Epidemiology, (2) Postgraduate Programme for applied Epidemiology, (3) European Program for intervention Epidemiology Training, Germany, (4) Gesundheitsamt Halle, Germany, (5) Umweltbundesamt, Bad Elster, Germany, (6) Bernhard Nocht Institute, Germany

### BACKGROUND:

During weeks 32-33, 24 cases of cryptosporidiosis were notified in Halle (total annual average 2008-12: 9 cases). We investigated the outbreak's source, taking into consideration that between weeks 23-25 the river Saale overflowed the floodplain, affecting sewage systems.

### METHODS:

We defined a case as a resident of Halle with gastroenteritis and cryptosporidia-positive stool with disease onset since week 29. We compared cases and controls among kindergarten children regarding activities in previously flooded area, swimming pools, lakes, zoo and tap water consumption 14 days pre-onset or a corresponding 14-days-period (controls) and adjusted for residence. Human specimens were tested by PCR and isolates sequenced. Samples from the public water system, swimming pools, lakes and the river Saale were examined for cryptosporidia oocysts.

### RESULTS:

First cases occurred during week 29, peaked in week 34 and started to decrease in week 36 (total until week 38: 136 cases; median age 8 years). Compared to controls (n=61), cases (n=20) were more likely to report visits to previously flooded areas (odds ratio 4.9; 95%CI 1.4-18) and the zoo (OR 2.6; 95%CI 0.9-7.6). In multivariable analysis visits to the floodplain remained the sole risk factor (OR 5.5; 95%CI 1.4-22). Only *C. hominis* was detected in human specimens. Cryptosporidia oocysts were detected in samples from the Saale, two lakes and three public swimming pools, but not in the public water supply.

### CONCLUSIONS:

Epidemiological and environmental results suggest that activities in the dried out floodplain led to infection among children. Consequently, in week 37 authorities recommended to avoid playing and picnics in the flood-affected area. While the exact mode of transmission in the floodplain remained unclear, health authorities should consider this risk and take preventive measures.

PRESENTED BY: Maximilian Gertler

**Keywords:** *Cryptosporidium* water, borne disease outbreak gastrointestinal disease case, control study

ESCAIDE REFERENCE NUMBER: 20131880

## Measles outbreak vaccination campaign 2013: a unique intervention in The Netherlands

Irmgard Zonnenberg-Hoff <sup>(1)</sup>, Alies Van Lier <sup>(1)</sup>, Susan Hahne <sup>(1)</sup>

(1) RIVM, The Netherlands

### BACKGROUND:

Since May 2013, an outbreak of measles is ongoing with currently over 1500 cases reported. The outbreak management team defined infants between 6 and 14 months of age living in municipalities with MMR vaccination coverage below 90% as the main risk group for developing measles complications. An early MMR vaccination was offered to this group.

### METHODS:

Praeventis, the Dutch electronic register for the National Immunisation Programme (NIP) is linked with the population register. All children are included in Praeventis, regardless of participation in the NIP. 4970 unvaccinated children aged 6-14 months were selected based on their municipality of residence. Their parents were sent an invitation letter for MMR vaccination. Additionally, the possibility for early vaccination was also announced through advertisements in a national newspaper with high readership among the orthodox reformed community.

### RESULTS:

64% (3194/4970) of all invited children have received the MMR vaccine as part of the campaign, 28% before and 36% after receiving the early invitation letter. 22 of these children had not received any of the routinely scheduled vaccinations before.

### CONCLUSIONS:

The current vaccination campaign is unique in that it is implemented using the national vaccination register, which allows a personal invitation to be sent to parents of children in the target population to have their child vaccinated. The uptake of the vaccination among the vaccine accepting population is therefore likely to be much higher than when there was only a recommendation for vaccination.

