

**E**uropean  
**S**cientific  
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**I**nfectious  
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# Abstract Book

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**Plenary  
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Reference: Plenary Session A

**Migration and communicable diseases in Europe**

**Migration and HIV**

*Francoise Hamers*

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**ABSTRACT**

Globally, the HIV epidemic is closely linked to poverty and disease inequity. Its prevalence varies widely – by a factor of 100 or more from one country to another. Migrants from high HIV burden countries will logically bring their prevalence levels to the host country where to migrate.

The epidemic in the EU is increasingly influenced by the global epidemic and migrants account for a growing proportion of new HIV diagnoses so that in 2006, over 20% of all new HIV diagnoses reported in the EU 27 were among people originating from sub-Saharan Africa. In addition, migration often places these same people at heightened vulnerability to HIV and its complications. Migrants tend to be diagnosed at a late stage of their HIV infection. Country-specific findings will be presented, gaps in knowledge highlighted, and implications for public health policies discussed.

## Reference: Plenary Session A

**Migration and communicable diseases in Europe****Measles outbreaks in minority groups in Europe***Mark Muscat*

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## ABSTRACT

Measles outbreaks continue to occur in many European countries. Most measles cases are reported amongst unvaccinated individuals in the general population. However, several outbreaks in recent years have been described primarily affecting distinct minority groups such as Roma and Sinti communities in Italy, Roma and immigrant families in Greece, Travellers' communities in the United Kingdom and Norway, orthodox Jewish communities in Belgium and the United Kingdom, and anthroposophic communities in Austria, Germany and the Netherlands.

The susceptibility to measles outbreaks stems from poor measles vaccination coverage due to a variety of reasons prevailing in the different groups including lack of awareness on the importance of vaccination, religious and philosophical beliefs, lifestyle, mobility and access to health-care facilities. Furthermore, increased measles transmission is facilitated by the social factors that bring individuals of these groups to interact closely with each other, both in their resident countries and across borders. This is particularly notable with some groups that also tend to consist of large families and have large social gatherings.

It is important to recognise the need for vaccinating high-risk groups due to the potential of outbreaks to occur within the group and to transmit the disease to population at large. To realize the measles elimination goal, a high degree of awareness and commitment by decision makers and public health authorities in all European countries are essential to strengthen vaccination programmes. These programmes should target better particular groups at-risk to achieve and sustain the WHO-recommended minimum of 95% coverage with two measles-containing vaccine doses. Future research should identify barriers for measles vaccine uptake and explore ways of better targeting vulnerable groups that may be hard-to-reach by standard programmes.

## Reference: Plenary Session B

**Special needs in communication. How to reach the hard-to-reach?****How to reach the hard-to-reach?  
Communication challenges and considerations.***Robb Butler*

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**ABSTRACT**

The presentation begins by considering the access to information or dialogue that hard-to-reach populations have. A framework is presented for forming communication and media profiles of these groups – and suggests how communication exposure profiles assist us in translating informational and service support 'needs' into meaningful messages. The framework poses the questions one should be asking (but often does not) to determine most optimal source and channel for: conveying information to these particular population groups; and for strengthening the enabling environment within which health seeking behaviour change or maintenance takes place. The role of agents of change and gatekeepers within these groups are briefly considered here.

The notion that an informed and knowledgeable individual is not necessarily a behaviourally responsive individual, provides a foundation for the presenter to suggest future emphasis on participatory dialogue communication approaches and social learning methods applied successfully in a number of health and social development settings. The importance of local people taking local leadership, voicing their perspectives, framing debate and dialogue on their terms and developing their own agendas are presented as important principles for communications; principles all too often ignored. The notion that for the marginalised 'change' is often accommodated through feelings of empowerment and ownership – brought about through strengthening community solution efficacy - is also considered here. An example of such an approach is presented next, regarding 'Health Mediators in Roma communities' – by Nicoleta Bitu.

Given the complexities and importance of communication profiling and planning, the presenter, in closing, advocates for the increased involvement of professional communication managers, to better conduct communication profiling, to undertake the necessary tailoring of approach and messages required for bottom line health impact, and the harmonizing of communication strategy with the overall response to meeting the needs of the hard-to-reach.

## Reference: Plenary Session C

**"The expansion of vector-borne infections in Europe – are we prepared for it?"****Trends of vector-borne infections in Europe**

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**ABSTRACT**

Among emerging infectious diseases, 75% are originating principally from wildlife due to social, ecological, technological and microbial factors.

The criteria for emergence of vector-borne pathogens in humans in Europe from 2000 through 2008 were: detection of novel species or increased incidence, or spread to a new vector/animal reservoir, or expansion of their hosts or vectors to novel geographical locations.

The following vector borne diseases, predominantly affected by climatic change and human behaviour were emerging in Europe: Tick borne Lyme incidence increase and novel species *B.spielmanii* in Central Europe. Tick borne *Anaplasma Phagocytophilum*. Spotted fever group (SFG) rickettsioses caused by novel species, and expanding. In South-Eastern Europe, outbreaks of CCHF in Bulgaria, Albania and Kosovo (social disruption, war), in Turkey (milder climate), and the first human case in Northeast Greece in June 2008. Sandfly fever viruses in the Mediterranean area with a potential for geographic spread. Tick-borne encephalitis virus (TBEV) group with a rising incidence in central Europe and geographical expansion. West Nile virus transmitted mainly by mosquitoes, with circulation of the virus along migratory bird routes in Africa, Europe, Asia, USA to new European areas is evolving genetically. Sindbis virus in Finland, Sweden and Karelia has increased seroprevalence. Visceral leishmaniasis (VL) presents a high risk for climate related expansion. Chikungunya virus was imported by viremic patients and transmitted by *Aedes albopictus* mosquitoes in Italy, in summer 2007.

National and regional public health sectors should give priority to enhanced diagnostics and surveillance coordinated by clinicians, public health workers, veterinary public health officials, and entomologists to ensure prevention and prompt public health response.

## Reference: Plenary Session C

**"The expansion of vector-borne infections in Europe – are we prepared for it?"**

**Tick – borne encephalitis in Europe – what needs still to be done?**

*Ursula Kunze, U.K*

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## ABSTRACT

Tick borne encephalitis (TBE) is the most important and widespread disease caused by tick transmitted arboviruses in Europe. The spectrum of clinical presentations ranges from mild meningitis to severe encephalitis with or without myelitis, and infection may result in death or long-term neurological sequelae.

Over the past three decades, TBE has become a growing public health challenge, with a minimum of about 13,000 cases in Europe. The incidence has increased in several European countries; among the most affected are Germany, Switzerland, Czech Republic, Slovenia, Sweden, and the Baltic States. Various social, economic, political, ecological, and climatic factors may be responsible for the observed increases. Quality improvements in epidemiological surveillance and diagnostics may play a role. Changes in lifestyle have resulted in more leisure time spent in nature and most infections are contracted during outdoor leisure time activities. In many European regions, the three basic requirements for optimal living conditions for ticks - humidity > 85%, temperatures > 6°C–7°C, and the presence of large numbers of hosts - have been changing in favour of the tick population. Increasing travel streams of non-vaccinated persons from non-endemic to high-risk areas are also important. Especially tourism to and within Europe is continuously increasing and the market is expected to grow further during the next years.

Although recent years have seen increases in the vaccination rates in some countries, coverage is still too low to offer adequate protection. Presently, no clear recommendations for travellers exist. The International Scientific Working Group on TBE has initiated programs geared towards increasing appreciation of TBE in countries where the disease is largely unknown and towards incorporating travel-related considerations when drawing up vaccination recommendations.

## Reference: Plenary Session D

## Old and new vaccines, old and new challenges

**Measles and Rubella Elimination in the WHO European Region: what will it take to reach the goal by 2010?***Rebecca M Martin*

WHO Regional Office for Europe, Copenhagen, Denmark

## ABSTRACT

Substantial progress has been achieved towards the elimination goal for measles and rubella within the WHO European Region. Reported measles incidence in the European Region in 2007 has declined nearly 90% from 2006 levels. The number of countries reporting measles incidence of <1 per 1,000,000 population (elimination target) increased to 29 from 19 in 2006.

The regional elimination strategy relies on all countries to maintain high immunization coverage (>95%) with measles and rubella vaccines. The strategy is being implemented with an emphasis on supplemental immunization campaigns to catch up susceptible populations, advocacy and awareness raising to reach high-risk population groups across the Region, and sensitive surveillance to monitor the disease burden and progress to the goal.

However, measles and rubella outbreaks continue to occur among unvaccinated populations and in a few countries, measles is once again endemic. Nine of ten countries with the lowest average measles immunization rates from 2000 through 2007 are in the European Union. In 2007, seven Western European countries accounted for 94% of the total number of measles cases. The WHO European Regional Office recommends targeting populations at risk and health care providers with communication and prevention messages to increase vaccine uptake.

The existing monitoring systems to track the progress towards elimination need to be strengthened or enhanced to ensure accurate and reliable reporting of all clinical cases of measles and rubella.

The elimination goals for 2010 are reachable, but countries need to ensure the gains made are sustained and not jeopardized. At this critical juncture, it is important to urge countries to commit themselves and give high priority to achieving measles and rubella elimination by 2010.

## Reference: Plenary Session D

## Old and new vaccines, old and new challenges

## HPV Vaccine – How to measure the impact

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## ABSTRACT

Both a priori and a posteriori evaluation of the impact of HPV vaccination programs poses unprecedented challenges in the field of vaccinology.

Several factors make the estimation of the anticipated impact of routine female pre-adolescent or adolescent vaccination a complex issue: although the burden of preventable severe morbidity or mortality in European countries is high, the actual impact of HPV vaccination compared to a well established screening programme of pre-cancerous cervical lesions remains questionable. The complexity of the natural history from HPV infection to cervix cancer and the different points of impact of those two interventions require mathematical models to evaluate their respective benefits and their interaction. However, the real impact of vaccination is largely dependant on the unknown future overlap between the populations reached by each of those two interventions.

Estimation of the impact of HPV vaccination is also hampered by other factors such as the lack of data on duration of protection, on effectiveness of the vaccines against a new infection or a reactivation, on the extent of cross-protection and of herd immunity and on the lack of knowledge on the burden of other non cervical HPV-related cancers.

Once the vaccine is routinely used, the evaluation of its impact is made difficult by the long time lag between HPV infection and the onset of clinically significant consequences. It requires new and sustainable surveillance systems which imply collaboration with health professionals with which infectious diseases epidemiologists are not used to work (pathologists, cancers specialists).

These new perspectives and challenges stress the need to actively strengthen the collaboration of Member States in the field of vaccinology, through sharing of data, expertise and experiences.

Reference: Plenary Session D

**Old and new vaccines, old and new challenges**

**The role of epidemiology in paving the way for the introduction new vaccines**

*Luc Hessel*

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**ABSTRACT**

The recent introduction of several new vaccines in Europe has illustrated the critical role played by epidemiology in recommending, implementing and assessing immunisation policies, beyond its "traditional" role of disease surveillance.

It covers three key elements: 1) evaluating the burden of disease (BoD), 2) defining optimal vaccination strategies, and 3) assessing the impact of vaccination programmes. The concept of BoD not only includes assessing morbidity and mortality, but also collecting data on economical and societal aspects of the disease as well as patient-related outcomes. It relies on standardised case definitions and methods, and is critical to perform health technology assessment. Effective vaccination strategies rely on the knowledge of many different parameters relating to the natural history of the disease and its transmission, and to the expected direct and indirect impact of the vaccine in a given population. This requests developing and using models that will allow policy makers to define appropriate vaccination programmes.

Assessing the impact of vaccination programmes is critical to ensure their acceptance and sustainability. It includes the evaluation of vaccines' efficacy/effectiveness and safety, monitoring vaccine coverage, vaccination practices, and measuring the expected impact of the intervention on health and socio-economic parameters as well as potential changes in the ecology of the pathogen. To address this broad spectrum of activities we need to understand new vaccination paradigms, to develop skills and competences, as well as appropriate tools and technical platforms. Knowing which vaccines are going to be available in the short, medium and long term is therefore critical to define specific action plans that will contribute to ensure their timely and equitable access to the target populations and the successful adoption of vaccination programmes.



# Parallel Session Abstracts



01.1 Reference: 20080157

Track: Zoonoses

## Reptile associated infections with *Salmonella* Tennessee in children below 3 years in Germany, 2007/2008 - a preliminary report

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5. Robert Koch Institute, Wernigerode Branch, Germany

### BACKGROUND

In March/April 2008, eight *Salmonella enterica* serovar (S.) Tennessee infections in children <3 years were notified (March/April 2001-2006: 0-1 cases). We carried out an investigation to identify the source of infection and to halt the potential outbreak.

### METHODS

Cases were children <3 years of age with *S. Tennessee* isolated from stool 01.09.07 through 31.05.08. In addition to describing cases we conducted a case-control study with 2 randomly selected children with notified rotavirus infections per case from the same districts, frequency-matched on age-group, as controls. We interviewed children's parents by telephone on food, herbal infusions and animal contact during the week before onset. Secondary household cases were excluded. Matched odds ratios (mOR) were calculated in univariate analysis. We performed pulsed field gel electrophoresis (PFGE) of human strains and investigation of reptiles (cloacal swabs).

### RESULTS

Twelve cases (75% ≤ 6 months of age) were notified from eight states. Four were female. Eight cases had diarrhoea and five fever, two were asymptomatic. Five of ten households, home to seven case children, owned reptiles - all denied direct contact between children and animals. For two further cases other reptile contact was reported (e.g. child taken to reptile exhibition). The case-control study included 10 cases and 21 controls. Case households more likely owned pet-reptiles than control households (mOR=29.0, CI95%: 3.11-∞). PFGE showed various patterns implicating a multisource origin of infections. In reptile samples from two households *S. Tennessee* and *S. Monschaui* were detected.

### CONCLUSIONS

Reptile contact was the apparent source of these infections in children. Since pet reptiles are increasingly popular in Germany, the public should be aware of the salmonellosis-risk associated with them, especially for small children.

## 01.2 Reference: 20080114

Track: Zoonoses

**Psittacosis: an unexpected souvenir after the visit of a bird show in The Netherlands**

Harold Noël (1, 2), B. Schimmer (1, 3), R. Koene (4), J. van der Velden (4), L. Züchner (5), AM Horrevorts (6), J. Reimerink(1), M. van der Lubben (1), JLA Hautvast (3, 4).

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6. Department of Medical Microbiology and Infectious Diseases, Canisius-Wilhelmina Hospital, Nijmegen, The Netherlands

**BACKGROUND**

In November 2007, a psittacosis outbreak occurred among visitors of a bird show in a rural community in the Netherlands. An epidemiological and a veterinary investigation were conducted to study symptoms, risk factors for clinical and serological infection, and to identify the source in this particular setting.

**METHODS**

We conducted a retrospective cohort study among the estimated 200 adult attendees. Study participants were asked to provide two serum samples in a two-week interval and were administered a questionnaire exploring symptoms, bird-related exposures, route and time spent at the show. A lab-confirmed case was an attendee with a positive PCR and/or recent *Chlamydia psittaci* infection according to ELISA or CFT. The food safety authority traced exhibited birds and screened 74 pooled fecal samples for *C.psittaci*.

**RESULTS**

In total, 185 identified attendees filled in a questionnaire. Laboratory results were available for 156 of whom 42 (27%) had evidence of a recent infection. Among the respondents with lab-positive results 57% reported clinical symptoms, most frequently, cough, headache and flu-like symptoms. Seventy-five (48%) had serological evidence of a previous *Chlamydia* spp infection. Preliminary results showed that board membership and direct contact with birds were associated with psittacosis (RR: 2.1[95%CI:1.3-3.6], 3,07 [95%CI:1.72-5.47]). There was a dose-response relationship between time spent at the show and recent infection (RR for attending at least 4 hours: 2.7[95%CI:1.7-4.4]). Pooled faecal samples of birds from one bird exhibitor who had been ill himself were PCR positive for *C.psittaci*.

**CONCLUSIONS**

This outbreak was characterised by a particularly high clinical and serological attack rate. Prevention could focus on development of integrated public health and veterinary preventive measures such as testing or prophylactic treatment of pet birds before exhibition or sale.

## 01.3 Reference: 20080052

Track: Zoonoses

**Epidemiology of Coxiella burnetii infection in Denmark**

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**BACKGROUND**

During 2003-04 new sensitive diagnostic methods for *Coxiella burnetii* were introduced in Denmark. Increasing number of animals and humans were found positive for *C. burnetii*, probably resulting from the new methods and a change in testing habits. Our aim was to describe reasons for testing and symptoms in patients with serological signs of acute Q-fever.

**Methods**

We performed a cross-sectional study among all persons tested in Denmark who had serological signs of acute Q-fever in 2006-07. We defined serological confirmed cases: four-fold increase in IgG phase II or the concomitant finding of IgM phase II  $\Rightarrow$  1:256 and IgG phase II  $\Rightarrow$  1:1024. Serological probable cases: IgG phase II  $\Rightarrow$  1:512. Physicians of all cases were asked to complete a questionnaire retrospectively.

**RESULTS**

We identified 33 confirmed and 290 probable cases out of 1341 persons tested serologically, 76.2% (246/323) responded to the questionnaire. Among all cases, M:F ratio was 1.8, median age 39.4 years. In 30.4% the reason for testing was symptoms and possible exposure to *C. burnetii*, for 61.2% a possible exposure only. Overall 42.0% were farmers, 40.6% veterinarians, 91.6% were exposed to cattle, 61.6% to birthing animals. Among symptomatic individuals, the most common symptoms were: asthenia (70.9%), myalgia (62.0%), fever (48.1%), headache (39.2%). Preliminary analysis showed no difference between probable and confirmed cases in terms of demography, indication for testing, exposures, or symptoms.

**CONCLUSIONS**

The high number of persons with serological signs of present or previous infection with *C. burnetii* suggests that the infection may be endemic in Denmark. Only a third showed symptoms consistent with Q-fever. Including Q fever among the notifiable diseases is likely to provide a more accurate ascertainment of the disease.

## 01.4 Reference: 20080136

Track: Zoonoses

**Are sporadic Q fever cases different from outbreak-related cases?**

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**BACKGROUND**

Q fever in humans is a notifiable disease in Germany. Knowledge about risk exposure primarily results from outbreak investigations. Outbreak-related cases, however, account for only a small fraction of the notified cases. We started a study on Q fever cases, in order to investigate possible exposures among sporadic cases compared to outbreak-related cases.

**METHODS**

Notified laboratory-confirmed Q fever cases in the state of Baden-Württemberg between 6/2006-5/2008 were interviewed by the responsible local health departments. The structured questionnaire included questions on demographics, disease manifestation and possible exposure to *Coxiella burnetii* during the four weeks before onset of diseases. Student's t-test and Fisher's exact test were used to analyze continuous and categorical variables.

**RESULTS**

In the study period, 118 of 138 notified cases (85%) agreed to interviews. All age categories were represented (mean 43 years, 5-81 years). The male-female ratio was 1.6:1. Forty-seven patients belonged to five outbreaks and 71 were sporadic cases. Compared to outbreak-related cases, sporadic cases were more likely to be male (24 vs. 49 cases,  $p < 0.05$ ), to be older (38 vs. 47 years,  $p < 0.05$ ), and to develop pneumonia (28 vs. 41 cases,  $p < 0.05$ ). Sporadic cases had less direct contact to sheep, goat or cattle (18 vs. 29 cases,  $p < 0.05$ ) and were less likely to be professionally exposed to animals (4 vs. 7 cases,  $p < 0.05$ ). In one third of sporadic cases ( $n=20$ ) no direct or indirect exposure to sheep, goat or cattle (including consumption of raw milk) could be identified.

**CONCLUSIONS**

Our results suggest that sporadic cases differ from outbreak-related cases in demography, severity of disease, and exposure. More studies are needed to identify further, yet unknown, risk exposures in sporadic cases in order to develop targeted prevention strategies.

## 02.1 Reference: 20080131

Track: Evolving influenza strains

**Use of personal protective measures and H5N1-seroprevalence among bird collectors during an avian influenza A/H5N1 outbreak, Ruegen, Germany, 2006**

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**BACKGROUND**

In Germany, the first outbreak of highly pathogenic avian influenza A/H5N1 occurred among wild birds on the island of Ruegen between February and April 2006. Of 1,878 tested birds, 9% were positive for A/H5N1. We launched an investigation to assess protective measure usage among bird collectors, and to determine their seroprevalence of H5N1-antibodies.

**METHODS**

Inclusion criteria for our study were participation in collecting wild birds on Ruegen between February and March 2006. Study participants were asked to complete a questionnaire, and to provide blood samples. We evaluated the protective measure usage applying a personal protective equipment (PPE)-score between 0 and 9, where 9 corresponds to a continuous and complete use of PPE. Sera were tested by plaque-neutralization (PN) and microneutralization (MN) assays. Reactive sera were reanalysed in the World Health Organization-Collaborating Centre (WHO-CC) using MN and hemagglutination inhibition assays.

**RESULTS**

159 firemen, local government workers (LGW) and veterinarians fulfilled the inclusion criteria. Of those, 97 participated in our study. Gloves showed the highest PPE-device compliance rate (88%) and masks the lowest (46%). PPE compliance was higher in firemen (mean PPE-score: 6.6) than in LGW (mean PPE-score: 4.5;  $p=0.006$ ). There were no reports of influenza-like illness. Seventy-eight participants provided blood samples. Five samples were initially reactive in the PN assay, but WHO-CC confirmatory tests were negative.

**CONCLUSIONS**

According to laboratory results, no person involved in the bird collection was infected with A/H5N1. PPE usage was suboptimal. Highest PPE compliance in firemen was probably owing to their occupational training in PPE use. Early and regular training in PPE especially masks use should be offered to all potential collectors.

02.2 Reference: 20080172

Track: Evolving influenza strains

## Molecular epidemiology of influenza viruses in North-Eastern Italy in four consecutive seasons: 2004-2008

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### BACKGROUND

The incidence of influenza is related to the antigenic matching between circulating viruses and the vaccine strains. Integrated clinical and laboratory surveillance is the best tool to control the influenza epidemiological behaviour and to update the vaccine composition. The study objective is to describe the genetic evolution of influenza viruses circulating during the four last seasons as compared to the contemporary vaccine composition.