PRESENTED BY: Irmgard Zonnenberg-Hoff

**Keywords:** Measles, outbreak, vaccination, National Immunisation Programme (NIP)

ESCAIDE REFERENCE NUMBER: 20131863

## Hepatitis A genotype IA outbreak associated with products containing frozen berries, Ireland 2013

Margaret Fitzgerald Justyna Rogalska <sup>(1)</sup>, Patricia Garvey <sup>(2)</sup>, Darina O'Flanagan <sup>(2)</sup>, Lelia Thornton, on behalf of the Outbreak Control Team, Ireland

(1) ECDC EPIET Programme, Health Protection Surveillance Centre, Ireland,  
(2) Health Protection Surveillance Centre, Ireland

### BACKGROUND:

In May 2013, a European alert was issued regarding a hepatitis A virus (HAV) outbreak in Italy. On 18/06/2013, three Irish HAV genotype IA cases were identified as having an identical sequence to the Italian outbreak strain (IOS); none had travelled to Italy. We investigated the outbreak to identify the vehicle of infection and recommend control measures.

### METHODS:

We defined a case as a person with laboratory confirmed HAV IA and identical sequence to IOS and a date of symptom onset on or after 01/01/2013. We identified cases using the notification system and actively searched for new cases by contacting laboratories and clinicians. We compared each case to at least three randomly-selected (using random digit dialling) controls of the same age, sex and municipality to identify risk factors. We calculated matched odds ratios (mOR) and 95% confidence intervals (CI) for different food exposures. We collected food samples for HAV testing and conducted trace-back investigations.

### RESULTS:

We identified 16 cases (including 1 secondary) with symptom onset between 05/04/2013-09/08/2013 (median age 34 years, range 25-58; 56% female; in 5 of 8 regions). We recruited 12 primary cases and 45 controls. Cases were more likely than controls to have eaten fresh berries (mOR=3.4, 95%CI 0.3-38), frozen berries (mOR 9.5, 95%CI 1.0-89) and berry-cheesecake (mOR=15.5, 95%CI=1.8-135). Combining products containing frozen berries i.e. smoothies, juices, cheesecakes, ice-creams, yoghurts and sauces (mOR=11, 95%CI 1.4-89) accounted for 92% of the cases. Fifteen food samples tested were negative for HAV.

### CONCLUSIONS:

Products containing frozen berries were associated with the outbreak. Trace-back investigations are looking for overlaps with the Italian supply chain. Frozen berries should be heat-treated prior to consumption or use in uncooked products.

PRESENTED BY: Margaret Fitzgerald

**Keywords:** Hepatitis A, infectious disease outbreaks, foodborne disease, case-control study, risk factors

ESCAIDE REFERENCE NUMBER: 20131868

## Hepatitis A outbreak in Italy, 2013: disentangling the role of risk factors associated with the disease

Lara Ricotta <sup>(1) (2)</sup>, Carmen Montano <sup>(2) (3)</sup>, Valeria Alfonsi <sup>(2)</sup>, Maria Elena Tosti <sup>(2)</sup>, Antonino Bella <sup>(2)</sup>, Anna Rita Ciccaglione <sup>(2)</sup>, Roberto Bruni <sup>(2)</sup>, Nadia Losio <sup>(4)</sup>, Valter Carraro <sup>(5)</sup>, Silva Franchini <sup>(5)</sup>, Bernhard Natter <sup>(5)</sup>, Martha Augschiller <sup>(5)</sup>, Adelheid Foppa <sup>(5)</sup>, Alba Carola Finarelli <sup>(6)</sup>, Bianca Maria Borrini <sup>(6)</sup>, Tolinda Gallo <sup>(7)</sup>, Rosa Prato <sup>(8)</sup>, Maria Chironna <sup>(8)</sup>, Vanessa Cozza <sup>(8)</sup>, Caterina Rizzo <sup>(2)</sup>

(1) University of Bologna, Alma Mater Studiorum, (2) Istituto Superiore di Sanità (ISS), Rome, Italy, (3) Epiet training- ECDC, (4) Institute Experimental Zooprophyllactic of Lombardy and Emilia Romagna, Italy, (5) Department of Health Province of Trento, Italy, (6) Public Health Service – Directorate General for Health and Social Policy – Emilia-Romagna Region, Italy, (7) Prevention Department ASS4 Medio Friuli, Udine, Italy, (8) Regional Epidemiological Observatory of Apulia, Italy

### BACKGROUND:

In January-May 2013, the Italian sentinel surveillance (SEIEVA) reported a 70% increase in hepatitis A compared to the same 2010-2012 period. In May 2013, Germany, Poland and The Netherlands reported hepatitis A cases among travellers returning from Northern Italy. We investigated to identify a common exposure.