### METHODS

Viral isolation was performed on MDCK cell cultures, and identified by HA and HI test. Sequences of the HA1 gene obtained from the isolated strains were aligned with reference and vaccine strains sequences. Phylogenetic analysis was performed by Mega software

### RESULTS

The four seasons were characterized by different flu incidences: the season 2004-05 presented a high peak of flu incidence (16,4‰) and was sustained by H<sub>3</sub>N<sub>2</sub> and B viruses, the following season was characterized by low influenza activity, the 2006-07 and 2007-08 seasons presented an halfway incidence of influenza (about 7‰). The 2006-07 epidemic was characterized by the circulation of influenza A H<sub>3</sub>N<sub>2</sub> (56%) and H<sub>1</sub>N<sub>1</sub> (40%) viruses while in the last season both A(H<sub>1</sub>N<sub>1</sub>) and B types had been isolated. The H<sub>1</sub>N<sub>1</sub> sequence analysis indicates that, after a long period of stability, a relevant drift occurred during the two last seasons. The H<sub>3</sub>N<sub>2</sub> constantly evolved during the entire study period, forming new cluster every season. The B viruses demonstrate a higher stability even if an irregular alternating of the two lineages has been observed.

### CONCLUSIONS

Combining epidemiological and virological surveillance of influenza viruses, together with the molecular characterization of the isolates, is a powerful tool to determine the matching between the vaccine and the circulating strains and so to evaluate the efficacy of vaccination.

## 02.3 Reference: 20080133

Track: Evolving influenza strains

**Seropositivity for avian influenza A/H5N1 among poultry workers in Jakarta, Indonesia**

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**BACKGROUND**

Since 2005, Indonesia has reported more than 100 human cases of highly pathogenic avian influenza (HPAI) A/H5N1. Cases were typically associated with poultry exposure and 24% were from Jakarta. Human infections raise concern for viral adaptation to humans and a pandemic. Seroprevalence studies that may reveal additional unrecognised mild infections are lacking. We aimed to measure H5N1 seroresponse and identify associated determinants among poultry workers in Jakarta.

**METHODS**

This cross-sectional study was an extension of an agricultural HPAI project by Dutch and Indonesian Ministries. We approached 40 collector houses in Jakarta, where poultry is channelled from the countryside to markets. Collector house poultry workers contributed blood for H5N1 serological testing and were interviewed about possible risk factors. H5N1 seroresponse was measured by hemagglutination inhibition at NIHRD Jakarta and confirmed by neutralisation at NIID Tokyo.

**RESULTS**

In 34 of 40 collector houses, 218 of 276 (79%) workers participated. Of these, 206 of 218 (94%) lived in or next door of the collector house, 206 of 218 (94%) were male and the median age was 29 years (interquartile range 24-37 years). Twenty-six (12%) workers had H5N1 positive titres, of which 19 reported no influenza-like symptoms in the previous six months, while seven reported one or two symptoms. Seropositivity was not related to personal protective measures. Collector houses with workers exhibiting seropositivity did not report more poultry deaths or handling of more poultry, as compared to other collector houses.

**CONCLUSIONS**

Our results suggest occurrence of H5N1 seropositivity in poultry workers in Jakarta, which may reflect unrecognised mild H5N1 infections. This finding highlights the importance of ongoing HPAI education efforts among poultry workers.

02.4 Reference: 20080262

Track: Evolving influenza strains

## Reducing human exposure during an outbreak of Avian Influenza A (H7N3) on a poultry farm; Saskatchewan, Canada, 2007

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### BACKGROUND

In September 2007, highly pathogenic H7N3 avian influenza (AI) was confirmed in a commercial poultry operation in Saskatchewan. During depopulation and disposal of the infected flock, minimizing human exposure was paramount. A multi-agency approach was taken using the principles of protection; rapid control of infection in birds using measures which minimized dust formation, restricted access to infected birds and contaminated materials, training on and access to personal protective equipment, prophylactic antiviral use, influenza vaccination and enhanced human health surveillance.

### METHODS

Health surveillance was implemented through detailed interviews with personnel involved in depopulation efforts. Data collected included health status, risk factors for infection and the use of personal protective measures, and questions about adverse events related to influenza vaccine and antiviral drugs.

### RESULTS

A total of 61 individuals were identified as exposed, with 13 reporting developing conjunctivitis or ILI symptoms. No human cases of AI occurred. Compliance with recommended personal protective measures was high (97.4%) during depopulation and disposal however use was inconsistent in the earlier stages of the outbreak. Farm employees and residents were at greatest risk because they had unprotected exposure to sick and dying birds. Influenza vaccine and antiviral drugs were generally well tolerated, with no serious adverse events.

### CONCLUSIONS

Close cooperation between agricultural and health jurisdictions was required to optimally reduce occupational and public health risk during this outbreak. To improve efficient response to incidents such as this one and help prevent unnecessary exposure and decrease risk, a multi-jurisdictional framework should be in place for reducing risk among poultry workers. It would involve education; promotion of annual influenza vaccination, and the rapid implementation of personal protective measures on suspicion of AI.

02.5 Reference: 20080206

Track: Evolving influenza strains

## Low risk of transmission of highly pathogenic avian influenza A/H5N1 from wild birds to humans - evidence from an outbreak in a swannery

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### BACKGROUND

Highly pathogenic avian influenza (HPAI) A/H5N1 is a zoonotic disease which is often fatal in humans. Wild birds may carry the disease, but it is not known to what extent contact with infected wild birds results in transmission to humans. On January 10th 2008 HPAI A/H5N1 was isolated from carcasses of mute swans collected at the Abbotsbury Swannery, a wild swan sanctuary in South West England. This signalled the start of a two month outbreak in which ten mute swans and one Canada goose tested positive for the disease. We investigated the outbreak to evaluate the risk of transmission to humans from wild birds.

### METHODS

People who had reported sick or dead wild birds to the Veterinary Laboratories Agency that tested positive for HPAI A/H5N1 were contacted and interviewed about their exposure. They were also asked to name others potentially exposed. Those that had been within one metre of infected birds without protective equipment were considered exposed. The exposed were assessed for the need for oseltamivir treatment and asked daily about symptoms during the HPAI A/H5N1 incubation period. Samples for serology were collected and analyzed 30 days after exposure.

### RESULTS

Twelve exposed persons were identified of which six had manually handled infected swans. Seven were given post prophylactic oseltamivir treatment. None of the exposed developed overt disease and follow-up serology was negative for the ten who accepted testing.

### CONCLUSIONS

The investigation results suggest that the risk of transmission of HPAI A/H5N1 to humans from wild birds is low even during close contact. Still, due to the severity of the disease we recommend protective measures to be taken in accordance with WHO and ECDC guidelines when handling wild birds.

03.1 Reference: 20080255

Track: International health

## Estimating the Risk of Communicable Diseases aboard Cargo Ships

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### BACKGROUND

Publications on the risk of communicable diseases associated with the transport sector mainly focus on outbreaks among high risk passengers on cruise liners. The study aims to assess main public health risks aboard cargo ships.

### METHODS

Retrospective analysis of all documented entries to 49 medical log books from international cargo ships under German flag between 2000 and 2008. Case series of acute respiratory infection (ARI), influenza like illness, and infectious gastrointestinal illness affecting >2 persons within one week were classified as an outbreak. Attack rates were calculated based on visits by the average shipboard population during possible outbreak periods. Incidence rates in 100 person-years were used to control for variations in length of journey and crew size.

### RESULTS

Nearly one forth of the visits to the ship's infirmary was due to communicable diseases, with an overall rate of 45.8 consultations per 100 person-years. With 33.9 crew members per 100 person-years, ARI was the most frequent infectious disease for seeking medical attention. Of the 68 outbreaks that met predefined criteria, 66 were caused by ARI with a subset of 12 by influenza like illness. Attack rates ranged between 13 and 41% with 3 to 10 persons affected. Two outbreaks of gastrointestinal infection were detected.

### CONCLUSIONS

Respiratory infections are common aboard cargo ships and may cause outbreaks of considerable morbidity. In contrast to cruise ships, gastrointestinal infections were rare in the study population. Although the validity of the data is limited due to the use of non-professional diagnoses, missing or illegible entries and restriction of the study population to German ships, the results provide guidance to port health authorities to build capacities under International Health Regulations 2005.

03.2 Reference: 20080095

Track: International health

## Can we predict the risk of mortality among malnourished children by using the 2006 WHO Child Growth Standards?

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### BACKGROUND

The recently introduced 2006 World Health Organization (WHO) Child Growth Standards, which replaced the 1977 National Center for Health Statistics (NCHS) reference, change the definition of malnutrition. However, their ability to predict mortality has not been explored. The aim of this study was to assess the diagnostic accuracy of malnutrition in children to detect their risk of death.

### METHODS

We analysed data from 64,484 children aged 6-59 months admitted with malnutrition in 2006 into the Médecins Sans Frontières nutritional programme in Maradi, Niger. We calculated sensitivity and specificity of weight for height in terms of Z-score (WHZ) and percentage of the median (WH%) for both the WHO standards and NCHS reference in predicting mortality. Sensitivity and specificity of mid-upper arm circumference (MUAC) was also calculated. We traced the receiver operating characteristic (ROC) curve and estimated its area under curve (AUC). We performed a stratified analysis by age and sex.

### RESULTS

In predicting mortality, the NCHS reference using WHZ and WH% showed AUC values of 0.63 (95%CI: 0.60–0.66) and 0.71 (0.68–0.74), respectively. Using WHO standards for WHZ and WH% AUC values were 0.76 (0.75–0.80) and 0.77 (0.75–0.80), respectively. The relationship between MUAC and mortality risk was 0.63 (0.60–0.67). Analyses stratified by sex and age yielded similar results.

### CONCLUSIONS

WHO standards were more accurate than the NCHS reference to predict mortality risk in this population of malnourished children. Conversely, the use of MUAC as an indicator to predict risk of death at admission is potentially less useful. This study supports the use of the new WHO standards in order to identify children at highest risk of death among malnourished children.

03.3 Reference: 20080061

Track: International health

## Jellyfish Envenomation Situation in Thailand, 2003-2008

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### BACKGROUND

Lethal jellyfish envenomation has occurred sporadically in Thailand for years. However data of health burden and types of dangerous jellyfish (Cubozoan or box jellyfish) in Thailand are limited. We conducted an investigation to study morbidity and mortality of jellyfish envenomation, identify species and implement prevention measures.

### METHODS

A descriptive study was conducted by medical records review in 2 coastal provinces. A case was defined as a jellyfish envenomation injury documented by a medical professional from 2003-2008. Events were analyzed by place, time, age, gender and severity. Jellyfish specimens were collected by local fishermen and speciated by marine biologists.

### RESULTS

From 2003-2008, 54 cases occurred, including 1 death. Of cases, 49% were 21-40 years old; median age was 26 years. Thai to foreigner ratio was 2.6:1; male to female ratio was 1:1.2. The most frequent sites of attack were leg (29%), forearm (15%), foot (12%) and hand (12%). Symptoms included burning pain (37%), pain (27%) and respiratory discomfort (18%). Signs included erythema (51%), burning (20%) and swelling (12%). Twenty-three percent required hospitalization. Number of events peaked in April for Trat and May for Krabi province. Of 12 jellyfish specimens collected from Trat, marine biologists identified all as Cubozoan (box jellyfish).

### CONCLUSIONS

Jellyfish envenomation is a significant public health problem in the coastal provinces. Global warming could increase the scope of this problem. Based upon this investigation, the Bureau of Epidemiology is developing public health jellyfish warnings for four coastal provinces. Vinegar, which denatures the cysts which contain venom, should be available in all beach areas. Fishermen should wear long sleeves and gloves.

03.4 Reference: 20080047

Track: International health

## Leptospirosis outbreak from military training activities - Nakhon Nayok, Thailand, November 2007

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### BACKGROUND

A cluster of suspected leptospirosis patients, were admitted at a military hospital in Nakhon Nayok, one died from massive hemoptysis. Bureau of Epidemiology (BOE) was notified, on 27 Nov 2007, to identify cause and control measures, collaborating with local, regional and military teams.

### METHODS

We reviewed medical records at the military hospital. Active case finding was performed among 255 (94%) of all conscripts. Cases were conscripts, resided in the military camp since Nov 2007, who had 4-fold rising of MAT (both IgM and IgG) or ELISA; or died from clinical compatible with leptospirosis and positive immunoblot. Pair serum from all conscripts was sent for ELISA and then MAT. A retrospective cohort was performed among all conscripts. We surveyed environment, reviewed training activities, and collected samples from water and rodents for dark field microscope and real time PCR (LipL32) for *Leptospira*.

### RESULTS

Overall, 48 cases were identified (attack rate 19%), 37 symptomatic (77%) and 11 asymptomatic cases (23%). Median age was 21 years (range 21-29 years). Main symptoms were fever, chill, cough, sore throat, severe headache and myalgia. Ten were hospitalized and one died. Australis and Icterohaemorrhagiae were main serogroup. History of lying down in mud of Pond C was significant risk factor (adjusted RR 2.72, 95%CI 1.53-4.82). *Leptospira* were found in water from Pond C, Pond B and Canal A. Rodents trapped from nearby Pond C were positive for *Leptospira*.

### CONCLUSIONS

This outbreak raised awareness in training safety and environmental hazard. Risk from cows in livestock area in the camp was further investigated. Surveillance in the camp hospital was strengthening. Training activities were discussed. Health education to military camp personnel and rodent control were implemented.

03.5 Reference: 20080160

Track: International health

## First recorded circulation of Rift Valley Fever Virus in Mayotte, a French territory in the South-western Indian Ocean, 2007-2008

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### BACKGROUND

The circulation of Rift Valley fever virus (RVFV) has never been recorded in Mayotte. A resurgence of RVFV in 2006-2007 in several East-African countries of the region led to an active laboratory-based surveillance in the livestock being set up. Several seroconversions in Mayotte were detected in cattle. Consequently, human surveillance was implemented. This report describes the findings for human surveillance from 1 September, 2007 through 31 May, 2008.

### METHODS

Serum specimens collected from patients with dengue like illness (DLI) in any health centre in Mayotte and tested negative for Chikungunya, dengue, and malaria were screened for RVFV infection. A confirmed human case-patient was defined as a person with the presence in the serum of anti-RVFV IgM by MAC-ELISA or RVFV RNA by RT-PCR.

### RESULTS

In total, specimens from 217 patients were screened. Nine (4.2%) had evidence of recent RVFV infection (i.e., presence of viral RNA in 6 and presence of IgM for 3). Of these confirmed case-patients, the earliest recorded onset of DLI was September 28, 2007 and the latest was May 12, 2008. Confirmed case-patients resided across the four sub-regions of Mayotte. Of these 9 persons, 8 (88%) were male, the median age was 22 years. Neither severe cases nor fatalities were observed. Animal exposure was documented in 5 of 8 cases (63%) and only presence of numerous breeding sites for mosquito in the housing environment in 3 others (37%).

### CONCLUSIONS

Initial animal and human surveillance efforts led to the rapid identification of this first recorded active circulation of RVFV in Mayotte. These efforts should be intensified and maintained routinely in order to detect promptly any renewed introduction or resurgence of RVFV in Mayotte.

04.1 Reference: 20080126

Track: HIV - STI risk behaviour

## Alcohol Consumption and Hepatitis C among injecting drug users in Glasgow

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### BACKGROUND

Of an estimated 38000 individuals chronically infected with the hepatitis C virus (HCV) in Scotland today, approximately 90% have ever injected drugs. Clinical HCV guidelines recommend avoiding alcohol, even in moderation, as it can accelerate liver disease progression. We determined the prevalence of, and characteristics associated with, alcohol use and its relationship with actual and self-reported HCV status among injecting drug users (IDUs), to assess compliance with the guidelines.

### METHODS

Data were collected in repeat cross-sectional surveys (2005 & 2007) among a convenience sample of IDUs attending harm-reduction services in Glasgow. Participants submitted saliva specimens for anonymised HCV antibody testing and were categorised according to whether they exceeded (Yes/No) the UK Royal College of Physicians recommended weekly alcohol allowance for females (14 units) and males (21 units). We calculated adjusted odds ratios (aOR) using multivariable logistic regression.

### RESULTS

We recruited 808 IDUs (437 in 2007), with similar participant characteristics in both years. Among 506 (65%) who tested HCV positive, 328 (65%) consumed alcohol and 149 (29%) exceeded the allowance. Of 278 (34%) who self-reported as HCV positive, 165 (60%) drank and 74 (27%) exceeded the allowance. The risk of exceedance was greater for HCV positives (aOR=1.7, 95%CI=1.14-2.47) compared to negatives, when adjusted for significant variables like gender, homelessness, incarceration and high-risk injecting behaviour. In the subgroup of HCV positives, those who self-reported positive were as likely to exceed the allowance as the self-reported negatives. Exceedance was associated with homelessness (aOR=2.7, 95%CI=1.55 – 4.66), and incarceration (aOR=2.1, 95%CI=1.19–3.66).

### CONCLUSIONS

HCV positive IDUs are more likely to drink to excess; knowledge of status doesn't influence consumption. A strong focus on reducing their alcohol consumption is essential to minimise HCV-related morbidity.

04.2 Reference: 20080101

Track: HIV - STI risk behaviour

## High Hepatitis B and Hepatitis C Seroprevalence and Frequent Risk Behaviour among Prisoners in Estonia, 2006

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### BACKGROUND

Bloodborne infections, injection drug use and other risk behaviours are common among prisoners. This study was conducted to determine (1) knowledge and attitudes towards bloodborne infections and protective measures, (2) hepatitis B and hepatitis C seroprevalence and (3) prevalence of risk behaviour in Estonian prisoners in order to guide further preventive measures.

### METHODS

In 2006, a cross-sectional survey using anonymised questionnaires on knowledge, attitude and risk behaviours regarding bloodborne infections was conducted among detainees in 3/7 Estonian prisons. Participants provided a blood sample to test for serological markers of hepatitis B and C. Blood samples and questionnaires were linked by paired barcode labels. Stepwise logistic regression analysis was performed to identify risk factors for bloodborne infections.

### RESULTS

Of 598 prisoners contacted, 99.2% participated, and 98.6% agreed in blood testing. Russian and Estonian speaking prisoners differed in antibody prevalence (anti-HBc, HBsAg, anti-HCV: 52.7%, 3.6%, 61.3% vs. 18.6%, 2.1%, 20.4%) and in prevalence of risk behaviours: 52.5% vs. 46.8% reported having been tattooed while in prison, 53.9% vs. 16.9% mentioned ever injecting drugs, of which 67.8% vs. 21.1% also mentioned having shared i.v. drug paraphernalia. Risk factors for HCV (OR[95% CI]) in Russian/Estonian speaking prisoners (adjusted for age group and sex) were "sharing injection paraphernalia" (42.1[14.9-166.0] vs. 42.0[5.3-335.6]), "ever injecting amphetamines" (33.4[7.4-152.2] vs. 12.9[2.8-58.4]) and "tattooing inside prison" (3.9[1.9-8.1] vs. 3.1[1.2-7.8]).

### CONCLUSIONS

Differences between language groups likely reflect the much higher prevalence of injection drug use among the Russian minority in Estonia. High prevalences of risk behaviour and bloodborne infections among both, Estonian and Russian speaking prisoners, demand rapid implementation of further harm- and risk reduction measures, e.g., provision of opioid substitution therapy and ensuring safer tattooing practices.

04.3 Reference: 20080183

Track: HIV - STI risk behaviour

## Risk behaviour of Norwegian men who have sex with men, with self-reported sexually transmitted infection: an internet-based cross-sectional survey

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### BACKGROUND

Sexually transmitted infections (STIs) rates among men who have sex with men (MSM) have increased since 1990s in Norway. We aimed to identify the differences in the risk behaviour of MSM with and without selected STIs in order to make recommendations against STIs spread.

### METHODS

We conducted a cross-sectional online survey during 1-19 October 2007 among members of a MSM-oriented Norwegian website using a questionnaire with details on meeting partners, drug and alcohol use, sexual behaviour and STIs. We defined a case as a MSM reporting gonorrhoea, syphilis, HIV or Chlamydia infection in the previous 12 months. We calculated prevalence ratios (PR) with 95% confidence intervals.

### RESULTS

Among 2384 eligible respondents, 183 (8%) were cases (17 syphilis, 35 gonorrhoea, 41 HIV and 126 Chlamydia infections). The median number of sexual partners in the past six months was 6 among cases and 3 among the rest of respondents. Cases were more likely than other respondents to choose organised sex-parties to meet partners (PR=4.5 [2.6-7.8]), have unprotected anal intercourse with a casual or anonymous partner (PR=2.9 [2.2-3.8]), report unsafe sex with an Internet partner (PR=2.5 [1.9-3.3]), having paid/received money for sex (PR=2.1 [1.5-3.1]), use recreational drugs (PR=2.6 [1.9-3.6]) or alcohol (PR=2.3 [1.8-3.1]) during sex.

### CONCLUSIONS

The STI prevention efforts among MSM should focus on frequent sex-related drug and alcohol use. While organized sex parties are difficult to tackle, our study suggests MSM involve in risky behaviour with sexual partners they meet online, and therefore Internet based health interventions might be used.

04.4 Reference: 20080236

Track: HIV - STI risk behaviour

## Antiretroviral Prophylaxis following Sexual Exposure in Italy

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### BACKGROUND

HIV post-exposure prophylaxis (PEP) is increasingly offered following potential sexual exposure to HIV. Formal recommendations were issued in Italy in 2002.

### METHODS

The Italian Registry of Antiretroviral PEP enrolls 98 HIV clinics nationwide; for each case, details are collected on standardized forms: demographics of the exposed individual, type of exposure, characteristics of the source, prescribed PEP regimen, occurrence of adverse effects, duration of the prophylaxis, date and reason of premature PEP interruption, if any.

### RESULTS

From 1997 to 2007, 548 sexual cases were enrolled; median age was 31 years (range 13-60); 45% were women. Almost all started with 2 NRTI plus a PI. Exposures within stable serodiscordant couples accounted for 45%, sex with casual partners for 38%, rape for 10%; in 7% of cases, details were not available. The source was HIV+ in 66%, serostatus was unknown in 32%, while in 2% the source tested negative. Treatment was completed in 400 cases (73%); of the remaining 148, 25% discontinued PEP because of adverse effects, 21% because of self-withdrawal, in 8% the source tested negative and 44% were lost to observation. Adverse effects, mostly gastrointestinal symptoms, were reported in 243 cases (44%). Overall, 36% of subjects were lost to follow-up. Three seroconversions were observed in MSM: one following an occasional intercourse, who simultaneously acquired HCV; the remaining two were in stable serodiscordant couples, who acknowledged subsequent unprotected exposures.

### CONCLUSIONS

Information on PPE, including risk assessment, potential efficacy and toxicity, should be provided to at-risk subjects and especially to serodiscordant couples possibly in advance with respect to a potential exposure, and always in the context of counseling on safe sex, reinforcing messages on primary HIV prevention and consistent condom use.

05.1 Reference: 20080019

Track: Respiratory diseases

## Was meteorology to blame for a sudden increase in Legionnaires' disease in England and Wales?

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### BACKGROUND

In 2006, 551 cases of Legionnaires' disease had onset in England and Wales; the previous high was 389. A study was conducted to examine whether this increase could be associated with meteorological factors.

### METHODS

Preliminary analyses showed that the mean relative humidity (mRH) during the 2-10 days before onset and the mean maximum temperature (mmT) 10-14 weeks before onset were potentially associated with case numbers. The mRH and mmT for each case were compared with equivalent control data from other years in the study, and conditional logistic regression analysis conducted.

### RESULTS

674 sporadic, community-acquired cases had onset between 2003 and 2006. On average mRH increased 3.1% in the 2-10 days before onset in the case compared with control year. mmT increased by an average of 0.30C in weeks 10-14 before onset. There was a significant three way interaction between quarter, year, and mRH ( $p < 0.0001$ ) or mmT ( $p > 0.0001$ ). A four-way interaction was fitted (mRH, mmT, year and quarter). For the cases that had onset in July to September, there was strong evidence to suggest a year, humidity and temperature interaction (Wald  $\chi^2 = 30.79$ ,  $p < 0.0001$ ).

### CONCLUSIONS

There is evidence to suggest that the incidence of Legionnaires' disease may be associated with the weather. If periods of increased risk from meteorological factors can be identified, clinicians could be informed and testing policies modified accordingly. Additionally, if climate change leads to an increase in mmT, a rise in the incidence of legionella infections may be expected in the future, resulting in higher levels of morbidity and mortality. Given the degree of investigations currently conducted to find the source of these infections, this will impose a significant resource burden on public health services.

05.2 Reference: 20080011

Track: Respiratory diseases

## Transmission of tuberculosis by smear negative pulmonary tuberculosis patients in the Netherlands

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### BACKGROUND

Sputum microscopy is commonly used for diagnosing tuberculosis (TB). Although smearnegative TB patients are less infectious than smearpositive patients, they are still capable of transmitting TB. The purpose of this study was to determine the contribution of smearnegative TB patients to TB transmission in the Netherlands.

### METHODS

All culture confirmed TB patients from 1996 to 2004 were included in this study. Patients with identical DNA fingerprints of the *Mycobacterium tuberculosis* isolates from sputum were considered to be clustered. First patients in a cluster were considered index cases, all other patients secondary cases. In addition, we examined the transmission from sources notified in conventional contact tracing.

### RESULTS

We analyzed 394 clusters among 1285 patients. Studying molecular linkage only, 12.6% of the secondary cases were attributable to transmission from a smear-negative TB patient. The relative transmission rate of smear-negative compared with smear-positive TB patients was 0.24 (95% CI 0.20-0.30). Secondary cases of clusters with a smear-negative index case were more often smear-negative (OR 1.86, 95% CI 1.18-2.93) compared to secondary cases in clusters with a smear-positive index case. Conventional contact tracing showed that 6.3% (26/417) of the source cases as identified by the Municipal Health Services were smear-negative.

### CONCLUSIONS

In the Netherlands, patients with smear-negative culture-positive tuberculosis are responsible for 13% of tuberculosis transmission. Countries that have enough resources should expand their TB control efforts to include prevention of transmission from smear-negative culture positive pulmonary TB patients.

05.3 Reference: 20080100

Track: Respiratory diseases

## Estimating diagnostic accuracy of tests for latent tuberculosis infection without a gold standard

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### BACKGROUND

The evaluation of diagnostic accuracy of new in vitro diagnostic assays for tuberculosis infection has been hampered by the lack of a standard reference test. We aimed at estimating assessing accuracy of interferon-gamma assays for latent tuberculosis infection by using latent class analysis, a statistical method that has proposed to evaluate diagnostic tests when a gold standard is not available, and by evaluating association of tests results with risk factors for TB infection.

### METHODS

We analyzed data of 115 health care workers on whom tuberculin skin test (TST) and the following in vitro tests were performed: in-house RD1 proteins ELISPOT, T.SPOT-TB (a commercial ELISPOT) and Quantiferon-TB Gold (a commercial whole blood ELISA).

### RESULTS

Among participating individuals, 53% tested positive by TST, 35% by in-house ELISPOT, 37% by T.SPOT-TB and 25% by Quantiferon. All test correlated with TB risk, while only TST positivity was associated with BCG vaccination. Sensitivity/specificity estimated by a latent class model were: TST 99% /64%; in-house ELISPOT 95%/87%; T.SPOT-TB 96% /85%; Quantiferon 79%/ 97% . In a model in which BCG status was entered, tuberculin skin test sensitivity and specificity were 99% and 71% among non-vaccinated individuals and 99% and 43% among those BCG vaccinated.

### CONCLUSIONS

When used in health care workers, in vitro assays may provide a significant increase of specificity for tuberculosis infection compared to TST, even among non vaccinated individuals, at the cost of some sensitivity. ELISPOT-based tests may differ from the ELISA-based test.

05.4 Reference: 20080153

Track: Respiratory diseases

## Investigating recurrent tuberculosis in England and Wales

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### BACKGROUND

In a low prevalence setting the incidence of recurrent tuberculosis gives an indication about the quality of tuberculosis treatment. Understanding the risk factors associated with recurrent TB can help improve clinical services. This study investigated the incidence of, and risk factors for, recurrent episodes of tuberculosis in England and Wales.

### METHODS

Episodes of recurrent tuberculosis were identified among cases reported to national surveillance between 1998 and 2005. An episode of recurrent tuberculosis was defined as a new case reported in the same patient after at least 12 months from the date of the initial report. To determine the incidence of recurrent tuberculosis, follow up time in days was calculated for all cases until another episode or censure. Information from treatment outcome monitoring was used to account for losses to follow up attributable to death. Cox proportionate hazard models were used to determine hazard ratios (HR) for recurrence of tuberculosis and investigate the risk associated with clinical, demographic and microbiological factors.

### RESULTS

588 recurrent tuberculosis events were identified among 53214 cases reported between 1998 and 2005, a rate of 4 episodes per 1000 person years of follow up. Factors independently associated with a greater risk of recurrent tuberculosis were: belonging to a South Asian ethnic group (HR 1.5 95% CI 1.17-1.95), pulmonary disease (HR 1.37 95% CI 1.06-1.78), culture-positive (HR 1.25 95% CI 1.02-1.52), HIV co-infection (HR 1.6 95% CI 1.1-2.47) and non completion of treatment (HR 1.77 95% CI 1.27-2.46).

### CONCLUSIONS

Tuberculosis recurrence is uncommon in England and Wales despite the absence of a universal DOT policy. Most of the risk factors identified are consistent with findings elsewhere. The high risk among South Asians, however, requires further investigation.

05.5 Reference: 20080253

Track: Respiratory diseases

## First airborne outbreak of tularemia in Germany – Epidemiological and laboratory investigations

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### BACKGROUND

In 2005, an outbreak of tularemia occurred among a group of 39 participants of a hare hunt in Hesse, Germany. In Germany, previously reported tularemia outbreaks date back to the 1950ties. Epidemiological and environmental investigations were undertaken to determine the cause of the outbreak.

### METHODS

A retrospective cohort study was done to identify risk factors for infection. A confirmed case was a symptomatic participant of the hare hunt with a single high titre of *F. tularensis* specific antibodies, who fell ill during 30 October–12 November 2005. A probable case was either asymptomatic with a single high titre of specific antibodies or had signs and symptoms suggestive of *F. tularensis* infection without laboratory confirmation. Environmental samples (at the cooling chamber, water used to clean hares), parts of hunted hares and serum samples of participants were microbiologically analysed.

### RESULTS

Thirty-eight participants were interviewed, 29 provided sera. Eleven participants met the case definition (9 confirmed, 2 probable). One probable case-patient died before tularemia was suspected. Nine of 11 cases and 1/27 non-cases were within 5 meters to the place where disembowelled hares were rinsed with a water-hose, the only independent risk factor after multivariate logistic regression (odds ratio 20.0; 95% confidence interval 1.7-1332.9; p-value 0.01). 27 swabs taken at the game chamber and two water samples were PCR-negative. Six of 14 hare parts showed low-level concentrations of *F. tularensis* by PCR, compatible with cross-contamination.

### CONCLUSIONS

The majority of cases may have been infected through the inhalation of aerosolised droplets containing *F. tularensis*, generated while rinsing one or few contaminated hares. The risk of tularaemia through aerosol-generating activities should be considered when handling hares and by health care professionals.

06.1 Reference: 20080248

Track: Vector borne diseases

## Assessing the Risk of an Urban Yellow Fever Outbreak in Abidjan, Côte d'Ivoire, 2008

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### BACKGROUND

Yellow fever (YF), a vaccine preventable, potentially deadly, viral disease transmitted by arthropods has increased in Latin-America and Africa in 2007/2008 resulting in near depletion of the world-wide YF-vaccine stockpiles. In the Côte d'Ivoire, YF is part of the expanded programme on immunizations. In 2001 a mass vaccination campaign (MVC) was conducted in Abidjan (population 5 million) in response to an urban YF outbreak. In May 2008, for the first time since the 2001 MVC, 2 YF cases were reported. We conducted a risk assessment to determine the need for a new MVC and its possible target population.

### METHODS

Risk assessment included: Case ascertainment by ELISA IgM confirmed by seroneutralisation, interview of patients; active case finding among contacts; entomological investigation (Bretau Index = total number containers with larvae/pupae of *Ae. aegypti* per 100 habitation units); administrative assessment of vaccination coverage, surveillance system evaluation, YF-virus PCR in vectors and blood samples of monkeys from zoo; serosurvey (ELISA IgG); qualitative assessment of response capacity.

### RESULTS

By July 10, 2008, 3 confirmed cases with onset in April 2008 and 10 IgM positive cases awaiting confirmation were identified. Bretau Index from 6435 habitation units ranged from 5 to 24. Estimated vaccination coverage was 40% for those younger and 72% older than 7 years. Additional risk groups could not be identified. Further analysis is in progress.

### CONCLUSIONS

Favorable environmental conditions, increasing susceptibility among humans and new case reports may indicate the beginning of an urban YF epidemic in Abidjan. Given the worldwide vaccine shortage, decision to mass vaccinate will have to be taken on frequent updates of risk assessment. Production and stockpiling of YF vaccine must be urgently increased.

06.2 Reference: 20080097

Track: Vector borne diseases

## Correlates of Rodent Flea, Climate and Human Plague: an Ecologic Study in Vietnam

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### BACKGROUND

Human plague (caused by *Yersinia pestis*) remains a public health threat in developing countries, because the disease is associated with increased risk of mortality and severe economic and social consequences. During the past 10 years, outbreaks of plague have occasionally occurred in Vietnam's Central Highland Region. The present study sought to analyze the ecologic factors that were associated with the occurrence of plague.

### METHODS

The study included all 510 communes of the Central Highland Region (with a total population of ~4 million) where 95% of incident of plague in Vietnam had been observed between 1997 and 2002. Plague was ascertained by using a standard protocol. Data on domestic fleas and rodents were obtained in accordance with the World Health Organization's guidelines. Temperature and rainfall were recorded by local meteoric stations. The association between these risk factors and plague was analyzed by using the Poisson regression model.

### RESULTS

During the period, 472 cases of plague were reported, of which 24 (5.1%) died. The incidence of plague peaked during the dry season, with ~63% of cases occurring during February to April. Increased rodent density, high flea index, low rainfall, and low humidity were each associated with an increased occurrence of plague. However, after adjusting for season and locality, increased flea index (risk ratio per SD [RR]: 1.08; 95%CI: 1.04-1.12) and low humidity (RR 1.16; 1.00-1.35) were independently associated with the risk of plague occurrence.

### CONCLUSIONS

These data suggest that flea index and humidity could be used as ecologic indicators of plague risk in Vietnam. The data also suggest the occurrence of plague was likely resulted from multiple causes which remain to be delineated.

06.3 Reference: 20080247

Track: Vector borne diseases

## Prevalence of anti-TBEV antibodies in goats as a tool to validate high-risk areas for tick-borne encephalitis in Poland

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### BACKGROUND

To assess the risk of tick-borne encephalitis virus (TBEV) infections in particular regions of Poland, the official surveillance figures need to be validated by data from independent sources. The aim of the present study was to utilize the TBEV seroprevalence in goats to confirm the presence of endemic regions in Poland.

### METHODS

The material for this seroprevalence study were serum samples (n=1,122) collected from goat breeding farms in 2006-2007. A cluster sample from farms located throughout the country was selected. Testing was performed using FSME ELISA IgG test (Genzyme Diagnostics Virotech, DE) adapted previously for testing clinical specimen from goats. Standard errors for anti-TBEV antibody prevalence were adjusted for cluster sampling method.

### RESULTS

Fifty-two sera were positive for anti-TBEV antibodies, for an overall prevalence of 4.6% (95% CI 2.7-6.5). Seroprevalence in endemic provinces was 27/339 (8.0%, 95%CI 3.5-12.5), and was higher compared to non-endemic provinces – 25/783 (3.2%, 95%CI 1.4 – 5.0). When looking only at 1 year-old goats (recent infections), the difference was even more striking (7.3% in endemic vs. 2.1% in non-endemic provinces). There were marked differences in anti-TBEV prevalence in particular clusters. In herds with >10 goats tested, the proportion of seropositive goats ranged from 2.1% (1/47) in a non-endemic province to 40% (6/15) in an endemic area.

### CONCLUSIONS

The present study indicates the possible existence of endemic foci in regions, where no human TBE cases were reported to the routine surveillance system. Valid ascertainment of regions with increased risk for TBE infections is crucial for precise assessment of probability of milk-borne transmission from household animals. Due to low mobility, goats can serve as sensitive indices of local TBEV circulation.

06.4 Reference: 20080099

Track: Vector borne diseases

## Assessing the risk of importing chikungunya virus into the European Union

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### BACKGROUND

Chikungunya virus (CHIKV) is transmitted through the bite of infected *Aedes* mosquito. The disease re-emerged in 2005-2006 resulting in large outbreaks in the Indian Ocean and Asia. A competent vector is established in 5 EU member states and there is a large flow of air-passengers between the EU and endemic/epidemic countries. In summer 2007, local transmission occurred in Italy, with the index case returning from India. To assess the risk of CHIKV importation and transmission in the EU we estimated the number of viremic air-passengers and duration of viremia (viremic person-days) arriving in areas with established *Aedes albopictus*.

### METHODS

We built a deterministic model based on quarterly incidence of CHIKV in endemic/epidemic countries (WHO, national health institutes), quarterly number of air-passengers arriving in the EU from endemic/epidemic countries (international flights databases), proportion of asymptomatic cases and average duration of viremia (literature).

### RESULTS

Based on direct passenger flow data for the EU and India, an estimated 6 viremic person-days arrived in *Aedes*-infested areas in the EU in 2006. All arrived in Italy, during quarters 2&3, when the vector is most active. Using passenger flow data including stopovers from both India and Réunion Island to Italy, an estimated 10 viremic person-days arrived in *Aedes*-infested areas in Italy during the same period.

### CONCLUSIONS

While it is likely that reported CHIKV incidence in endemic/epidemic countries is underestimated, these results suggest that local transmission of CHIKV can be triggered by a relatively low number of viremic-person days. Information on personal protection to travellers visiting endemic/epidemic countries, early diagnosis of CHIKV infection and timely implementation of vector monitoring and control measures should be a priority in the EU areas where the vector is established.

06.5 Reference: 20080096

Track: Vector borne diseases

## Assessing the risk of importing dengue viruses into the European Union

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### BACKGROUND

Dengue virus fever has been rising worldwide, while a competent transmission vector, *Aedes albopictus*, has established itself in some European Union (EU) member states. With increasing air-travel, the risk of viremic individuals entering the EU from endemic countries and introducing dengue virus also increases. We attempted to quantify the number of viremic person-days among travellers arriving in EU, as a first step towards estimating the likelihood of local transmission within EU.

### METHODS

A Monte Carlo simulation model was developed with the following parameters: probability distributions based on quarterly incidences in endemic countries (years 2003-2007), passenger flow from endemic to EU countries (year 2006), duration of viremia, probability of being viremic upon arrival in EU, period of vector activity in the EU (April to October).

### RESULTS

Throughout 2006, the median dengue viremic person-days estimated among air-travellers arriving in EU was 4763 (range 3067-7019 person-days). Highest estimates were among travellers from Asia during the third quarter (median 740 person-days), followed by travellers from South America and again Asia during the first quarter (median 579 and 475 person-days respectively). A median 169 dengue viremic person-days were estimated among travellers arriving in EU *Aedes*-infested areas from April to October, the majority arriving in Italy (130 viremic person-days).

### CONCLUSIONS

We highlighted a high number of dengue viremic person-days among air-travellers arriving in EU, with the highest number in Italy when the vector is active. Although no dengue virus transmission has been documented so far in Europe, vigilance is warranted. Medical advice to travellers visiting endemic countries, as well as a rapid diagnosis capacity and the implementation of vector surveillance and control measures should be considered a priority in EU areas harbouring the vector.

07.1 Reference: 20080107

Track: Health care associated infections

## A hospital acquired *Staphylococcus aureus* skin infection outbreak in neonatal unit at a district hospital of Nan province, Thailand, January 2008

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### BACKGROUND

In January 2008, a district hospital had detected an increasing number of neonates with skin infection. FETP was notified to help identify source and control the outbreak during 26–31 January 2008.

### METHODS

We invited parents and newborns who delivered during 1-25 Jan 2008 for physical examination and interview. Probable cases were defined as neonates, delivered 1-25 Jan 2008, with pustule, bulbous, bleb or peeling skin at any sites. Confirmed cases were probable cases with culture positive for *S. aureus*. We reviewed medical records, duty schedule, interviewed and observed hospital staffs who worked in delivery room. Samples were collected from hands, nostrils and equipments. A historical cohort study was conducted.

### RESULTS

56 (79%) of 71 neonates came for examination. We identified 14 probable cases and 16 confirmed cases. Most cases had bullous (93%), pustule (17%) and peeling skin (3%). Lesions were at neck (47%), trunk (36%), axilla (30%), and groin (23%). Median age at onset was 4 days. Radiant warmer, weighing equipment and bathing counter had no regular disinfection. Hand washing practice was not strict. Culture from skin lesion and equipment found identical *Staphylococcus aureus*, MSSA- Phage type 29/52/80/3C/55/95/81/94/96. *Staphylococcus aureus* was also found in 2/34 personnel. From multiple logistic regression, exposing to staff-A4, symptomatic cases and ward-PP1, increased risk of illness, with adjusted OR and 95%CI equal 28.05 (3.47-226.91), 17.34 (2.08-144.38), and 13.98 (1.17-167.21), respectively.

### CONCLUSIONS

A hospital acquired *Staphylococcus aureus* skin infection outbreak in this district hospital was associated with contaminated equipment. Hospital staff was the most likely source of infection. We recommended the hospital to clean and disinfect delivery room and neonatal unit, isolate the infected neonates, treat the carrier and strengthening hand washing practice.

07.2 Reference: 20080227

Track: Health care associated infections

## Risk factors for community-onset urinary tract infection (UTI) with extended spectrum beta-lactamase (ESBL) producing *Escherichia coli* in London and South East England

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### BACKGROUND

Extended spectrum beta-lactamase (ESBL) producing Enterobacteriaceae are an increasing problem, with rising incidence reported from both hospital and community settings in the UK and elsewhere. Several studies have investigated risk factors for acquisition of ESBL positive infections in hospitals, but there is scant information on factors associated with these infections in community settings.

### METHODS

A case-control study was set up to investigate risk factors for community-onset ESBL-producing urinary tract infection (UTI) in London and South East England. Both cases and controls were patients with an *Escherichia coli* UTI who had a urinary specimen sent for laboratory testing by their GP (primary care doctor). Specimens from cases were reference laboratory confirmed as positive for ESBL-producing *E. coli*, whereas controls were negative for ESBL production. Questionnaires were sent to patients' GPs, asking for details of hospital admissions, institutional care history, co-morbidities, medication history, and patient outcome.

### RESULTS

184 questionnaires were returned, 56 relating to cases and the remainder to controls. On univariate analysis, the following factors were significantly associated with risk of UTI with ESBL-producing *E. coli* in community settings: being hospitalised in the year before UTI (OR 2.0, 95%CI 1.0-3.7), being admitted to a nursing home (OR 3.7, 1.4-10.0) or residential care (OR 3.9, 1.2-12.7), having a urinary catheter in the community (OR 2.8, 1.0-7.6), receiving antimicrobials in the year prior to infection (OR 2.7, 1.0-7.6), and having dementia (OR 3.0, 1.1-7.7). Results of the multivariate analysis will be presented.

### CONCLUSIONS

This study has identified risk factors associated with community onset of ESBL-producing *E. coli* UTI. These findings should raise awareness of risks associated with ESBL-producing *E. coli* towards better diagnosis, treatment and prevention.

07.3 Reference: 20080167

Track: Health care associated infections

## Healthcare-Associated Infection in Italy: annual point prevalence surveys, 2002-2004

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### BACKGROUND

Healthcare associated infections (HAI) are frequent complications in healthcare facilities. In industrialized countries 5%-15% of all hospitalized patients develop an HAI. In order to gain a better understanding of the epidemiology of HAI in Italy, we conducted repeated annual prevalence-surveys in a sample of Italian hospitals.

### METHODS

A total of 9609 patients were surveyed in 53 hospitals during 3 annual point prevalence surveys conducted on October -November between 2002-2004. Associations between HAI and selected characteristics were assessed by estimating odds-ratio with a multivariate logistic regression (MLR-OR) model. Linear trend in the probability of infection was assessed using the same multivariate model.

### RESULTS

The HAI prevalence was 6.1%, with lower respiratory tract infections (LRTI, 35.8%) more frequent than urinary tract infections (UTI, 23.6%). Invasive procedures (MLR-OR 3.92), hospital staying >15 days (MLR-OR 10.4), intensive care unit staying (MLR-OR 10.23), previous hospitalization (MLR-OR 1.57), chemotherapy (MLR-OR 2.11), trauma (MLR-OR 1.55), coma (MLR-OR 1.91) and country location (South vs North MLR-OR 0.52) were all factors associated with occurrence of HAI. HAI prevalence showed no statistically significant differences over period; however a steady increase of blood stream infection (BSI) and a similar reduction of UTI were observed (only BSI variation was significant). Enterobacteriaceae and Pseudomonaceae were the most common isolate respectively in medical/ surgical wards and intensive care unit.

### CONCLUSIONS

The HAI prevalence we found is similar to other European and Italian studies (3.5 - 11.6%). Nevertheless we found LTRI more prevalent than UTI and this difference can be explained by different studies designs. Moreover our findings are consistent with the most recent findings that report a steady increase of BSI during the last years especially in older population.