### METHODS:

We defined a case as a patient with onset between January 1st-May 31st 2013 and an IgM anti HAV positive test among Trento, Bolzano, Emilia-Romagna, Friuli-Venezia-Giulia and Apulia residents. We compared each case with four age- and neighbourhood-matched controls to explore potential risk factors. We calculated adjusted odds ratios (AOR) using conditional logistic regression and attributable fraction in the population (PAF).

### RESULTS:

The five regions reported to SEIEVA 119 cases (mean age 37.0, 44% female) in the period considered, mainly from Emilia-Romagna (57%) and Trento (26%). The number of cases increased progressively until a peak at the 20th week. Compared with the 419 controls, cases were more likely to eat berries (AOR 4.2; 95% confidence interval [CI], 2.5-7.0; PAF 26%), eat raw seafood (AOR, 3.8; 95% CI, 2.2-6.8; PAF 26%) and travel (AOR, 2.0; 95% CI, 1.2-3.4). Laboratories amplified sub-genotype 1A and genotype KF182323 from 32 cases and berries, identical to the Dutch, German and Polish cases.

### CONCLUSIONS:

Clear and effective information exchange between countries allowed early alert and prompted investigations. Epidemiological and laboratory evidence suggested that berries were the source of this outbreak, leading to tracing back and forward. In addition, raw seafood led to a number of cases, as reporting regularly in Italy.

PRESENTED BY: Lara Ricotta

**Keywords:** Disease outbreak, case-control study, food-borne disease, waterborne disease, hepatitis a

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# Plenary Session C – Late Breaker Abstracts

## Intensified Environmental Surveillance Supporting the Response to Wild-Type Poliovirus type 1 Silent Circulation in Israel, 2013

Jacob Moran Gilad <sup>(1)</sup>, Musa Hindiyeh <sup>(1)</sup>, Yossef Manor <sup>(1)</sup>, Lester Shulman <sup>(2)</sup>, Ehud Kaliner <sup>(2)</sup>, Itamar Grotto <sup>(1)</sup>, Danit Sofer <sup>(1)</sup>, Ella Mendelson <sup>(1)</sup>

(1) MOH, Israel, (2) Ministry of Health, Israel

### BACKGROUND:

In February 2013, wild poliovirus type 1 (WPV1) was reintroduced into Israel and resulted in silent circulation in the immune population (95% IPV coverage) without poliomyelitis. WPV1 circulation has been detected through monitoring of sewage for WPV.

### METHODS:

As a part of the public health response to this incident, the environmental surveillance programme has been enhanced and novel qRT-PCR assay specific for the outbreak strain (Isr-SOAS) was developed to allow sensitive and specific detection and manage increased testing demands. Specific primers and probes derived from the VP-1 region of sequenced sewage isolates were designed and multiplexed with bacteriophage MS-2 as internal control. High titer PV-1(Isr-SOAS) stock virus was used for assay optimisation. The programme has been intensified to include 24 and later 48 different sites nationwide. Fifty processed sewage samples collected from Southern Israel and tested by reference culture methods were used for analytical validation.

### RESULTS:

The limit of detection of the multiplex qRT-PCR (Isr-SOAS/MS-2) assay was 1 pfu/reaction (20 pfu/mL) for Isr-SOAS with 100% sensitivity, specificity, positive and negative predictive values when compared to the culture based method. The turn-around time was rapid, providing results for environmental samples within 24-48 hours from completion of sewage processing, instead of 5-7 days by culture-based analysis. Environmental testing of 176 samples has revealed ongoing transmission and spread from the epicentre in Southern Israel to Central Israel

### CONCLUSIONS:

Direct testing by qRT-PCR assay proved useful for rapid detection and environmental surveillance of WPV during emergency response. The results of monitoring provided evidence in support of supplemental OPV campaign. Application of this approach for detection of WPV in stool AFP surveillance or field surveys should be further evaluated.

PRESENTED BY: Jacob Moran Gilad

**Keywords:** Polio silent surveillance vaccine PCR

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