07.4 Reference: 20080110

Track: Health care associated infections

## Epidemiology of nosocomial Norovirus outbreaks and measures taken to control them, Germany, 2007

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### BACKGROUND

In Germany, gastroenteritis outbreaks and laboratory confirmed cases of Norovirus gastroenteritis are notifiable. In 2007, Norovirus gastroenteritis was, with over 200,000 cases, the most frequently notified disease. Institutional Norovirus outbreaks, responsible for over 75% of these cases, significantly impacted on resources. We aimed to describe the epidemiology of nosocomial Norovirus outbreaks and the impact of measures taken to control them.

### METHODS

We investigated notified nosocomial Norovirus outbreaks with onset in 2007 in 19 Hessian counties (total population 4,157,822). In addition to case-based data we collected information on ward speciality, availability of infection control management plans for Norovirus outbreaks (ICMPs) and measures taken using a standardised, pretested questionnaire (in 2005-6). We used bed availability data to calculate outbreak incidence rates (IR) and 95% confidence intervals (CI) by medical speciality.

### RESULTS

During the study period 156 notified outbreaks affected 3381 persons (2721 patients, 660 employees) on 312 wards. Outbreak incidence varied widely between ward specialities (geriatrics: IR 44.3 outbreaks/1000 beds, CI 30.7-61.9/1000; internal medicine: IR 28.9 outbreaks/1000 beds, CI 24.1-34.4/1000; paediatrics: IR 23.4 outbreaks/1000 beds, CI 11.2-43.1/1000; surgery: IR 7.2 outbreaks/1000 beds, CI 4.8-10.4/1000; gynaecology: IR 5.0 outbreaks/1000 beds, CI 1.8-10.8/1000). In 148 (94.9%) hospitals with ICMPs median outbreak duration was 12 days (minimum 2, maximum 167) and median number of cases per outbreak 11 (minimum 2, maximum 522). 15.1% (43/284) of affected wards were closed to new admissions.

### CONCLUSIONS

Implemented infection control practices insufficiently controlled nosocomial Norovirus outbreaks and need further development. Measures suitable to limit the emergence of outbreaks, e.g. early identification and management of (possible) single cases may need to be strengthened, especially by specialities with high outbreak incidence rates.

07.5 Reference: 20080098

Track: Health care associated infections

## Incidence surveillance of surgical site infections after coronary artery bypass graft

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### BACKGROUND

Surgical site infections (SSIs) lead to additional burden for patients and the health care system. A mandatory national surveillance system was introduced in Norway in 2005 in order to provide incidence rates and identify risk factors for SSIs following certain surgical procedures, including coronary artery bypass graft (CABG).

### METHODS

Seven hospitals in Norway perform CABG. In 2005-2007 they were invited to assess all patients for SSIs in three-month periods. Vascular harvest site infections were included from 2006. The hospitals evaluated infection status at discharge and 30 days after surgery by sending post-discharge questionnaires to all patients. The hospitals transferred data to the national database. We calculated incidence proportions (2005 excluded for harvest site infections) and a risk index as predictor of infection (categories 0-3) based on the patients' physical status, duration of surgery and wound contamination. We returned local and national results to each hospital.

### RESULTS

The number of hospitals that submitted data increased from two in 2005 to five in 2007. In total, 1461 patients were included and 93% were followed for 30 days. Sixty sternal and 95 harvest site infections were registered, corresponding to an incidence proportion of 4.1% (95% CI 3.1%-5.1%) and 7.3% (95% CI 5.9%-8.7%), respectively. Over 92% of infections occurred post-discharge. Incidence did not increase with higher risk index; however, 95% of the patients fell into risk category 1.

### CONCLUSIONS

The results show the importance of post-discharge follow-up. Results should be used locally to reduce incidence. Improved predictors of infection need to be developed. In an effort to obtain this, a different risk index (Euroscore), and variables like body mass index and diabetes will be included in 2008.

o8.1 Reference: 20080013

Track: HIV - STI epidemiology

## HIV infection late detection in AIDS patients of an European city with increased immigration since mid 1990s

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### BACKGROUND

Late detection of HIV infection in patients with AIDS is still a matter of concern all over the world. In Barcelona, an European city where number of immigrants has increased by 83% from 1990 to 2006, we explore what are the differential characteristics of patients with AIDS and its relation with late diagnosis is a key to implement measures to improve timely detection of HIV infection.

### METHODS

This study used AIDS surveillance data base of Barcelona city (1987 – 2006). Patients were defined as late testers, if they were diagnosed of an AIDS defining illness within less than 3 months from the time of testing positive for HIV infection. Independent variables: date of birth, sex, country of origin, HIV transmission category, prison history, city district of residence, immunological state and HAART era when diagnosed. We analysed (T test and chi2, OR and 95% CI) and logistic regression of all significant variables.

### RESULTS

Among the 6186 AIDS patients, 43.9% (n=2741) were late testers. Being a male, (OR: 1.60, 95% CI: 1.37-1.86), either < 30 years (OR: 1.21, 95% CI: 1.06-1.38) or > 40 years, (OR: 1.19, 95% CI: 1.02-1.38) with an increasing trend with age, of Latin American origin (OR: 1.35, 95% CI: 1.01-1.80) with homo-bisexual (OR: 1.97, 95% CI: 1.70-2.29) or heterosexual (OR: 3.06, 95% CI: 2.60-3.64) routes of transmission, and being diagnosed of AIDS during the initial HAART era (1997-2000) (OR: 1.28, 95% CI: 1.10-1.51) were all independent risk factors for being a late tester.

### CONCLUSIONS

During the last HAART era (2001-2006) no significant improvement in HIV infection detection has happened. Therefore, it is necessary to improve risk communication among persons with a sexual risk behaviour and migrants.

08.2 Reference: 20080033

Track: HIV - STI epidemiology

## Emergence of Lymphogranuloma venereum in MSM in Sweden

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### BACKGROUND

Lymphogranuloma venereum (LGV), a subtype of *Chlamydia trachomatis*, has in recent years become more common among men who have sex with men (MSM). Sporadic imported cases of LGV occurred in Sweden in the past but in 2007 the first outbreak of LGV among MSM was registered with domestic spread in two metropolitan areas. The aim of our study was to describe reported LGV cases in 2007 in order to define common features and draw recommendations to contain further spread of LGV in Sweden.

### METHODS

A LGV case was defined as a person with laboratory verified *Chlamydia trachomatis* (CT) genotype L1, L2 or L3. The national electronic database with epidemiological information on individual reported LGV cases was used to describe cases by sex, age, county of residence, country of infection and route of transmission was done. Additional information on HIV-status, other STIs, sexual behaviour and contact tracing was obtained by physicians or social workers.

### RESULTS

All 15 LGV patients diagnosed in 2007 were MSM from two metropolitan regions (Stockholm and Skåne). Among 15 patients all except one were symptomatic (proctitis and/or genital ulcer) and 73% were HIV positive. Fourteen patients acquired the infection in Sweden. Six of 12 patients from Stockholm belonged to the same sexual network. Anonymous sexual contacts were common among these LGV cases. In many of the cases the diagnosis of LGV and treatment was delayed.

### CONCLUSIONS

This is the first outbreak of LGV with domestic spread in Sweden. High risk behaviour among MSM requires more effective preventive campaigns. To contain domestic spread of LGV we recommend LGV to be included in the differential diagnosis in MSM who present with proctitis or genital ulcers.

08.3 Reference: 20080116

Track: HIV - STI epidemiology

## Chlamydia trachomatis among German adolescents – screening sexually active females is warranted

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### BACKGROUND

Chlamydia trachomatis (Ct) is worldwide the most common sexually transmitted bacterial infection; however, there are no representative data for Ct prevalence in Germany. A nationwide health survey, based on a representative sample of 0-17 year-olds, was conducted 2003-2006. Urine samples from this survey were tested for Ct to estimate baseline prevalence and provide recommendations for chlamydia screening.

### METHODS

We selected a random age-stratified (12-17years) sample of 1815 males and females from 5,755 participants. Urine samples were pooled (4x500µl) and tested for Ct (BD ProbeTec ET System). Positive urines were individually retested. We calculated prevalence, prevalence ratios (PR) and 95% confidence intervals (CI). We examined associations between infection and socio-demographic factors (age, sex, education, place of residence), sexual activity (defined by oral contraceptive use or gynaecologist visits) and abdominal pain among females.

### RESULTS

Sixteen (0.9%, 95%CI 0.5-1.3) samples, all from 15-17 year-olds, were positive for Ct. Prevalence increased with age to 2% (95%CI 0.8-3.2) among 17 year-olds and was higher among females than males (1.8% vs. 0.1%; p=0.000). 4.1% (95%CI 1.9-6.3) of sexually active females were infected and 6/11 of them had no regular abdominal pains. Of all females with abdominal pains, 52% had visited gynaecologists. Prevalence was higher among those with pains than those without (PR=3.8, p=0.01).

### CONCLUSIONS

This is the first nationwide study based on a representative sample of males and females to measure Ct prevalence. Prevalence in Germany is consistent with other countries and among sexually active females comparable to screening thresholds. As gynaecological visits were common among symptomatic persons, we recommend gynaecologists to actively offer screening to sexually active adolescents and strengthening the newly implemented screening for females under 25 years.

08.4 Reference: 20080176

Track: HIV - STI epidemiology

## Results of STI Sentinel Surveillance in Germany: Comparison of Data from local health offices and private practitioners

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### BACKGROUND

Since syphilis and HIV are the only notifiable STI in Germany, a STI sentinel surveillance system was set up in Germany in late 2002.

### METHODS

The nation-wide sentinel system collects data from 62 local health offices (LHO) and 163 private practitioners (PP, gynaecologists, dermatologists, urologist and HIV-specialists). In case of any infection with HIV, N. gonorrhoea, chlamydia trachomatis, syphilis or trichomoniasis, a diagnosis questionnaire (DQ) was provided by the physician including diagnosis, presumed mode of transmission and other demographic information. Additionally, quarterly questionnaires (QQ) about total number of clients, tests performed and positive results were allocated by PP and LHO.

### RESULTS

In total 446,691 patients attended LHO (71.3%) and PP between January 2003 and June 2008. 53.3% (n=6,461) of all STI reported in QQ (n=12,120) were diagnosed by PP. Additional DQ for diagnosed STI reported in QQ were submitted more frequently by LHO than PP (78.2% vs. 22.6%). 7,059 DQ were available for analysis. 88.4% of STI diagnosed by PP as opposed to 40.2% in LHO were among men. LHO patients were younger than PP patients (29 vs. 34 yrs). The most frequent mode of transmission in LHO and PP was sex work (44.1%) and sex between men (64.1%) respectively. The most frequent STI in LHO and PP were chlamydia (40% vs. 27.1%), gonorrhoea (21.1% vs. 39.5%), HIV (22.5% vs. 9.9%) syphilis (13.8% vs. 30.3%) and trichomoniasis (8.3% vs. 2.7%).

### CONCLUSIONS

These data underline the importance to include PP in addition to LHO in such sentinels as clientele and spectrum of diseases diagnosed at LHO and PP differ substantially. Stronger efforts and incentives are needed to further improve quality and completeness of data from PP.

08.5 Reference: 20080166

Track: HIV - STI epidemiology

## Compliance with national guidelines for antiretroviral therapy initiation and initial regimen prescription in a multicentre cohort of HIV-infected patients in Spain, Jan 2004-May 2008

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### BACKGROUND

We aimed to determine compliance with national guidelines regarding initiation of antiretroviral therapy (ART) and initial regimen prescribed in a multicentre cohort of HIV-infected patients in Spain (January 2004-May 2007).

### METHODS

Between January 2004-May 2007, we recruited HIV-positive, antiretroviral-naïve patients from 17 hospitals in 8/17 Spanish Autonomous Regions into a prospective cohort study (CoRIS). Data collected using a standardized questionnaire during patients' visits at participating hospitals included sociodemographic data, HIV transmission category, clinical/biological parameters and ART drugs. Criteria for treatment initiation were having AIDS or a CD4 cell count  $< 20,000$  HIV-RNA copies/ml (PCR). We examined factors associated with treatment initiation, failure to treat when meeting treatment criteria and receiving regimens not recommended. Regimens were classified as "recommended" (R) and "not recommended" (NR) comparing with guidelines. We estimated odds ratios (OR) and 95% confidence intervals (CI) using logistic regression.

### RESULTS

We included 2954 patients, mostly males (76%) and Spanish (72%); 40% were men who have sex with men (MSM), 39% heterosexuals and 19% injection drug users (IDU). Of 2954, 1774 (60%) initiated ART and 19% developed AIDS. Out of 1180 untreated, 240 (20%) met treatment criteria. Predictors of failure to treat when meeting criteria were the centre ( $p < 0.05$ ) and the transmission category ( $p = 0.006$ ). IDUs were less likely to initiate treatment than heterosexuals (OR 2.0, 95%CI 1.4 – 3.0). Thirty-one patients (2%) received NR regimens. Only education level ( $p = 0.003$ ) and centre ( $p < 0.005$ ) were associated with NR regimens.

### CONCLUSIONS

IDUs are at higher risk of not initiating treatment when meeting treatment criteria and should be investigated further for better targeting of this group in interventions. Nevertheless, among treated, prescription of NR regimens is very uncommon in CoRIS.

**09.1 Reference:**

**Track: Outbreaks**

**Preliminary epidemiological investigations  
on melamine contamination in China**

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09.2 Reference: 20080249

Track: Outbreaks

## Outbreak of staphylococcal intoxication after consumption of pasteurized milk drinks, June 2007, Austria

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### BACKGROUND

On 13.06.2007, the public health authority reported 40 pupils from two schools had fallen ill with abdominal cramps and vomiting on June 8. Milk drinks provided to 10 schools on June 8 by dairy X were suspected as outbreak source. The short incubation period – all cases fell ill the day the drinks were consumed – and the short duration of illness (1-2 days) suggested intoxication. Descriptive-epidemiological, microbiological investigations, and a cohort study were conducted to identify the causative agent and mode of transmission.

### METHODS

Out of 10 schools provided by dairy X, six had completed the questionnaires. One school only had a sufficient response rate (79%) and was the basis for our cohort study analysis. A case was a child present in one of the schools provided by dairy X on June 8 who developed vomiting or abdominal cramps that day. Food samples were cultured and tested for staphylococcal enterotoxins.

### RESULTS

166 of 1025 pupils (16.2%) from nine of the 10 schools fulfilled the case definition. Consumption of milk drinks on June 8 was associated with illness (RR 37.8; 95%CI: 12.3-116.5;  $p < 0.001$ ). Left-over milk drinks yielded staphylococcal enterotoxins A and D (SEA/SED). Milk samples from cows delivering milk to dairy X tested positive for SEA/SED producing *S. aureus*. Nasal swab *S. aureus* isolates from the dairy owner tested negative for SEA/SED.

### CONCLUSIONS

The investigation revealed milk drinks from dairy X as the likely outbreak source. Cows were the likely reservoir of enterotoxins producing *S. aureus*. We hypothesize staphylococcal toxin production occurred in pasteurized milk during a 3-day storage in dairy X prior to re-pasteurization for production on June 7. An amendment of the existing HACCP system was recommended.

## 09.3 Reference: 20080034

## Track: Outbreaks

**Effect modification in a foodborne norovirus outbreak – November 2007, Sweden**

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**BACKGROUND**

In November 2007 over 400 employees at a company fell ill with gastroenteritis. All cases were working in the same unit with 2003 employees. We conducted an investigation to determine the source and etiologic agent of the outbreak.

**METHODS**

A retrospective cohort study was conducted among employees working in the affected unit using web-based questionnaires. Cases were persons with one or more of the following symptoms after 18:00 November 12: diarrhoea, vomiting, nausea, abdominal pain. Risk ratios (RR) were calculated using univariate, stratified and multivariable binary regression analyses. Microbiological tests were performed on samples from patients' stools.

**RESULTS**

Of 1744 respondents 306 (18%) met the case definition. Canteen visitors on 12 November had an increased risk of illness (RR 27.1 95%CI=15.7–46.8) compared to non-visitors. Among canteen visitors, tomato consumption (RR 3.6 95%CI=2.4–5.2) was clearly associated with illness while hamburger consumption (RR 1.5 95%CI=1.1–1.9) was borderline associated. In stratified analyses, the risk for illness associated with hamburger consumption among those not exposed to tomatoes was 4.9 (95%CI=2.4–9.8), and among those who ate tomatoes 1.1 (95%CI=0.8–1.6). In a multivariable model including an interaction term, the adjusted RRs for hamburger and tomato consumption were 4.9 (95%CI=2.4–9.8) and 5.6 (95%CI=3.2–9.6), respectively. Norovirus genogroup I was isolated from stool samples of all three tested cases and of a kitchen worker who fell ill on 12 November. This kitchen worker handled the tomatoes and hamburgers.

**CONCLUSIONS**

Tomatoes and hamburgers were the likely vehicles of the outbreak. If we had not checked for effect modification by tomato exposure using stratified analyses, the association with hamburgers would have been missed. Checking for effect modification is therefore important in foodborne outbreaks.

09.4 Reference: 20080117

Track: Outbreaks

## An outbreak of leptospirosis among seasonal strawberry harvesters, Germany 2007

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### BACKGROUND

Leptospirosis is a zoonotic disease usually transmitted through contact to urine of infected rodents. In July 2007, a suspected outbreak of leptospirosis was notified among strawberry harvesters from Eastern Europe working on one farm in North Rhine-Westphalia, Germany. An investigation was initiated to identify the outbreak source and risk factors for infection.

### METHODS

We conducted a retrospective cohort study. Since harvesters had returned home, questionnaires were administered by health authorities in Romania, Slovakia and Poland. Collected sera were tested by microscopic agglutination test. A case was a person working on the strawberry field between 05/06-08/09/2007, with leptospirosis compatible symptoms (suspected case) and an antibody titre  $\geq 1:100$  against serovar Grippityphosa (confirmed case). Risk ratios (RR) and 95% confidence intervals (CI) were determined by multivariable analysis. Rodents caught from the same field were examined for leptospirosis.

### RESULTS

We detected 16 confirmed and 11 suspected cases with onset between 19/06-25/08/2007 among 153 strawberry harvesters (attack rate 18%). Median age of cohort was 33 years; 54% were females. Risk of disease increased with each day worked in rain with hand cuts (RR=1.1/day, 95%CI1.0-1.1) or touching rodents (RR=2.6, 95%CI1.4-4.9). High density of rodent holes was observed at the outbreak site. Six of seven common vole (*Microtus arvalis*) sera tested positive for serovar Grippityphosa.

### CONCLUSIONS

This is the largest leptospirosis epidemic in Germany since the 1960s. Contact between hand lesions and water/soil contaminated by vole urine was the most likely outbreak source. Common voles were identified as the reservoir. The unusually warm winter of 2006/2007 supported vole population growth and probably contributed to leptospirosis re-emergence in Germany. For occupations with frequent exposure to rodents, we recommend waterproof dressings to cover wounds and wearing gloves.

09.5 Reference: 20080051

Track: Outbreaks

## High Varicella Vaccine Effectiveness during Outbreaks in Child Day Care Centres, February – Mai 2008, Berlin, Germany

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### BACKGROUND

Routine varicella vaccination for children older than 11 months was introduced in Germany in 2004. During spring 2008 the Robert Koch-Institute investigated four outbreaks in Child Day Care Centres (DCCs) in order to evaluate post-licensure vaccine effectiveness (VE).

### METHODS

We performed a cohort-study among 626 children. DCC's staff provided demographic information of children and distributed questionnaires to parents requesting disease and vaccination histories. Vaccination records were reviewed to confirm vaccination status. A case was defined as child with varicella in 2008 as reported by physician or parents. VE was calculated by comparing attack rates among vaccinated and unvaccinated. Children with previous history of varicella, younger than 11 months, vaccinated when <11months old or <42 days before disease onset were excluded from VE analysis. Disease was classified as mild (<50 skin lesions), moderate ( $\geq 50$  lesions) and severe (hospitalised).

### RESULTS

Information on vaccination and disease status was available in 375 (60%) children. Sixty-two percent of children were vaccinated at least once, differing by DCC (52-90%) and age (84% if born in 2006). For VE calculation, 305 (49%) children were eligible. Attack rate in vaccinated was 11%, in non-vaccinated 54%. VE was 79% (RR 0.21, CI 0.14-0.32) against disease of any severity and 95% (RR 0.05, CI 0.02-0.13) against moderate disease. No severe case was reported. VE among vaccinated with one and two doses was 59% (RR 0.41, CI 0.26-0.66) and 78% (RR 0.22, CI 0.09-0.52), respectively.

### CONCLUSIONS

VE is high among the population born between September 2001 and March 2007. Vaccine protection appears to be higher for 2-dose vaccination schedule and against moderate disease. Vaccine uptake is not high enough to prevent outbreaks.

## 10.1 Reference: 20080105

Track: Novel methods for epidemiological investigations

## Determining norovirus aetiology from viral load

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### BACKGROUND

Norovirus is the most common cause of infectious intestinal disease (IID). Diagnosis is mainly by RT-PCR, but up to 16% of healthy individuals may be RT-PCR positive. It is therefore unclear whether norovirus is causing illness when detected by RT-PCR in an IID case. The aim of this study is to identify a cut-off in viral load to determine when norovirus is the likely cause of IID.

### METHODS

TaqMan real-time PCR was used to determine the viral load in stool specimens from 92 community IID cases and 159 healthy controls positive for norovirus genogroup II. The real-time PCR cycle threshold (Ct) value was used as a measure of viral load and is inversely related to the amount of virus in the stool specimen. The median Ct value was compared between cases and controls using the rank-sum test. Receiver-operator characteristic analysis and Youden's index (sensitivity + specificity -1) were used to select the optimal Ct value cut-off.

### RESULTS

The median Ct value was substantially lower in cases (24 [Interquartile range 22-28]) than in controls (37 [IQR 34-39]) ( $p < 0.001$ ), indicating a higher viral load in cases. The optimal Ct value cut-off for classifying norovirus as the cause of IID was 31 (Youden Index = 0.77, sensitivity = 0.88, specificity = 0.89).

### CONCLUSIONS

This study has identified a viral load cut-off to determine when norovirus is causing illness in an RT-PCR positive IID case. Clinical management of IID and the strategy of outbreak control are contingent upon the pathogen causing illness. When RT-PCR is used for diagnosing norovirus as the cause of an outbreak or IID case, the viral load needs to be considered to minimise misdiagnosis when another pathogen is the true cause of illness.

10.2 Reference: 20080074

**Track: Novel methods for epidemiological investigations**

## Using routine statutory health insurance data to determine varicella vaccination coverage for 2-year-old children born in 2004 in Germany

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### BACKGROUND

Since July 2004, vaccination against varicella is recommended by the German Standing Vaccination Committee (STIKO) for all children. Health Insurance Funds (HIF) started to cover vaccination costs at different dates in the federal states. Surveillance data on the vaccination status of under-school-aged children are not available. We aimed to determine varicella vaccination coverage in 2-year-old children using secondary data of the regional associations of statutory health insurance physicians (ASHIPs).

### METHODS

In order to receive payment from HIF, physicians are obliged to be member of an ASHIP and to report their provided services quarterly. We analysed data including vaccination status and demographic characteristics from 10 of 17 ASHIPs. The study population consisted of all statutory health insured children under 2 years born in 2004 in 9 federal states, followed-up for 24 months ( $n=375.746$ , corresponds to 85% of all children born in 2004 in the respective states). Vaccination coverage was determined by the number of vaccinated children under 2 years to the number of statutory health insured children under 2 years.

### RESULTS

In the federal states, vaccination coverage for 2-year-old children born in 2004 was 68% (Saxony-Anhalt), 53% (Brandenburg), 50% (Saarland), 42% (North Rhine-Westphalia), 39% (Schleswig-Holstein), 30% (Saxony), 19% (Bavaria), 17% (Lower Saxony) and 9% (Bremen). Thus, the average vaccination coverage of children was 36%. Of those children, 57% were vaccinated at the recommended age of 11 – 14 months.

### CONCLUSIONS

The range of the average varicella vaccination coverage in 2-year-old children might be explained by different regulations for cost coverage in the federal states during the period of investigation. The results indicate that routine data from ASHIPs are suitable to determine vaccination coverage and to evaluate implementation of vaccination recommendations.

## 10.3 Reference: 20080125

Track: Novel methods for epidemiological investigations

## Development of an algorithm to guide diagnostics for Public Health professionals in gastro-enteritis outbreaks

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### BACKGROUND

Outbreak diagnostic does aim at determining the etiology of the outbreak at the group level. Our aim was to develop an algorithm to guide diagnostics for Public Health professionals for gastro-enteritis outbreaks.

### METHODS

We reviewed surveillance data of gastro-enteritis outbreaks and specific studies in the Netherlands against the following questions: 1. what are indications for diagnosis of outbreaks in public health? 2. which data can be used in triaging for the choice of diagnostic methods? 3. what is the most cost-effective preferred diagnostic work-up. An inventory of available diagnostic tests was done.

### RESULTS

For Public health action, diagnosis of food-borne outbreaks and those in health care settings were considered to be important. Review of available data showed that for outbreaks in health care settings the primary etiological agent is norovirus, while restaurant associated outbreaks were as frequently caused by norovirus as by bacterial pathogens (19% and 22% respectively). In daycare center outbreaks, parasites were found in 10% of the outbreaks, in addition to viruses. Clinical symptoms like bloody diarrhoea, fever of vomiting could not distinguish between various pathogens. The basic diagnostic algorithm for all settings proposes to screen at least 5 persons for rota- and norovirus (antigen testing followed by PCR), and starting routine testing for bacterial agents when the virus assays are negative, unless specific indications exist. For outbreaks with specific symptoms (e.g. bloody diarrhoea, mortality) or food-borne origin more extensive first-line diagnostics are recommended.

### CONCLUSIONS

The majority of outbreaks can be diagnosed by including norovirus, rotavirus, salmonella and campylobacter, in which a step-wise approach starting with virus testing is most cost-effective. Availability of detection techniques for norovirus are essential for diagnostic in outbreak settings.

10.4 Reference: 20080151

**Track: Novel methods for epidemiological investigations**

## Binomial CUSUMs for the surveillance of infectious diseases

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### BACKGROUND

Automatic algorithms for the monitoring of infectious diseases are an important tool for handling the massive amounts of data available from routine public health surveillance. In this work we focus on detecting changes in the behaviour of a binomial time series. An application of this in influenza surveillance is monitoring the proportion of positive throat swabs. Other areas of application in sentinel surveillance are the investigation of antibiotic resistance or the study of vaccine efficacy.

### METHODS

Taking the seasonality of a disease into account is an aspect of outbreak detection often not handled by standard methods originating from statistical process control. Rogerson and Yamada (2004) use the cumulative sum (CUSUM) method as basis for developing a surveillance method for Poisson distributed data with time varying mean. We adopt their approach to the monitoring of a time varying proportion  $p$  in a binomial setting. This is done by re-weighting each contribution to the binomial CUSUM in order to maintain average run length properties. By estimating parameters of a seasonal logistic model from historic data one is thus able to on-line detect aberrations from such a model.

### RESULTS

A flexible time varying binomial CUSUM is provided, which allows one to detect changes from a given seasonal binomial time series model. Results from our proposal are compared to a likelihood-ratio based CUSUM using a simulation study and by applying both methods to the monitoring of throat swabs tested positive for the influenza virus in Lower Saxony, Germany.

### CONCLUSIONS

An implementation of the method is made publicly available through the add-on package 'surveillance' for R -- the free software environment for statistical computing and graphics.

## 10.5 Reference: 20080250

**Track: Novel methods for epidemiological investigations**

## Comparison of Salmonella sero-incidence in humans with published data on human and veterinary Salmonella epidemiology in Europe

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### BACKGROUND

Reported incidence rates of human salmonella infections are mostly derived from notifications of culture-confirmed cases. Factors such as health seeking behaviour, clinical practices, diagnostic practices in clinical laboratories lead to substantial underascertainment. The extent of underascertainment differs between countries and over time, making comparison of reported incidence rates problematic, if not misleading.

### METHODS

We used an in-house mixed-ELISA to measure antibodies against salmonella lipopolysaccharide antigens in large population-representative serum collections from seven European countries. We estimated the incidence of salmonella infections with a stochastic backcalculation model. Methodological details are explained by Simonsen et al. in a separate presentation at this conference. Here we compare our sero-incidence estimates with reported incidence rates, incidence estimates based on infection rates in Swedish travelers (de Jong, Ekdahl 2006), and data on prevalence of salmonella in chickens and pigs from the European Union baseline surveys 2004-2007.

### RESULTS

Sero-incidence estimates for Denmark, Finland, France, Italy, Poland, Romania and The Netherlands range from 5600 to 54300 infections per 100 000 person-years, ~100 to several 1000-fold the reported incidence. In contrast to the reported incidence, the sero-incidence estimates correlate with incidence estimates derived from Swedish travelers, with salmonella prevalence in layer hens and broilers (exception: France) and in slaughter pigs (exception: Poland).

### CONCLUSIONS

Sero-epidemiology is a new method to estimate and compare the incidence of salmonella infections in human populations independent of surveillance artifacts. Sero-incidence is not a direct measure of burden of illness, because it includes asymptomatic infections. Its correlation with salmonella prevalence in major food animal reservoirs suggests that it is a better metric of the infection risk for humans than the reported incidence of culture-confirmed cases.

11.1 Reference: 20080220

Track: Antimicrobial resistance

## **Outbreaks of nalidixic acid-resistant *Salmonella* Enteritidis phage type 1e with reduced susceptibility to ciprofloxacin in Great Britain and the Channel Islands linked to imported pasteurised egg products.**

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### **BACKGROUND**

The presence of *Salmonella* in egg products is a potential health threat. In 2007, outbreaks of infection with *Salmonella* Enteritidis phage type 1e resistant to nalidixic acid and with reduced susceptibility to ciprofloxacin (NxCP), were identified in Great Britain and the Channel Islands. Following the isolation of an indistinguishable salmonella serotype and resistance profile in liquid egg yolk, egg white and cases, a product recall was instigated through the sole UK distributor of these products.

### **METHODS**

In November 2007, we conducted a retrospective and prospective follow-up of all cases of *S. Enteritidis* PT 1e (NxCP), reported by the Laboratory of Enteric Pathogens in 2007, to ascertain food exposures and links to caterers supplied with implicated produce.

### **RESULTS**

Fifty-five (79%) of 70 cases were linked epidemiologically to the implicated product in 11 disparate clusters (Scotland 1, Jersey 2, England 7, Wales 1). Twelve cases could not be directly associated with either implicated products or supplied premises. Of these, eight cases in the east Midlands exhibited a high level of spatial and temporal proximity, suggesting a likely association. One patient died from their infection. All implicated dishes involved partially cooked egg products, including; salmon mousse (14), meringue pies (11), baked Alaska (9), chocolate or coffee mousse (7), cheese fritters (6), chocolate bombe (4), tiramisu (2) and raspberry roulade (2).

### **CONCLUSIONS**

These outbreaks involved pasteurised egg products as ingredients in lightly cooked foods. It is ironic that the affected caterers were applying due diligence in their prudent use of pasteurised liquid egg in these dishes, and underlies the need for stringent controls during the production of such ingredients, as the potential for serious illness exists if breakdowns in control measures occur.

**11.2 Reference: 20080173****Track: Antimicrobial resistance****Time trends in antimicrobial resistance surveillance are affected by the number of isolates collected***Sharon Kühlmann-Berenzon (1), P. Geli (1, 2), G. Kahlmeter (3, 4, 5)*

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**BACKGROUND**

In WHO guidelines, statistical aspects for analyzing year to year changes in antimicrobial resistance (AMR) surveillance are covered, but not those for detecting trends over time. Trends in a longer time perspective are relevant for policy makers providing recommendations for treatment. In Sweden all 29 laboratories report susceptibility for specified bacteria and antibiotics based on at least 100 consecutive clinical isolates. This number of isolates is usually collected within two months. The objective of this study was to investigate statistical requirements for sample size to detect time trends in the proportion of resistant isolates of *Escherichia coli* in AMR laboratory surveillance.

**METHODS**

Since 2000 County Kronoberg in Sweden has collected over 3000 consecutive *Escherichia coli* isolates every year within their AMR surveillance. We analyzed the proportion of resistant isolates to six antibiotics from 2000 to 2007. Time trends based on 100, 200, 500 and 1000 isolates were calculated by logistic regression.

**RESULTS**

Mean proportion of resistant isolates, number of isolates and number of time points influenced the trends observed. Using yearly data based on 100 or 200 isolates, no significant trends were found for any of the antibiotics. Trends based on 500 or 1000 isolates were significant for some antibiotics. With 1000 isolates, trends were also possible to calculate using monthly data, with the implication of narrower confidence intervals of the trend estimates.

**CONCLUSIONS**

The current sample of 100 isolates in the Swedish AMR laboratory surveillance is not sufficient for detecting trends and in fact may give misleading results. For time series analysis in a longer perspective, we recommend that the number of isolates be increased or made dependent on the resistance level.

**11.3 Reference: 20080039****Track: Antimicrobial resistance****MRSA Prevalence and Nosocomial Infections Control Indicators in French Hospitals**

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**BACKGROUND**

To assess whether nosocomial infections (NI) control indicators are associated with Methicillin-resistant *Staphylococcus aureus* (MRSA) prevalence in French hospitals.

**METHODS**

We linked the database of the 2006 national NI prevalence survey in which the prevalence rate of MRSA is available by hospitals with the database of NI indicators (ICALIN = indicator of infection control organisation, resources and actions and ICSHA = indicator of alcohol-based solution consumption) recorded from hospitals by the Ministry of Health. To take into account the fact that 2-level variables were included (patient: age, sex... and hospital: status, indicators...), we used a multilevel logistic regression model with random intercept. Because the MRSA prevalence was low and often nil, we restricted our analysis to hospitals with 300 patients or more.

**RESULTS**

Of the 2,337 hospitals included in the prevalence survey 202 had  $\geq 300$  patients with 128,631 patients (0.34% MRSA infection). The average rate was 7.8 L/1 000 patient-days (median 6.1, range 0-33) for ICSHA and 92/100 (median 94.5, range: 67-100) for ICALIN. The final multilevel model showed that MRSA prevalence was significantly lower if ICALIN increased (OR = 0.97; 95%CI: 0.94-0.99). There was no association between MRSA and ICSHA. Other significant variables in the final model were gender, vascular or urinary catheter, previous surgery, Mac Cabe score, type of units (long-term care) or of hospital (public).

**CONCLUSIONS**

A negative association was found between MRSA prevalence and ICALIN, suggesting that a better ICALIN score is predictive of a lower MRSA infection rate. Using a multilevel model limited the ecologic bias and controlled cluster effect. Using incidence rate in future analysis as the dependant variable could be helpful to confirm these results.

**11.4 Reference: 20080147****Track: Antimicrobial resistance****Emergence of oseltamivir resistant influenza A H1N1 during the 2007-2008 winter season in Luxembourg**

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**BACKGROUND**

During the winter of 2007/08, a high proportion of oseltamivir resistant isolates of influenza A subtype H1N1 were observed in many European countries including Luxembourg raising concerns of the effectiveness of antiviral drugs for pandemic preparedness.

**METHODS**

We conducted a retrospective analysis of all laboratory confirmed influenza cases in Luxembourg to assess a possible link between the emergence of oseltamivir resistance and prophylactic exposure, treatment or stockpiling of oseltamivir. We also investigated whether patients with resistant strains differed in terms of clinical symptoms and epidemiologic characteristics from those with sensitive strains.

**RESULTS**

During the winter season, of 1040 samples received 270 were positive for influenza A and 198 were positive for influenza B. Of the 270 samples positive for influenza A, 22% were oseltamivir resistant H1N1(ORH1N1). Emergence of ORH1N1 was synchronous to the emergence of oseltamivir sensitive influenza A H1N1 strains and their proportion did not increase during the course of the epidemic. The clinical characteristics, symptoms and epidemiology of patients infected with ORH1N1 were no different from those infected with oseltamivir sensitive strains of influenza A or influenza B. Prophylactic exposure, treatment or stockpiling of oseltamivir was uncommon and was not significantly associated with ORH1N1. Sequencing data of the neuraminidase gene helped to document local chains of transmission and identified geographic clustering.

**CONCLUSIONS**

Our study suggest that emerging ORH1N1 strains in 2007/2008 were similar to other circulating influenza strains in terms of patient characteristics, clinical picture or epidemiology and were not associated with exposure to oseltamivir. ORH1N1 strains appear to have spread similarly as oseltamivir sensitive strains following initial seeding at the start of the season.

## 11.5 Reference: 20080134

Track: Antimicrobial resistance

**A high proportion of oseltamivir resistant A(H1N1) influenza viruses in Norway 2007-08; no association with oseltamivir use***Siri Helene Hauge (1, 2), O. Hungnes (3), S. Dudman (3), K. Borgen (1)*

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**BACKGROUND**

The surveillance of influenza viruses runs yearly from week 40 until week 20 the following year, and includes sub-typing and susceptibility testing. In January 2008, resistance to oseltamivir was found in 12/16 influenza A(H1N1) viruses in Norway. We intensified the surveillance system in order to look for any association with oseltamivir exposure, and to see if there were any differences in clinical characteristics between the resistant and the susceptible A(H1N) virus.

**METHODS**

Patients with A(H1N1) infection during the 2007-08 influenza season were identified through the existing surveillance system. All A(H1N1) viruses were tested for oseltamivir susceptibility. Physicians of the patients received a structured questionnaire, asking for predisposing diseases, oseltamivir exposure, clinical symptoms, and complications. Data was analysed in Stata 9.0, using logistic regression for the adjusted outcomes.

**RESULTS**

The resistant virus was present all through the surveillance period. Among the 272 patients with A(H1N1) infection, 183 (67.3%) A(H1N1) had oseltamivir resistant virus. Clinical data was obtained for 265/272 patients. None had received oseltamivir prior to the onset of symptoms, or been in close contact with anybody who had used oseltamivir. Symptoms and hospitalisation rates did not differ between patients with a resistant and a susceptible virus. Being infected with a resistant virus was (not significantly) associated with a higher risk of getting pneumonia (RR= 3.2, 95%CI 0.7-13.6) and sinusitis (RR=2.0, 95%CI 0.5-9.1) when adjusting for age, gender and predisposing disease.

**CONCLUSIONS**

Our study showed no association between oseltamivir exposure and the emergence of the oseltamivir resistant A(H1N1) virus in Norway. Guidelines for treating influenza should take into consideration possible resistance towards oseltamivir. Continued surveillance of antiviral drug resistance in influenza viruses is recommended.

## 12.1 Reference: 20080041

**Track: Influenza: seasonal and pandemic****Are health care workers in hospital at increased risk for influenza?**

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**BACKGROUND**

Influenza immunisation for healthcare workers (HCW) is encouraged due to their sometimes vulnerable clients but also to a perceived, but not yet demonstrated, higher influenza risk. We compared the risk of serologically confirmed influenza infection (SCII) in HCW in acute hospital care with that in non-HCW.

**METHODS**

We conducted a prospective, multicentre cohort study over the 2006/7 influenza season in Berlin. HCW were recruited from three large hospitals, non-HCW from four blood-donation and two administrative centres. Participants gave serum samples before and after the season, and completed questionnaires to determine relevant exposures and possible confounders. Influenza antibody titres to influenza A/H1, A/H3 and B were measured by haemagglutination inhibition. We sent weekly mobile phone text messages to prompt reporting of respiratory illnesses during the influenza season. SCII was defined as a fourfold or greater titre rise, with a postseason titre of at least 40. We used logistic regression to assess the influence of potential risk factors.

**RESULTS**

We recruited 1044 participants: 736 (250 HCW and 486 non-HCW) were included in the analysis. Being a HCW was not a risk factor for SCII (RR 1.1;p=0.70). In the multivariate model, significant risk factors were living with children, which showed a "dose-response" effect; and car ownership (OR 3.0;p=0.02). 30% of participants with SCII reported no respiratory infection.

**CONCLUSIONS**

Our results suggest that HCW in hospitals do not have a higher risk of influenza than non-HCW. Household contacts seem to be more important than exposure to patients. Car ownership needs further investigation. These results do not support influenza vaccination of HCW on the grounds of increased risk of infection, but do support vaccination if asymptomatic infections lead to virus shedding.

## 12.2 Reference: 20080228

Track: Influenza: seasonal and pandemic

## Challenges to measure influenza vaccine effectiveness in European Union –and European Economic Area: can we trust our measurements?

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### BACKGROUND

Estimating influenza vaccine effectiveness (IVE) early in the season or during a pandemic helps measuring consequences of vaccine/circulating strain mismatch and guiding alternative interventions. ECDC supports pilot studies (PS) for rapid IVE estimation in European Union Member States (EU-MS). We reviewed the literature to identify the best IVE methods for EU-MS.

### METHODS

We identified IVE studies using Medline and references from three Cochrane and one Sanofi Pasteur-MSD IVE reviews. We completed the list with references of identified articles. We summarised articles by study design, outcome, target population and methods to control for confounding factors (CF).

### RESULTS

We identified 60 cohort, 30 case-control, and two studies using screening methods. IVE ranges between -340% and 100% and varies by study design and outcome. Age and risk groups are IVE effect-modifiers. Using non-specific outcomes (deaths, hospitalisations, influenza-like illness, acute respiratory infections) underestimates IVE- and laboratory confirmation is recommended. Reported CF include negative confounding by indication (chronic conditions, their severity, impaired functional status) and positive confounding reflecting healthy vaccinee effect (smoking history, former vaccination, health-related behaviours). The absolute difference between crude and adjusted IVE ranges from -220% to 21%. Restriction, multivariable analysis and propensity score are used to control for CF. Residual confounding is assessed through studies providing pre/during/post-influenza season estimates.

### CONCLUSIONS

Estimates ranges underlines the difficulty to interpret IVE. Estimates should be presented by age and risk group. Non-specific outcomes, lack of control for CF result in biased IVE. Cohort, case-control, screening method studies will be pilot-tested in the 2008-2009 season. They will include laboratory-confirmed outcome, control for CF and provide pre/during/post-influenza season IVE estimates. PS will be the basis to develop robust methods to monitor IVE in EU-MS.

**12.3 Reference: 20080198****Track: Influenza: seasonal and pandemic****Influenza- and RSV-associated hospitalizations by age in Spain. 1997-2005***Silvia Jiménez-Jorge , S. de Mateo , T. López , A. Larrauri*

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**BACKGROUND**

Influenza has long been recognized as a major cause of excess morbidity and deaths in the community. Recent studies stress the importance of age-specific data when considering the impact of respiratory infections. Excess hospitalization associated with influenza has been used extensively to measure influenza severity. However, co-circulation of respiratory syncytial virus (RSV) during influenza season makes it difficult to estimate influenza-associated morbidity burden accurately. The aim of the study was to evaluate influenza- and RSV-associated hospitalizations by age in Spain between 1997-2005, comparing two different models to estimate virus active periods: model 1:Fleming, 2007 and model 2:Izurieta, 2007.

**METHODS**

Virological data were obtained from the Spanish Influenza Sentinel Surveillance System and the Microbiological Information System. Study outcomes were weekly hospitalizations by age from Minimum Basic Set of Data: pneumonia and influenza (P&I:480-487), and circulatory and respiratory disease (C&R:390-459, 460-519). Estimated annual cumulative winter excess rate was the average of the difference rates between virus active and baseline periods without viral circulation.

**RESULTS**

Excess of morbidity estimated by both models appeared particularly high in 74yr-olds. With the two models, RSV-associated excess hospitalization was higher than in influenza active periods in 64-yr-olds. However, we found statistically significant RSV-associated excess hospitalization for C&R and P&I in <1-yr-old compared with influenza active periods only with model 2.

**CONCLUSIONS**

Substantial influenza and RSV-associated burden in Spain appeared particularly in young children but also in the elderly adults. Both models provided a similar seasonal and aged pattern of period-specific morbidity but different virus-associated burden. There is a significant higher RSV impact over young children in model 2.

## 12.4 Reference: 20080016

Track: Influenza: seasonal and pandemic

**Counting contacts – Nurse data for infectious disease modelling, Bavaria, 2007***Helen Bernard (1, 2), R. Fischer (3), R.T. Mikolajczyk (4), M. Kretzschmar (5, 6), M. Wildner (3)*

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**BACKGROUND**

Nurses are likely to be at higher risk for infectious diseases like influenza due to close and frequent interaction with vulnerable population subgroups. During a pandemic this might result in a staff shortage. Some mathematical models of pandemics incorporate social contacts to account for disease dynamics, however, no model includes individual data from the health-care sector (HCS). Our study aimed to assess frequency and type of contacts in nurses and compare these with general population data to provide specific data for pandemic preparedness planning.

**METHODS**

We asked 160 nurses from internal medicine and surgery departments of five Bavarian hospitals to record their daily contacts (conversational or skin-to-skin) in a diary over 24 hours. The diary included age and sex of contact persons, place and duration of contacts, and whether skin-to-skin contact was involved. We matched one control to each nurse by age, sex, and weekday of data collection from a study conducted earlier in a representative sample of the German population based on the same diary.

**RESULTS**

Between April and July 2007, a total of 131 (82%) nurses completed a diary. Matched nurses (n=129) reported a median of 40 contacts (85% work-related) vs. 12 (33% work-related) in controls (Wilcoxon-test  $p < 0.0001$ ). Of the work-related contacts in nurses, 51% were with patients (74% involving skin-to-skin contact, 63% lasting  $\leq 15$  minutes) and 40% with staff members (29% involving skin-to-skin contact, 36% lasting  $\leq 15$  minutes).

**CONCLUSIONS**

We found a higher number and a different pattern of social contacts in nurses than in the general population. Models of pandemic spread of close-contact infectious diseases should consider the HCS to make predictions about available work-forces in this sector and to inform infection control guidelines.

12.5 Reference: 20080119

Track: Influenza: seasonal and pandemic

## Survey of influenza vaccination coverage and its determinants in nursing homes in France, season 2007-2008

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### BACKGROUND

Influenza is a major threat to elderly people, especially those residing in nursing homes. In these settings, influenza is best prevented by vaccination of both patients and staff. The purpose of this study was to describe influenza vaccination practices, to estimate the influenza vaccination coverage rates and identify factors associated with high coverage in French nursing homes during the 2007-2008 season.

### METHODS

We conducted a national cross-sectional survey using a one-stage stratified random sampling design. The sampling frame was the list of nursing homes recorded in the national database supplied by the Ministry of Health. A standardized questionnaire was sent to 2276 facilities in February 2008.

### RESULTS

Among them 1663 responded (73%). Influenza vaccination was delivered free of charge by 93% (95%CI: [91-94]) of facilities and training regarding influenza vaccination done by 49% (95%CI: [46-51]). Overall, influenza vaccination coverage was 92% (95%CI: [91-93]) for residents and 30% (95%CI: [29-32]) for the staff. Vaccination rates were greater among physicians (64%, 95%CI: [60-69]) and nurses (38%, 95%CI: [36-41]) than for nursing assistants (29%, 95%CI: [27-31]) and non-medical staff (33%, 95%CI: [30-36]).

In a negative binomial multivariate regression model, vaccination coverage was lower among staff of public nursing homes than for that of private nursing homes (RR: 0.73, 95%CI: [0.64-0.85],  $p < 10^{-3}$ ); it was higher when free influenza vaccination campaigns had been implemented (RR: 2.68, 95%CI: [2.00-3.58],  $p < 10^{-3}$ ) and, for nurses and nurses assistant, when meetings or training courses to promote vaccination had been organized (1.20, 95%CI: [1.10; 1.30],  $p < 10^{-3}$ .)

### CONCLUSIONS

Influenza vaccination coverage is high among residents but remains low among health staff working in nursing homes. Free vaccination and information of staff through meetings on influenza vaccination should be promoted.

**13.1 Reference: 20080202****Track: Environmental & Occupational health****Biological risk stemming from the long-term burial of vaccinal strains**

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**BACKGROUND**

Since the early past century, different bio-pharmacological products including vaccines, prophylactic sera, blood flasks, and waste of animal origin, had been buried at a depth not exceeding 1.5 meters in the 12,000 square meters waste yard of a pharmaceutical research institute in Milan (Istituto Sieroterapico Milanese, ISM). This area has recently been reclaimed after nearly a decade of complete abandonment. This study aimed to assess the viability of the unearthed vaccines.

**METHODS**

During the reclaiming activities, live-vaccines against Newcastle Disease Virus (NDV), Canine Distemper Virus (CDV), Brucella spp, Classical Swine Fever Virus (CSFV), Poliovirus and Rabies Virus were collected. The viability of the viral vaccine strains was tested by isolation in permissive substrates (VERO, MDCK, L2oB, RD and embryonated chicken eggs). Bacterial viability was assessed by culturing in Brain-Heart broth and subculturing in Columbia-agar plates. Viable vaccine strains were characterized through sequencing and phylogenetic analysis by bioinformatic software.

**RESULTS**

Nowadays, our results showed that NDV LaSota-like and CDV vaccine strains, unearthed in sealed vials, maintained their replication and infectious activities in permissive substrates (VERO cells and embryonated chicken eggs). Moreover, Brucella abortus B19 strains were grown.

**CONCLUSIONS**

This residual vitality implies that manipulation of discarded vaccines may involve risk for infection. Indeed, human cases of infection with NDV and B. abortus B19 vaccinal strains have been documented among veterinarians and lab-workers. This study indicates the existence of biological risk stemming from the uncontrolled burial of vaccines and their by-products.

## 13.2 Reference: 20080040

**Track: Environmental & Occupational health****Effects of occupational exposure in middle-aged males on excess cardiovascular mortality associated with cold spells in the Czech Republic***Jan Kysely (1), L. Pokorna (1), J. Kyncl (2, 3), B. Kriz (2, 3)*

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**BACKGROUND**

Extreme temperature events influence human society in a number of ways, including impacts on morbidity and mortality. No comprehensive study on cold-related mortality in central Europe has been carried out despite the fact that cold air invasions are more frequent and severe in this region than in western and southern Europe.

**METHODS**

Cardiovascular mortality associated with winter cold spells is evaluated in the population of the Czech Republic over 21-yr period 1986-2006. Cold spells are defined as periods of at least three consecutive days on which air temperature does not exceed  $-3.5^{\circ}\text{C}$ . Days on which mortality was affected by epidemics of influenza are identified and excluded from the analysis. Excess cardiovascular mortality during and after cold spells (with lags up to 20 days) is determined in individual age groups and genders.

**RESULTS**

Cold spells are associated with positive mean excess cardiovascular mortality in all examined age groups 25-59, 60-69, 70-79 and 80+ years and both in males and females. The mortality effects are most pronounced and most direct in middle-aged males (25-59 years; on average +13.8% increase), which contrasts with most previous studies on cold-related mortality. Excess mortality observed during cold spells in January 1987 (+274 cardiovascular deaths) is comparable to excess mortality during the most severe heat wave in this region in 1994.

**CONCLUSIONS**

The results show that cold stress has been an underestimated risk factor for the population in central Europe as it leads to excess cardiovascular mortality in all population groups. The large mortality risks in males aged 25-59 years are likely related to occupational exposure, mainly a higher percentage of males working outdoors in winter. Preventive measures and improved biometeorological forecast could lower the risks. (Supported GACR 205/07/1254).

## 13.3 Reference: 20080088

Track: Environmental &amp; Occupational health

**Bacillus anthracis in a wool processing factory:  
Sensitisation among factory workers**

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**BACKGROUND**

In 2006 evidence of *B. anthracis* was found in environmental samples of a wool processing factory whenever goat-hair was processed. No confirmed anthrax cases were ever reported in this factory despite its long-term activity (120 y). The objective of this study was to identify factors associated with high antibody levels of *B. anthracis* in factory workers' blood in order to advise on protective measures at the workplace.

**METHODS**

We carried out a cross-sectional seroprevalence study: blood samples were taken from employees and a questionnaire on risk factors including exposure to goat-hair and use of protective gear was administered. ELISA (SERION, Germany) tests for IgG were carried out and a cut-off was calculated using 71 negative control samples. We used Poisson regression with robust variance to estimate prevalence ratios. Workers with borderline or positive serology were considered sensitised to *B. anthracis*.

**RESULTS**

The response rate was 98.5% (66/67). Eight of 66 (12.1%) employees were sensitised. Workers working on machines processing raw wool and goat-hair (MPW) or sorting raw goat-hair had a prevalence of 30% (3/10) and 20% (2/10), respectively. Workers working on MPW and persons sorting raw goat-hair were more likely to be sensitised (PR:44.4; 95%CI:4.4-444.8; p=0.001; and PR=14.5; 95%CI:1.6-128.0; p=0.016 respectively) than workers in less exposed jobs. An increase in protective masks used per day was protective (PR: 0.3; 95%CI:0.1-0.8; p=0.015).

**CONCLUSIONS**

Processing raw goat-hair can be associated with high antibody titres of *B. anthracis*, either at machines or manually handling raw goat-hair. Even though no clinical cases of anthrax were ever reported, it is important that employees are provided with protective gear and given appropriate guidance in order to prevent a potentially lethal disease.

13.4 Reference: 20080090

Track: Environmental &amp; Occupational health

**Bio-aerosol exposure in sewage workers: results from a health survey***Pietro MANOTTI, Dr. Valeria TRABACCHI, Prof. Cesira PASQUARELLA, Prof. Carlo SIGNORELLI*

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**BACKGROUND**

Sewage treatment may cause work-related health effects due to exposure to a variety of chemical and microbiological agents. The aim of this study was to evaluate inflammatory responses, respiratory function and prevalence of symptoms in sewage workers (SWs).

**METHODS**

Thirty-one volunteered non-smoking male SWs were evaluated. Fifty-four controls were recruited among clerical male workers with no history of smoking habit or exposure to respiratory risk agents. Inflammatory and liver function markers were retrieved through blood specimens. Respiratory Function Tests (RFT) were also performed on workplace. Finally health symptoms (gastrointestinal and airway symptoms, osteo-articular pain, asthenia) and their weekly trend were elicited through a questionnaire. Statistical analysis was performed through Student t-test and Fisher's exact test, where appropriated. Odds ratios (OR) and relative 95% Confidence Intervals (95%CI) for association of symptoms with work-related exposures were also calculated.

**RESULTS**

Laboratory tests showed higher white-cell blood count in SWs than controls ( $p < 0.0001$ ), increased percentage of neutrophils ( $p = 0.0021$ ) and a slight reduction of lymphocytes ( $p = 0.0041$ ). Moreover higher values of erythrocyte sedimentation rate ( $p = 0.0313$ ) and gamma globulin expression ( $p = 0.0467$ ) were observed among SWs. A reduction of respiratory function was evidenced by FEV<sub>1</sub>/FVC and PEF decrement (respectively 83.8% vs 87.5%,  $p = 0.045$  and 64.2% vs 78.1%,  $p = 0.001$ ). According with blood specimens and RFT, higher odds ratios of sneezing (OR=10.45; 3.65-29.92), cough (OR=11.08; 3.65-33.58), wheezing (OR=3.81; 1.23-11.85), and systemic symptoms were reported among SWs compared with clerical workers. SWs referred worsening of these symptoms during working week ( $p = 0.0002$ ) and improving during week end ( $p = 0.0036$ ).

**CONCLUSIONS**

Our results confirm the bio-aerosol exposure in SWs as able to induce a pro-inflammatory state, with high prevalence of respiratory symptoms and eventually associated with mild obstructive respiratory defect.

13.5 Reference: 20080231

Track: Environmental &amp; Occupational health

## Epidemiology of internal contamination with <sup>210</sup>Polonium in the London incident

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### BACKGROUND

The London <sup>210</sup>Po incident posed unprecedented challenges for the operational public health emergency response. Over 1,000 persons associated with the ten most significantly contaminated locations in the London Polonium incident in 2006 were assessed for their risk of internal contamination with <sup>210</sup>Polonium (<sup>210</sup>Po). Of these 726 completed urine tests for <sup>210</sup>Po activity within two half lives of last possible exposure.

### METHODS

Retrospective cohort analyses were carried out for all sites where practicable, to identify associations between occupational, temporal and behavioural factors and risk of internal contamination with <sup>210</sup>Po.

### RESULTS

Overall prevalence of internal contamination (measured as 24h <sup>210</sup>Po activity greater than 30mBq/24h) was 0.19 (95 CI: 0.16-0.22) (n 139). Highest frequency of contamination was observed among Millenium Hotel staff associated with the Pine Bar, guests of affected rooms at the Hotel, office staff, and family contacts. The largest number of affected perons was identified from customers of the Pine Bar (n 38).

### CONCLUSIONS

These findings may provide insight into risks of bystander contamination in the context of community radiological incidents, including those of deliberate rather than accidental origin.

14.1 Reference: 20080179

Track: Surveillance

## Evaluation of Listeriosis Surveillance in Spain, 2002 – 2005

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### BACKGROUND

In Spain listeriosis is a notifiable disease in only three Autonomous Communities. An evaluation of Surveillance System of Listeriosis in Spain between 2002 to 2005 was conducted to ascertain the situation of the disease, analyzing the type of information provided by the administration, estimating incidence trends and evaluating the capacity of outbreak notification

### METHODS

A review of the Database of hospital discharges CMBD and the Microbiological Information System SIM of listeriosis was carried from 2002 to 2005. The case definition was any person with a clinical profile compatible with listeriosis and isolation of listeria in sterile specimen or not; registered in the CMBD and SIM databases between January the 1st, 2002 and December the 31st, 2005. For estimating the incidence rates, data was obtained from the Municipal Register of Inhabitants of the National Institute of Statistics for the period of study.

### RESULTS

A total of 1040 cases were reported to CMBD; 2002 (172 cases), 2003 (249), 2004 (332) and 2005 (287), At the SIM database a total of 280 cases were reported by 36 hospitals in 10 Communities, 2002 (49 cases), 2003 (52), 2004 (99) and 2005 (80); 60% were males, the overall mortality rate (13%). 5.3% of the Listeriosis cases were taken to another hospital, 51.8% was discharged from hospital and 0.3% was voluntary discharged. Maternal and neonatal cases were 1% of all cases. An estimated average incidence rate of 6/millón inhabitants.

### CONCLUSIONS

The Coverage by the National Reference Laboratory is not appropriate therefore sensitivity to detect outbreaks and representativeness is reduced. Currently. We recommend a project to strengthen surveillance, enhancing Laboratory capacity, expand the geographic coverage.

## 14.2 Reference: 20080214

## Track: Surveillance

**Representativity of a population-based influenza surveillance system in Stockholm, Sweden.**

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**BACKGROUND**

The current influenza surveillance in Sweden requires that cases seek health care. Since on average Swedes seek their General Practitioner only 1.38 times per year, the surveillance might be biased. We therefore developed Sjukrapport, an influenza surveillance where individuals themselves report symptoms via web and interactive voice response. The objective of this study was to determine if the participants of Sjukrapport were a representative sample of the target population.

**METHODS**

In October 2007, 14,000 randomly selected 0-95 year old residents of Stockholm County were contacted by post and invited to participate in Sjukrapport. Participants were asked to report fever and cold within the first seven days of illness, between October 2007 and May 2008. Using proportion test, sex and age distributions were compared between the participants and the general population of Stockholm County to determine representativeness.

**RESULTS**

In total 3,447 individuals joined Sjukrapport. Of these, 7.6% were 0-4 years, 12.0% were 5-14 years, 61.7% were 15-64 years, 18.7% were 65-95 years, and 39.3% were male. The difference in age and sex distribution compared to Stockholm County population was 0.9% ( $p=0.040$ ) among those 0-4 years, 0.7% ( $p=0.211$ ) among those 5-14 years, -6.1% ( $p<0.001$ ) among those 15-64 years, 4.6% ( $p<0.001$ ) among those 65-95 years, and -10.1% ( $p<0.001$ ) among males.

**CONCLUSIONS**

Our preliminary results show that the participants of Sjukrapport differ in varying degrees in age and sex from the target population. An overrepresentation of the young and elderly can be helpful since these groups are more vulnerable to influenza. The sex distribution needs to be addressed further. Sjukrapport might be a valuable complement to sentinel and laboratory surveillance and an analysis of the reported incidence of influenza-like illness is ongoing.

14.3 Reference: 20080256

Track: Surveillance

## Surveillance of Foodborne Botulism in Canada: A Need for Speed

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### BACKGROUND

Foodborne botulism is a potentially fatal enteric intoxication caused by *Clostridium botulinum*. Surveillance relies on two reference laboratories that test clinical and food samples and communicates results solely to the requestor. Recently an internationally distributed commercial carrot juice was implicated in a botulism outbreak. In managing this outbreak, it became clear that botulism surveillance required evaluation and remediation to ensure a coordinated, swift and informed response to future threats.

### METHODS

To evaluate the system, provincial and territorial (PT) guidelines were reviewed and the procedures pertaining to national notification were evaluated. These protocols were then compared to other enteric surveillance systems with more direct laboratory linkage. Data in the National Notifiable Disease Report (NND) were compared to results provided by the reference laboratories.

### RESULTS

Lack of parallel reporting to public health resulted in inconsistencies between NND and laboratory data. Between 1985 and 2005, 12% of cases in the NND were not laboratory confirmed, and therefore did not meet the national case definition, and 12% of laboratory confirmed cases were not reported in the NND. PT guidelines did not address timely national notification.

### CONCLUSIONS

Resulting from this evaluation, modifications were made to Botulism surveillance. The reference laboratories now notify national public health authorities, allowing the system to be more timely, complete and responsive. The national case definition is being re-evaluated to better reflect the burden of illness and help rectify inconsistencies in the NND. Surveillance is relatively complex, involving notification pathways rarely used and therefore prone to errors and omissions. Botulism will continue to be a challenging disease to monitor due to centralized testing, low numbers of cases and pre-established provincial reporting mechanisms.

14.4 Reference: 20080205

Track: Surveillance

## Evaluation of the Hydatidosis Epidemiological Surveillance System in Extremadura, Spain, 2003-2005

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### BACKGROUND

From 1984-2002, hydatidosis incidence in Extremadura decreased sharply from 6.8-1.04 cases/100.000 inhabitants. However, it was followed by sustained increase in notifications (1.3 in 2003, 1.6 in 2004 and 3.1 in 2005). Our objective was to confirm this increase and assess the exhaustivity and other attributes of the regional epidemiological surveillance system (SVE) for hydatidosis.

### METHODS

We considered the population of the eight health areas in Extremadura during 2003-2005. We designed a capture-recapture, with two sources for estimating exhaustivity and 95% confidence intervals (95%CI). Sources were: Mandatory Diseases Notification System (EDO) and the Hospital Discharges Registry (CMBD). We reviewed medical records in all health areas to confirm cases registered by both systems. We used Extremadura's standard EDO case definition and CDC's Guidelines for Evaluation of Surveillance Systems. Amongst other qualitative attributes, we estimated completeness of report forms.

### RESULTS

During the study period, 66 cases were reported to EDO (overall regional incidence=6.6 cases/100.000 inhabitants.). The CMBD registered 153 cases, 36 were also reported to EDO. Exhaustivity was 23.7% for EDO, 55% for CMBD and 65.8% for both. Total cases estimated was 277 (95%CI= (227-329)) for a crude rate of 25.6 cases/100.000 inhabitants (95%CI= (20,9-30,4)). EDO exhaustivity improved over time (16% in 2003, 20% in 2004 and 33% in 2005). Telephone number (46%), locality of the workplace (52%) and workplace (62%) had the lowest completeness.

### CONCLUSIONS

A significant underreporting to EDO was confirmed. The increase observed for 2003-2005 could be attributed to improved compliance with reporting. We recommend periodic active case-finding using CMBD and other registries for optimal hydatidosis cases detection.

14.5 Reference: 20080111

Track: Surveillance

## Chikungunya outbreak on Reunion Island and Mayotte in 2005-2006, context and questions for surveillance of emerging arbovirolosis

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### BACKGROUND

In 2005 and 2006, the southwestern Indian Ocean region experienced a severe epidemic of chikungunya virus infection. This study compares the methods and main findings from chikungunya surveillance on Reunion Island and Mayotte and points out the questions raised by the monitoring of arboviral outbreaks.

### METHODS

On Reunion Island, surveillance relied on active case finding throughout periods of moderate epidemic activity and on estimations from sentinel physicians reporting when the epidemic reached massive proportions. It was complemented by hospital case finding and death surveillance. On Mayotte, passive community and active hospital-based surveillance were performed. On both islands, transversal ELISA serosurveys were operated to assess the reliability of community surveillance.

### RESULTS

Overall, 266 000 chikungunya cases, 250 serious forms, 44 cases of mother-to-child transmission and 250 deaths were reported on Reunion Island by surveillance. The resulting cumulative attack rate of 36% corresponded to the seroprevalence rate of 38% measured at the end of the epidemic. In Mayotte, the attack rate of 4% resulting from surveillance data had to be revaluated to 38% according to transversal surveys (i.e. 60 000 estimated cases). Hospital-based surveillance identified six (6) serious cases and nine (9) cases of mother-to-child transmission.

### CONCLUSIONS

From our experience, surveillance of emerging arbovirolosis should be i) able to identify the transmission areas, especially when the incidence is low; ii) adaptative enough to follow the epidemiological trends regardless of incidence level. It should monitor the unexpected severe forms of the disease, or even deaths, which might occur outside endemic areas. Unlike passive surveillance, which roughly described the epidemiological trends but underestimated the real incidence on Mayotte, these goals have been achieved by the surveillance system implemented on Reunion Island.

## 15.1 Reference: 20080086

Track: Vaccine preventable diseases

## Nationwide mumps outbreak in the Republic of Moldova, October 2007-July 2008: Most cases vaccinated with a single dose of mumps monovalent vaccine

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### BACKGROUND

Moldova experienced a nationwide mumps outbreak between October 2007 and June 2008. Mumps is notifiable, when clinically suspected. Single dose mumps vaccination at 15-18 months was introduced in 1983 and replaced by a two dose MMR schedule at 1 and 6-7 years of age in 2002. We investigated the outbreak to quantify its extent, explore primary and secondary vaccine failure, and provide recommendations for control.

### METHODS

We analysed national surveillance data and conducted a cohort study in five educational institutions with high attack rates (ARs). We calculated ARs and vaccine effectiveness (VE) in cohort and, using the screening method, 1997-2001 national data. PCR-Genotyping was performed.

### RESULTS

Of 31,049 cases reported between 01/10/2007-31/07/2008, 80% were 15-24 years old. Of cases with information (67%), 96% were vaccinated, of those 96% once and 4% twice. Mumps virus genotype G5 was identified in 20/21 specimens. In the cohort (n=1,589) ARs were 28% and 4% in one-dose and two-dose vaccines, respectively, and 19% in unvaccinated; comparing individuals with 1 to those with 0 doses ARs were 24% and 31% in 13-15, 34% and 23% in 16-19 and 16% and 5% in 20-25 year olds. VE estimates for one dose mumps vaccination in 1997-2001 declined from 74% in 2 year olds to 58% in 15-19 year olds.

### CONCLUSIONS

Low effectiveness of single dose mumps vaccination was the outbreak's main cause. Our findings may suggest waning immunity. The risk in individuals having received two doses of mumps vaccine was low. MMR vaccination of individuals having received only one dose of mumps vaccine was recommended and started in March.

## 15.2 Reference: 20080182

Track: Vaccine preventable diseases

## Survey on the vaccination status of midwives and on their knowledge, attitudes, and behaviour regarding vaccination, Germany, 2007

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### BACKGROUND

Midwives look after babies' well-being and give advice regarding prevention to parents during the first months of their child's life, where the majority of vaccinations are recommended. In Germany, little is known about midwives' vaccination status, knowledge, practice and attitudes regarding vaccinations. We conducted a study on these issues in order to identify characteristics that improve midwives' promotion of vaccination.

### METHODS

A survey was conducted among midwives attending the XI.-Midwife-Congress in Germany, May 2007. It covered demography, vocational training, self-reported vaccination status, endorsement of childhood vaccinations and opinion on vaccination-related statements. We performed descriptive analyses and calculated prevalence ratios (PR) for midwife-endorsements of officially recommended childhood vaccinations stratified by geography, vocational training, parent-counselling and self-reported vaccinations.

### RESULTS

Of 1,200 questionnaires distributed, 46% were returned. 67% of midwives counsel parents on vaccination. Vaccination coverage ranged between 10% for influenza, 18% for pertussis and 74% for tetanus. 35% of participants endorsed measles, 51% pertussis and 92% tetanus vaccinations for children under two. 71% supported the statement that "vaccines protect against infectious diseases". However, 47% agreed that "infections like measles are important for a child's development" and 54% that "vaccines contain too many additives". The following factors rendered endorsement of childhood vaccinations more likely: education in Eastern Germany (PR:1.4), no training in alternative medicine (PR range:1.2-2.1), being vaccinated (PR range:1.5-9.1) or not counselling parents (PR range:1.1-1.6).

### CONCLUSIONS

Low endorsements of important childhood vaccinations such as measles suggest substantial reservations against vaccinations. This should be countered by public health professionals with contributing lectures in vaccinology and vaccine-safety to existing midwife training-curricula in order to motivate more midwives to get vaccinated for their own well being and the wellbeing of their clients.

**15.3 Reference: 20080076****Track: Vaccine preventable diseases****Religious factors influencing vaccination coverage in the Netherlands**

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**BACKGROUND**

The Netherlands has recently experienced epidemics of vaccine preventable diseases largely confined to the Bible-belt, a rural area with low vaccination coverage, due to religious objections. The aim of this study is to assess the influence of the various orthodox protestant denominations (OPD) on vaccination coverage. Detailed knowledge on this subject is important for preparing management of future epidemics.

**METHODS**

A cross-sectional, descriptive study at municipality level. Data on number of inhabitants, level of urbanization and vaccination coverage were obtained from Statistics Netherlands and RIVM. Membership numbers of the various OPD were obtained from church year books and church offices. First, for all municipalities, the effect of presence of OPD on vaccination coverage was assessed by comparing means. The possible confounding effect of level of urbanization was checked for by oneway ANOVA. Second, for municipalities where OPD were present, the effects of each of them (measured as number of members proportional to total number of inhabitants) on vaccination coverage was assessed by multiple linear regression.

**RESULTS**

Mean vaccination coverage in municipalities (n=159) with OPD ( $93.0\% \pm 5.2$ ) was, significantly lower ( $p < 0.0005$ ) as compared to municipalities (n=297) without OPD ( $96.9\% \pm 2.1$ ). Over all vaccination coverage was not influenced by urbanization. Multiple regression analyses showed that in municipalities with OPD 74% of the variance in vaccination coverage was explained by membership of these denominations. Four out of five OPD were significantly inversely related to vaccination coverage; this relationship was strongest for the smallest denominations. Urbanization had no additional explanatory effect.

**CONCLUSIONS**

As variance in vaccination coverage is largely explained by membership of OPD, management of future epidemics should be focused on religious risk groups rather than on geographical areas.

15.4 Reference: 20080159

Track: Vaccine preventable diseases

## Can we know the immunisation status of health care workers? Results of a feasibility study in Hospital Trusts, England, 2008

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### BACKGROUND

In England, vaccine coverage in health care workers (HCWs) is determined yearly for seasonal influenza, but there is no uptake surveillance system for other vaccines (hepatitis-B, varicella, BCG, tetanus-diphtheria-polio and measles-mumps-rubella) also recommended for this at-risk population. In order to inform the feasibility of such a system and to understand which policies are in place, we conducted a survey of HCW immunisations in the occupational health (OH) departments of NHS (National Health Service) hospital trusts in England.

### METHODS

Between January and April 2008, we submitted a questionnaire to all OH departments on immunisation policies and methods of storing uptake data. Hospitals could choose to respond online, by email or by post. Our target population were the 162 English NHS Acute and Foundation Trusts (hospital trusts).

### RESULTS

One hundred and four hospital trusts (64%) responded; sixty-four percent online, 19% by email and 17% by post. Seventy-two percent had previously reported influenza flu uptake data (median coverage: 12.8%). All responders offer hepatitis-B, BCG, measles-mumps-rubella, and influenza vaccines to HCWs; one reported not offering varicella and 14 not offering tetanus-diphtheria-polio. Sixty-six percent of trusts record staff eligible for immunisations and 68% which staff they have immunised, using various software tools. Forty-two percent of hospitals were prepared to share coverage data in the future: 64% electronically or via internet and 48% on paper.

### CONCLUSIONS

This study suggests that immunisation policies are widely in place in NHS Trusts, but measures of uptake are required to give indication of their implementation. Setting-up a surveillance system for HCWs vaccine uptake is possible but would be challenging, given the variation in systems already in place.

15.5 Reference: 20080260

Track: Vaccine preventable diseases

## Decreasing incidence of invasive Meningococcal B disease after introduction of meningococcal C conjugate vaccination: Secular trend or cross-serogroup protection?

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### BACKGROUND

In 2002, routine meningococcal C (MCC) vaccination at 14 months and a catch-up campaign (94% coverage) for all 1-18 year olds was introduced in the Netherlands. Subsequently, the incidence of invasive meningococcal disease serogroup B (IMDB) strongly decreased. We analysed routine surveillance data to generate hypotheses explaining this.

### METHODS

We used data from notifications of IMD ((1993-2007) linked to laboratory data (serogroup and serotype). We calculated relative differences in the incidence of IMDB in the period before (1993-2001) and after MCC introduction (2003-2007), both overall and by specimens (blood or CSF and blood), serogroup. Subsequently, we compared these differences between the cohorts of eligible for MCC (all 1-18 year olds in 2002) and of others (<1 or >18 years). We fitted a regression model using half-yearly incidence data.

### RESULTS

Before MCC introduction, the IMDB incidence was 7.4/100,000 and 1.2/100,000 person years respectively for eligible and not eligible for MCC, (incidence rate ratio (IRR) 6.09 [95%CI: 5.70-6.53]); after MCC introduction incidences decreased respectively to 3.0/100,000 to 0.7/100,000 (IRR 4.36; [95%CI:3.85-4.94]). Moreover a significant interaction term between eligibility and MCC introduction suggested that decline in IMDB was greater in the age group eligible for MCC. Regression analyses showed a significant difference between linear half-yearly trends before and after MCC introduction (-2.5 and -10.6 cases/year,  $p < 0.001$ ).

### CONCLUSIONS

Our findings suggest that decrease in IMDB incidence could be related to the MCC introduction. However, they do not exclude that this decline could be attributed to other factors. They pleaded for a possible cross-protection conferred by the MCC vaccine against serogroup B IMD combined with a herd-immunity effect. Further time-series analysis, sero-epidemiological and comparisons of European countries with and without routine MCC are recommended.

**16.1 Reference: 20080212****Track: Food- and water-borne diseases****An endemic parasite in Germany? Characteristics and risk factors of autochthonous Giardiasis***Werner Espelage (1, 2), M. an der Heiden (1), K. Stark (1), K. Alpers (1)*

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**BACKGROUND**

*Giardia lamblia* (GIL) is considered a travel related pathogen in Germany. However, surveillance data since 2001 indicate that >55% of infections may be autochthonous. We aimed to determine characteristics and possible risk factors of autochthonous Giardiasis.

**METHODS**

We interviewed GIL-patients notified February 2007-January 2008 in 41 local health authorities on symptoms, underlying diseases, contact to persons with similar symptoms, pets, farm animals, surface or waste water, consumption of specific food items 3 weeks before symptom onset (enquiry period) and travel abroad in the previous year. We conducted a case-control-study including GIL-cases with clinical manifestations (diarrhoea, cramps, bloating) and laboratory confirmation (microscopy or antigen-test) and randomly selected controls from the registration offices matched by residence, age-group (0-5, 6-19, >20 years) and enquiry period. Secondary cases, controls with diarrhoea and people with travel outside Germany in the enquiry period were excluded. Odds ratios (aOR) with 95% confidence intervals (CI) were calculated using conditional logistic regression.

**RESULTS**

A total of 164/323 (51%) interviewed cases had not travelled abroad during enquiry period. Of these, 102 (62%) were male, 81 (49%) living in communities with >100,000 inhabitants and 102 (62%) aged above 20 years. We included 124 cases and 247 controls in the case-control study. Cases were more likely to be male (aOR 1.9 CI 1.1-3.3), immunocompromised (aOR 8.9 CI 1.5-51.7) and not to engage in outdoor activities (aOR 9.8 CI 4.0-24.1). Foreign travel in the previous year, number and age of household members, contact to pets, farm animals and surface water and drinking tap water were not associated with clinical GIL-disease.

**CONCLUSIONS**

Our results confirm that GIL is endemic in Germany. Physicians should consider GIL-infections also in patients without travel history.

**16.2 Reference: 20080137****Track: Food- and water-borne diseases****Compliance following water boiling advice in a non-outbreak setting in The Netherlands***Ioannis Karagiannis (1, 2), B. Schimmer (1), A.M. de Roda Husman (1)*

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**BACKGROUND**

In May 2007, *Escherichia coli* was detected in tap water supplied by a company in North Holland. The company issued advice through mass media to boil tap water before consumption; this advice was lifted six days later. We implemented a cross-sectional study to investigate compliance among residents in this area.

**METHODS**

Based on postcode, a total of 300 households, chosen randomly from a database of a private company running internet-based surveys for different marketing purposes, were sent a self-administered questionnaire for this study by the water company. The questionnaire contained questions on demographic information, source of information regarding the advice, response to it and personal opinions on the company's reaction and the advice. The data were sent back to the company and the RIVM, where they were analyzed.

**RESULTS**

Ninety-nine (66%) households of the affected area and 90 (60%) households from non-affected areas served by the same company replied to the survey. All respondents knew about the advisory. 81.8% of the respondents in the affected area and 5.6% of the non affected areas reported complying with the advisory. Most respondents from the affected area still used unboiled water to brush teeth, wash salads and wash fruit. There was no difference in compliance between men and women.

**CONCLUSIONS**

Using the mass media was proved to be efficient to inform the public and could be used in the future in similar settings. More detailed verbal expression of boiling advices should be considered in the future.

**16.3 Reference: 20080132****Track: Food- and water-borne diseases****Nationwide outbreak of Listeriosis due to consumption of sour milk cheese in Germany, 2006/2007**

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**BACKGROUND**

Listeriosis is a life-threatening food-borne illness affecting ~350 Germans annually. In November 2006, a 71-year old woman died from listeriosis. *L. monocytogenes*, serovar 4b was isolated from a sour milk cheese sample from her fridge and from 4 unopened retain samples obtained from the manufacturer. Following the public recall, an epidemiological and microbiological investigation was conducted to determine the extent of the outbreak attributable to the implicated cheese.

**METHODS**

Based on manufacturing- and best before date of the cheese lot and the incubation period the outbreak period was defined (weeks 44/2006 to 7/2007). Each case notified during this time was interviewed on the consumption of the cheese brands. Human and cheese isolates were collected for molecular subtyping.

**RESULTS**

During the outbreak period 189 listeriosis cases were reported from all over the country (mean case number during same period 2001-2005, n=85). Information about cheese consumption was available from 47 cases; among those 34 (72%) had eaten the incriminated cheese. The PFGE-pattern existed for additional 17 cases; of those 12 (71%) were identical with the outbreak strain. Thus, 72% of cases with information on food history or subtyping, could be linked to the outbreak. Of the outbreak cases, 76% were male, 89% were ≥60 years old, and 65% were immunocompromised, (overall case fatality 13%).

**CONCLUSIONS**

Contaminated sour milk cheese caused a nationwide listeriosis outbreak that affected probably about 70% of cases during the outbreak period. For rapid detection and investigation of listeriosis clusters PFGE subtyping is indispensable. In Germany, a system must be developed achieving the timely typing of all available isolates. Persons at risk to develop severe listeriosis should be counselled to avoid the consumption of risk products.

## 16.4 Reference: 20080015

Track: Food- and water-borne diseases

**Outbreak of VTEC O145 infection associated with ice cream Belgium 2007**

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**BACKGROUND**

Verocytotoxin-producing *Escherichia coli* (VTEC) are important causes of gastrointestinal illness and haemolytic uraemic syndrome (HUS) in young children. VTEC infections in Europe and the United States have increased in the last decade. However, in Belgium it still is a sporadic disease with an incidence of VTEC of 0.5 per 100,000. Worldwide the range of products associated with VTEC infections is wide varying from beef to un-pasteurized milk. In October 2007 the department of Control of Infectious Diseases of Antwerp was informed about several VTEC infections among the participants of two birthday parties for children where ice cream was offered (N=19). The scope of this study was to describe the outbreak and to identify the source

**METHODS**

A retrospective cohort study has been conducted among the participants. A confirmed case was a HUS patient, who met the microbiological criteria within 10 days after consumption of ice cream produced at a local farm in September 2007. Environmental and patient samples were compared as to genetic profile of VTEC.

**RESULTS**

Among the participants three VTEC infections with HUS (3/19) and seven VTEC with only diarrhoea (7/19), had been identified. Two extra VTEC infections with HUS were found among consumers of ice cream sold and eaten at the farm between September 12 and 16, 2007. Leftovers of the consumed pasteurized ice cream, faecal samples of calves and dust and patient data revealed to be identical (VTEC O145).

**CONCLUSIONS**

We described a VTEC associated outbreak associated with the ingestion of contaminated pasteurized ice cream. Surveillance on farms for detection of VTEC was strengthened and a prevention campaign targeting farms, being involved with the production of ice cream, was established.

## 16.5 Reference: 20080169

**Track: Food- and water-borne diseases****Enterohaemorrhagic Escherichia Coli (EHEC) O157 incidence is higher among people living near farms in Sweden***Gustaf Rydevik (1), Magnus Wiberg (1), Sven Löfdahl (2), Sofia Boqvist (3)*

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**BACKGROUND**

Enterohaemorrhagic Escherichia Coli (EHEC) is a growing public health problem in Sweden, as in many other countries. Cases infected with serotype EHEC O157 show a striking spatial pattern, being highly concentrated to southwestern Sweden. The reason for this concentration is not clearly understood, but postulated to be connected to that areas large bovine cattle population. To better understand the epimiology, we have analysed the geographical pattern of EHEC O157 cases in Sweden with respect to the locations of bovine farms.

**METHODS**

Data on the place of residence of 877 EHEC O157 cases that occurred between 1995 and 2007 was taken from the register of serum samples at the Swedish Institute for Infectious Disease Control (SMI). Data on the location of farms in Sweden with bovine cattle was provided by the Swedish Board of Agriculture. The collected data was plotted on a map using ArcGIS, and the map was used to calculate the incidence of EHEC O157 as a function of distance from place of residence to the nearest farm.

**RESULTS**

It was found that the incidence in the population living within 1000 m was twice as high as the incidence in the population living more than 1000 m away from a farm. This difference was highly significant. A plot of incidence in the population within a certain distance from farms versus the distance exhibited an exponential decay in incidence, sharply different from simulations of incidence that assumed independence between farm distance and risk.

**CONCLUSIONS**

Our results indicate that distance to cattle farms correlate with risk of acquiring EHEC O157, and raise questions concerning mechanisms of infection as well as methods of prevention of EHEC O157 cases.

17.1 Reference: 20080071

Track: Contribution of modelling to applied epidemiology

## The statistics of generation times in epidemic spread models

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### BACKGROUND

Recently, the analysis of data on past epidemics, in particular flu pandemics, has attracted great interest, because of the possible future pandemic threat posed by avian flu. The data is analyzed to yield parameter values for intervention evaluation models. Among the basic parameters, the generation time has a central role, both because of its intrinsic meaning and its relation to other basic parameters such as infectious period, latent period and contact intensity. The concept of generation time of an infectious disease has an 'innocent' definition, viz. the time from the the moment one person becomes infected until that person infects another person. This concept is similar to the demographic concept 'generation gap', with new infections replacing births in a population.

### METHODS

By formulating the inference problem within a simple yet basic mathematical model for infection spread, it is possible to derive theoretical properties of observations in various situations, e.g. in 'isolation', in households, during large outbreaks.

### RESULTS

In each case, it is shown that biases, usually not considered in the literature arise. These results lead to further considerations, which are subject to ongoing research: 1) do further features of the observation model, such as inclusion of latent period, observation of clinical onset instead of infection, varying infectivity during the infectious period, modify the bias effects found in the basic model? 2) what consequences would the acknowledgement of these bias effects have on estimates derived from published data sets?

### CONCLUSIONS

We will describe how generation times iare related to various basic quantities in models of epidemic spread and how the statistical properties of observed generation times are far from obvious...

17.2 Reference: 20080145

Track: Contribution of modelling to applied epidemiology

## Transmission dynamics of methicillin-resistant *Staphylococcus Aureus* in a medical intensive care setting

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### BACKGROUND

Hospital-acquired infection (HAI) is a major concern worldwide as it negatively impacts on patients' outcomes and generates substantial extra costs and preventing them is a top priority to improve quality of care and patient safety. Methicillin-resistant *Staphylococcus aureus* (MRSA) has come in the past 2 decades to symbolize HAI as it settled in many hospitals and frequently causes outbreaks. Fundamental unknown parameters are the probability of transmission from Health care worker (HCW) to patient and the rate of HCW contamination through the environment.

### METHODS

A stochastic individual based model was designed to explore the transmission dynamic of MRSA in the medical intensive care unit (MICU) of the University of Geneva Hospitals, and most parameters used to feed it were derived from this same unit. The MICU is an 18-bed unit admitting about 1700 patients yearly for a length of stay of 4 days.

### RESULTS

Surveillance data for MRSA transmission on the ward recorded 46 events over a 548 day study period and is best represented by a Negative Binomial process with parameter  $m$  given by the sample mean (0.083942) and "size" parameter  $k=0.377$ . We fit the model to this observed data, suggesting values of 0.008 and 0.02 for the unknown parameters mentioned above, respectively. Extensive sensitivity analysis allows uncertainty arising from other parameters to be accounted for.

### CONCLUSIONS

Having derived these values we can now test the effect of various infection control measures on MRSA cross-transmission burden, such as systematic screening or isolation. This study has also identified the need for parallel surveillance screening of HCWs during an observational study to reduce uncertainty in the system.

**17.3 Reference: 20080208****Track: Contribution of modelling to applied epidemiology****Evaluation of selection bias in register based studies of infectious diseases, exemplified using Swedish Hepatitis C data***Anna Törner, AS Duberg, Åke Svensson*

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2. Örebro University Hospital, Örebro, Sweden
3. Stockholm University, Department of Mathematical Statistics

**BACKGROUND**

Infection with hepatitis C virus (HCV) often remains asymptomatic for decades and the infection is frequently diagnosed when secondary complications such as liver cirrhosis or cancer emerge. The late diagnosis leads to a selection of more severely ill persons into registers of infected individuals. Register-based studies need to be adjusted for this bias. Standardized Incidence Ratio (SIR) is a measure of relative risk that is commonly used in register-based studies to estimate risk. The objective of this work was to describe and assess a novel method of calculating a continuous SIR that allows improved evaluation of and adjustment for selection bias.

**METHODS**

Selection bias was adjusted for by introducing a time window between diagnosis/entry into the register and entry into the study. Patients who did not experience the complication studied, e.g. cancer, in the defined time window were eligible for the study. SIR was calculated as a continuous function of the size of the time window. The resulting graph was inspected visually to decide on an appropriate window size. The proposed continuous SIR was compared to conventional interval-based calculations using Swedish HCV data from 1990-2006. The complications studied were primary liver cancer (PLC) and Non-Hodgkin Lymphoma (NHL).

**RESULTS**

The statistical power to evaluate selection bias was improved for the continuous SIR compared to interval-based calculations, especially for a rare complication such as NHL. The resulting graphs were also easy to interpret. The selection bias for both PLC and NHL was substantial and a time window of minimum 3-6 months was judged appropriate.

**CONCLUSIONS**

Continuous SIR may prove to be a more appropriate and powerful method for adjusting register-based studies of infectious diseases, where selection bias is of concern.

## 17.4 Reference: 20080187

Track: Contribution of modelling to applied epidemiology

## Investigating the transmission potential and the impact of control measures of the 2007 Chikungunya fever outbreak in Italy

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### BACKGROUND

In summer 2007, Italy experienced the first outbreak of Chikungunya virus (CHIKV) documented in a temperate climate country. The infection is transmitted through the bite of an infected *Aedes* mosquito. A total of 217 laboratory confirmed CHIKV cases were reported from 15 July 2007 to 28 September 2007. In order to assess control measures implemented we investigated the transmission dynamics of the CHIKV outbreak. As a first step, we estimated the basic reproduction number ( $R_0$ ) of the outbreak.

### METHODS

We used a system of ordinary differential equations to model the dynamics of the outbreak and assumed homogenous mixing between host and vector populations. We used two methods to estimate  $R_0$ . The first method relied on the estimation of the intrinsic growth rate and parameters such as the duration of viremia in humans and the extrinsic and intrinsic incubation period. The second method required an estimate of the biting rate and the total number of vectors. We estimated these parameters by fitting the model to the epidemic curve using a least-square algorithm.

### RESULTS

Using the intrinsic growth rate,  $R_0$  had a mean value of 3.62 (95%CI: 3.11-4.21). Fitting the model to the epidemic curve,  $R_0$  had a mean value of 3.93 (95%CI: 3.17-4.79). The 2 distributions of  $R_0$  were not significantly different.

### CONCLUSIONS

These results suggest that without vector control measures the attack rate in the initial affected villages could have been as high as 90%. Considering the effectiveness of control measures implemented during the outbreak, our results strongly suggest that the use of pyrethroids against adult mosquitoes and anti-larval products from 18 August 2007 onwards, together with an active information campaign on personal protection, limited the outbreak.

17.5 Reference: 20080103

Track: Contribution of modelling to applied epidemiology

## Modelling the incidence of human *Salmonella* infections from cross-sectional serological studies

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### BACKGROUND

The true incidence of human infections with non-typhoid *Salmonella* is unknown. Reported numbers of laboratory-confirmed infections represent only a small proportion of cases in the population. This proportion varies depending on the sensitivity of a country's surveillance system. We developed a serology-based approach that allows to compare infection rates between countries, regions or periods independent of surveillance data.

### METHODS

We determined the kinetics of the IgG, IgM and IgA antibody responses to *Salmonella* by repeated measurements in a cohort of culture confirmed *Salmonella* cases, using an in-house ELISA. Then we measured antibody concentrations in population-representative serum collections in seven European countries. We developed a backcalculation model to estimate the likely time since infection corresponding to each observed antibody concentration and the "sero-incidence", defined as the expected number of sero-conversions per person-year. The model can handle the different sources of uncertainty and variation such as measurement errors, individual variation of antibody response just after infection and of antibody decay rates

### RESULTS

We analysed a total of ~7000 sera from Denmark, The Netherlands, Finland, France, Italy, Poland and Romania. The lowest sero-incidence was found in Finland with 0.056 (90% credibility interval: 0.013 – 0.13) infections per person year, and the highest in Poland with 0.54 (0.37-0.73) infections per person year. The sero-incidences are ~100-fold to several 1000-fold higher than the incidence of reported culture-confirmed cases.

### CONCLUSIONS

The present study can be regarded as a proof of concept for the use of sero-incidence to consolidate and intercalibrate public health surveillance of *Salmonella* infections in humans. Our methodology can be used for other common pathogens provided a reliable assay to measure antibody concentrations is available.

**18.1 Reference: 20080243****Track: Intervention and policy****State Party self-assessment shows progress in the implementation of the International Health Regulations, World Health Organization European Region, January-June 2008***Marten Kivi, R. Andraghetti, S. Matic*

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**BACKGROUND**

The current International Health Regulations (IHR) entered into force in June 2007. The Regulations aim to prevent and control international spread of disease, encompassing biological, chemical and radionuclear hazards. In this respect, obligations of States Parties (SP) under the IHR include maintaining public health "core capacity requirements". Assessment of capacities should inform development of national action plans by June 2009 to ensure that core capacities are present by June 2012. The World Health Organization Regional Office for Europe (WHO/Europe) seeks to assist SP in the IHR implementation process.

**METHODS**

WHO/Europe developed an SP self-assessment tool to raise awareness and establish a baseline for monitoring of the IHR implementation process in the Region. The tool addressed steps in the implementation process, core capacities and needs for WHO assistance. In January-June 2008, 35 (65%) of 54 National IHR Focal Points, representing a broad geographical spectrum, shared completed tools with WHO/Europe.

**RESULTS**

Many SP had fully (n=13/35, 37%) or partially (n=13/35, 37%) developed IHR implementation strategies. Likewise, a majority had fully 18/35 (51%) or partially (16/35, 46%) developed public health emergency plans. In the past five years, 18/35 (51%) and 11/35 (31%) SP had performed full or partial assessment of public health capacities for "surveillance and response", respectively. Diverse needs for IHR-related WHO assistance or guidance were indicated by 27/35 (77%) SP.

**CONCLUSIONS**

These results are subject to a high degree of personal judgement and interpretation and there is considerable heterogeneity in the Region. In-depth assessment may further inform development of IHR national action plans. The results reflect that SP are in the process of meeting their requirements under the IHR, thereby contributing to international public health security.

**18.2 Reference: 20080106****Track: Intervention and policy****Mumps outbreak in the Czech Republic in 2005-2007 - implications for future immunization policy changes**

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**BACKGROUND**

Mumps is a viral illness with acute onset of unilateral or bilateral tender, self-limited swelling of the parotid or other salivary gland, lasting two or more days without other apparent cause. 8272 cases of mumps have been reported in the Czech Republic since January 1st 2005 till the end 2007. Compulsory routine two-dose vaccination against mumps was implemented in 1987.

**METHODS**

All the cases were notified in the Czech communicable disease notification system (Epidat) to the National Institute of Public Health through regional public health offices. Epidat contains all laboratory-confirmed cases and cases that meet the clinical case definition with an epidemiological link to a laboratory-confirmed case. To understand characteristics of the mumps outbreak in the Czech Republic and possible consequences for changes in immunization policy a descriptive analysis was undertaken.

**RESULTS**

Among cases 5038 (60.9%) were males. The peak incidence was recorded in males, age cohort 15-19, reaching 342/100000 in 2006. 6181 (74.7%) cases were previously immunized, out of those 157 with only 1 dose of mumps vaccine. Risk for complications was the highest for unvaccinated (OR= 7,9) and lower for those vaccinated with one dose (OR=6.6) compared to fully vaccinated cases.

**CONCLUSIONS**

Possible implications for immunization policy are: -to use mono-dose vials, -to keep high immunization coverage to avoid more serious complications, -to consider shift of the second dose more closely to preschool age or to add adolescent dose to the calendar, -to carry out immunosurveys.

**18.3 Reference: 20080240****Track: Intervention and policy****Methodology to Prioritize Infectious Diseases in Public Health, Germany**

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**BACKGROUND**

The field of public health has to deal with a multitude of pathogens and limited resources. This requires prioritization, yet standardized methodologies for this have rarely been published. In 2005 the national public health institute in Germany (RKI) has prioritized pathogens by public health criteria in order to guide research and surveillance activities in infectious disease epidemiology.

**METHODS**

In a Delphi-process we rated pathogens according to the following 12 criteria: 3 criteria on burden of disease (incidence, severity, mortality), 3 on epidemiologic dynamic (outbreak potential, trend, emerging potential), 4 on information need (evidence on risk factors / groups, validity of epidemiologic information, international duties and public attention, evidence for pathogenesis), and 2 on health gain opportunity (preventability, treatability). For each criterion a numerical score of +1, 0 or -1 was given. Each criterion received a weight by which the numerical score of the criterion was multiplied.

**RESULTS**

Eleven senior epidemiologists at RKI participated in the prioritization of 85 pathogens. The top ranked pathogen was influenza virus (total weighted score 23) followed by hepatitis C virus (18), methicillin resistant staphylococcus aureus (17), HIV (12), neisseria meningitidis (10), varicella zoster virus (9), campylobacter (5), mycobacterium tuberculosis (4), human papilloma virus (2), legionella (2). The median score was taken by rubella virus (-23) the lowest by vibrio cholera (-64).

**CONCLUSIONS**

Before updating the prioritization we plan to further improve the procedure. We therefore invite the audience to give feed back on the methodology via a structured web based questionnaire at <http://prio.rki.de>. Results of this survey will then lead to an improvement of the methodology.

**18.4 Reference: 20080073****Track: Intervention and policy****Can a multifaceted educational intervention targeting both nurses and physicians change the prescribing of antibiotics to nursing home residents? A cluster randomised controlled trial***Eva Pettersson (1), Å. Vernby (1), S. Mölsted (2), CS. Lundborg (1)*

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2. Unit of Research and Development in Primary Care, Jönköping, Sweden

**BACKGROUND**

Inappropriate use of antimicrobials is a common problem in the nursing home setting and can lead to adverse events for the consumers, development of resistance, increased mortality and excessive costs for the care providers. To improve antibiotic prescribing a multifaceted educational intervention was developed.

**METHODS**

This was a cluster randomised controlled trial. The main outcomes were analysed in the 46 nursing homes remaining at follow-up. The intervention consisted of small educational group sessions with nurses and physicians and included feedback on performance, presentation of guidelines and written materials. Main outcome measures were total amount of antibiotics prescribed, admission to hospital, physician's wait and see and for lower Urinary Tract Infection, UTI, in women the proportion of antibiotics and duration of treatment according to guidelines was assessed.

**RESULTS**

46 nursing homes completed the study. 889 and 540 infectious episodes were recorded pre- and post intervention. There was a significant change in proportion of physicians' wait and see policy between intervention and control group (0.09 v -0.05, 95% confidence intervals 0.03 to 0.16 and -0.10 to -0.00). No significant difference in admission to hospital could be seen between the two study arms. The total use of antibiotics remained the same. For lower UTI in women a significant increase in use of first line antibiotics and a significant decrease in the use of quinolones could be seen in both groups. The proportion of treatments with correct duration stayed the same in both groups before and after the intervention.

**CONCLUSIONS**

It is possible to increase physicians' wait and see by using a multifaceted educational intervention targeting both nurses and physicians. No effect could be seen on the other main outcomes.

**18.5 Reference: 20080031****Track: Intervention and policy**

## **e-Bug online Games for Children: Educational Games Teaching Microbes, Hand and Respiratory Hygiene and Prudent Antibiotics across Europe**

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### **BACKGROUND**

e-Bug is a DG SANCO funded antibiotic and hygiene teaching resource aiming to reinforce an awareness of microbes, hand and respiratory hygiene and the benefits of prudent antibiotics use among junior and senior school children across Europe. Education packs used at schools are complemented by web-based interactive games teaching the key learning outcomes of the e-Bug project. This talk will demonstrate two game styles aimed at junior children (fast engaging platform game) and senior children (cognitive detective style game) and discuss how the learning outcomes were taught through game mechanics.

### **METHODS**

The junior platform game has a number of "levels" teaching learning outcomes. The player, shrunken inside a human body, interacts with good and bad cartoon microbes as well as antibiotics and viruses. Children's knowledge is tested seamlessly before and after each level in a Game show style. Senior games use a detective style investigating a series of infectious related cases or outbreaks in Europe where the player has to discover the source of infection or contamination to successfully solve the puzzle.

### **RESULTS**

Evaluation during the development was primarily conducted in the UK. In the first phase, the knowledge gain is evaluated before and after playing sessions and complemented by qualitative studies conducted in the UK, France and the Czech Republic. This is complemented by qualitative studies (focus groups and observational studies) as well as with online users. This talk will present the results of this phase.

### **CONCLUSIONS**

After the comparative studies, e-Bug games will be translated to 9 European languages. E-Bug online games are a unique example of hygiene and AMR intervention implemented and evaluated across Europe aimed at junior and senior children.

19.1 Reference: 20080254

Track: Surveillance: novel methods

## Immediate communication via fax leads to a more positive assessment of collaboration with medical doctors on local level of the infectious disease surveillance system in Germany

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### BACKGROUND

International Health Regulations (IHR) require member states to assess their existing infectious disease surveillance system. Although essential, assessment of German local public health authorities in 2002 revealed inter alia that collaboration with medical doctors is in need of improvement. The system has now been re-evaluated to investigate recent progress e.g. concerning collaboration, and to assess processes and core capacities for IHR.

### METHODS

In preparation qualitative interviews and focussed discussions had been conducted with representatives of the local and intermediate public health levels to identify relevant target indicators additional to the ones used in 2002 and those proposed by the WHO. A questionnaire has been developed with collaboration of all levels of the surveillance system containing 59 questions about demographic factors, equipment, relevant core and support functions and satisfaction. It has been send to all public health authorities on local levels in Germany.

### RESULTS

351 of 410 authorities (82%) responded. Collaboration with medical doctors did not improve. Only 58% state to be continuously reachable. Information on events can be faxed immediately to relevant authorities by 58%. Analyses of local data have not been published periodically by 71%. Further training with medical doctors has never been organised by 42%. Assessment of collaboration depends significantly on the profession of the responder in our analysis. Physicians of health authorities are more satisfied with collaboration compared to other professions ( $p < 0.001$ ). In multivariate analysis only immediate communication via fax was significantly associated for all professions with a more positive assessment of collaboration ( $p < 0.05$ ).

### CONCLUSIONS

Core functions on local level should be optimised in order to improve collaboration with medical doctors and response on events. Immediate information via fax seems to improve collaboration.

19.2 Reference: 20080204

Track: Surveillance: novel methods

## Determination of Laboratory catchment area statistics for Salmonella infections in England and Wales

*Christopher Lane*

Health Protection Agency, Centre for Infections, Department of Gastrointestinal, Emerging and Zoonotic Infections.

### BACKGROUND

Geographical and temporal analysis of epidemiological data are recognised as valuable tools for improving our understanding of infectious intestinal disease epidemiology. Geographical Information Systems (GIS) are dependent on the availability of geo-referenced patient data. In England and Wales, surveillance of Salmonella infections is primarily laboratory-based, with minimal geo-referenced patient data (25-50%), and thus limited potential to provide an accurate picture of real localised levels of infection. We developed a method to create accurate catchment areas for laboratories providing Salmonella specimens to the reference laboratory.

### METHODS

All laboratories reporting specimens to the National Reference Laboratory between 2000 and 2007 were analysed. Laboratories reporting less than 30 specimens in this period were aggregated with their nearest neighbour, and geo-referenced using post codes. Thiessen polygons were generated for each laboratory and superimposed over high resolution census output areas. Output areas within each polygon were aggregated to create catchment boundaries with full demographic data, and concordance tested using available geo-referenced patient data.

### RESULTS

The original 294 laboratories were aggregated into 204 laboratory groups for which catchment areas were created. Validation of the catchment areas showed a concordance of 75.8% (95CI 74.8 – 78.8) based on 34,088 (25%) postcoded reports, indicating a relatively close match between the representative patient data subset and the created catchment areas.

### CONCLUSIONS

This method of catchment area development allows for the analysis of national datasets regardless of the level of patient geo-referencing, accounting for localised demographic variance. When combined with GIS, the method may be applied in near real-time for enhanced detection of outbreaks. The method will be applied to subsets of national Salmonella infections as an example of this application.

## 19.3 Reference: 20080239

Track: Surveillance: novel methods

**European Soccer Championship UEFA EURO 2008 - Enhanced Epidemiological Surveillance in Austria**

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**BACKGROUND**

In June 2008 the Soccer Championship UEFA EURO 2008 (UE) took place in Austria and Switzerland and as a mass gathering represented a potential risk for spread of infectious diseases (ID). Prior to the UE routine reporting on ID from the regional national health boards (RNHB) to the Ministry of Health (MoH) had been performed paperbased, monthly and without having an electronic system in place, so the Austrian health authorities had to set up enhanced epidemiological surveillance to early detect and control outbreaks.

**METHODS**

This enhanced system was developed in collaboration with the ECDC and the Robert Koch Institute. Being all 24h/7d on-call duty, the RNHB provided now daily reporting on outbreaks and line listing of mandatory reportable diseases by means of e-mailing or FAX-transfer to a Crisis and Communication Centre at the MoH from 05.-30.06.08. Further on international and national information on ID and environmental threats as well as on security affairs was exchanged in daily teleconferences and via a daily updated web-based forum with Switzerland, ECDC and RNHB. Reported data were summarised in daily and weekly bulletins by the MoH.

**RESULTS**

Daily reporting from the RNHB to the MoH, without any delay noted, resulted in a total of 488 individual, including also clinically suspected or laboratory-confirmed, notifiable ID-cases. Infections e.g. caused by *Campylobacter* accounted for 141 individual cases, but no outbreaks, in the four venue regions (mean =35,3; range: 12 to 65; CI: 13,4 to 56,6) compared to a mean of 242 cases in June 2003-2007 (range:142 to 311; alpha=0,5).

**CONCLUSIONS**

No impact from any ID on the UE was observed. The Austrian experience demonstrates that enhanced surveillance by daily reporting during mass gatherings can be set up by a motivated team also without an electronic system in place, provides good overview on ID and can be recommended for similar further events.

19.4 Reference: 20080078

Track: Surveillance: novel methods

## Enterovirus Surveillance: A new instrument for Polio surveillance in Germany

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### BACKGROUND

Polio surveillance is a prerequisite to assess the progress of polio eradication worldwide. The World Health Organization recommends acute flaccid paralysis (AFP) surveillance, which however is difficult to implement to a satisfactory level in industrialised countries. In Germany, it was therefore decided to establish in addition to AFP surveillance an enterovirus surveillance to assess the epidemiology of enterovirus infections as well as to detect reimported polioviruses. The project is supported by funds of the German Ministry of Health.

### METHODS

A national network of 14 laboratories with proven competence in enterovirus diagnostics was established in 2005. A free of charge enterovirus testing (PCR, isolation and typing) is offered to all hospitals treating patients with signs of aseptic meningitis/encephalitis. Clinical information and lab results are centrally collated and analysed.

### RESULTS

Since August 2005 a total of 5450 samples of patients with CNS infection were tested (as of 01 July 2008). In about one third of the cases, enterovirus PCR is positive, half of which yield a typing result. More than 40 different serotypes were isolated to date. ECHO virus 30 was most common (32% of all isolates). In several instances clusters of viral meningitis cases were detected. However, outbreak detection and management still needs further improvement. The results are published weekly on the internet at [www.polioeradikation.nlga.niedersachsen.de](http://www.polioeradikation.nlga.niedersachsen.de)

### CONCLUSIONS

This new enterovirus surveillance system not only allows to monitor enterovirus circulation and to detect outbreaks thus helping clinicians to improve patient care, but also is an invaluable corner stone for polio eradication activities and can serve as a model for other countries.

**19.5 Reference: 20080180****Track: Surveillance: novel methods****First step in standardising surveillance at the EU level – evaluation of dedicated surveillance networks (DSNs)***Johanna Takkinen (1), D. Faensen (2), A. Ammon (1)*

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**BACKGROUND**

The European Centre for Disease Prevention and Control (ECDC) has a mandate to coordinate and standardise surveillance on communicable diseases in the EU. Surveillance has been established as DSNs around Europe with highly variable objectives and methods, covering about 20 out of 47 diseases to be under EU wide surveillance. To receive objective information for decision making on what activities should be continued under supervision or by ECDC, an evaluation of the existing 17 DSNs was launched.

**METHODS**

Each network was evaluated by external evaluation teams (3-4 experts) with a standard evaluation protocol against their current objectives, including the usefulness and technical performance (completeness, timeliness, and acceptance). User groups common to all networks (national "state" epidemiologists (SE), laboratory and epidemiological network participants) gave their opinion about usefulness and technical performance, the SE by interview for all networks, the network participants via web-based survey for the respective network. With a standard assessment tool, the teams assessed how far the existing activities support the future surveillance needs.

**RESULTS**

A total of 16 DSNs (88%) have undergone the evaluation as of July 2008. Response rates ranged from 43% to 76% by DSNs. 11 DSNs covered laboratory activities and 14 epidemiological activities. 15 of the networks fulfilled the needs for the future surveillance and will be stepwise transferred to ECDC. Seven DSNs have been/will be outsourced as ECDC has no capacity to continue the activities yet, five have been transferred to ECDC, and three will be transferred in 2008.

**CONCLUSIONS**

First step in standardisation of surveillance at the EU level is progressing well. Laboratory activities will be outsourced. The transfer of DSNs is estimated to be finished by the end of 2010.





# Late Breaker Session Abstracts



Reference: 20080276

Track: Late Breakers

## Outbreak of Salmonella serotype Kedougou linked to infant formula milk. Spain, 2008 (Preliminary data)

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2. National Centre of Microbiology, Instituto de Salud Carlos III, Madrid, Spain
3. National Centre of Epidemiology, Instituto de Salud Carlos III, Madrid, Spain

### BACKGROUND

On 5/8/2008, National Centre of Microbiology notified an increase in isolates of Salmonella Kedougou, 21 isolates compared to 6 in 2007 and 2 in 2006. 90% of cases were under 1 year old. The same day, the National Centre of Epidemiology began a study to confirm this increase and identify the infection source, transmission mode and associated risks.

### METHODS

We performed a case-control study (1:4) matching controls by age, sex, place and diagnosis week. Case definition was: 'Every child under one year old with an isolate of S. Kedougou since 1/1/08'. Surveillance services of Spanish Regions applied an ad-hoc questionnaire to cases and controls. We described the cases and conducted a univariate and multivariate analysis of risk factors (exact conditional logistic regression). 95% Confidence Interval were estimated.

### RESULTS

Between 4/02/08 and 27/08/08, 23 cases under 1 year old were confirmed (35% hospitalized) from 11 Spanish Regions. The median case-age was 5 months and 43% were male. Main symptoms were diarrhoea(100%), fever(39%) and vomiting(22%). All cases consumed infant formula milk 'Brand-A' compared with 9% of controls. The matched univariate analysis showed an association between illness and milk consumption 'Brand-A' ( $P < 0.0001$ ; CI<sub>95%</sub>:10.39-∞). All isolates showed have a typical, indistinguishable Pulse Field pattern and the same pattern of sensitivity to antibiotics. Investigations are ongoing, microbiological results of milk samples are pending at the moment.

### CONCLUSIONS

Our results suggest: consumption of milk 'Brand-A' is associated with Salmonella Kedougou outbreak, occurred in Spain between January to August 2008. On 26/08/08, Spanish food safety authorities recalled five "Brand-A" milk batches. No cases have been identified after control measure were implemented.

Reference: 20080277

Track: Late Breakers

## Methods to determine the prevalence of acute gastroenteritis and associated risk factors in pilgrims doing the French route of Saint James Way, july-september 2008, Spain

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### BACKGROUND

The pilgrimage to Santiago de Compostela is done every summer by 40,000 pilgrims coming from different countries. In 2010 (Jacobean year), we expect a significant increase in number of pilgrims. The frequency of acute gastroenteritis (AGE) increases in the summer, but no baseline data is available in Galicia. Therefore, the Galician epidemiology service planned a study aiming at determining the prevalence and associated risk factors of AGE in pilgrims covering the Galician section of Santiago Way.

### METHODS

We designed: 1. – A cross-sectional descriptive study, to determine the AGE prevalence, using a self-completed questionnaire filled in by travelers arriving to the 'Monte do Gozo' shelter in Santiago, between July 15-September 15, 2008. 2. – A case-control study with incident AGE cases in the same period of time. We used as concurrent controls, fellow travelers of cases, whenever possible. We identified cases through notification done by doctors, pharmacists, emergency services and people in charge of shelters on the way. Using a self-completed questionnaire, we collected socio-demographic and exposure to risk factors-related data. We also asked cases to provide a stool sample for microbiological study.

### RESULTS

For the prevalence study, we received 593 valid questionnaires. For the case-control study, 121 questionnaires were filled-in: 96 cases and 25 controls. We received 31 stool samples. Preliminary analysis shows the AGE prevalence rate of 13.83% (n: 593; 95%CI:10.97-16.69). The majority of cases drank unbotled water from hostels (93.2%) or village fountains (86.7%). The main symptoms were: diarrhoea (51.2%), vomiting (23.2%) or both (25.6%). The microbiological tests and analysis of results are in progress.

### CONCLUSIONS

The results of these studies will be the basis of enhanced surveillance of AGE in Galicia for the Jacobean Year.

Reference: 20080266

Track: Late Breakers

## Explosive outbreak of dengue fever on a Pacific island, Kiribati, May-July 2008

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### BACKGROUND

As in most Pacific islands countries, dengue is not endemic in Kiribati; the last outbreak was in 2003. Mosquito vectors were unknown. A prolonged drought had led to an increased use of improvised rainwater containers. In May 2008, an increase in febrile illness on South Tarawa (47,000 inhabitants, 2558/km<sup>2</sup>) was confirmed as dengue by rapid tests. We aimed to describe the outbreak, identify the vector, and direct control measures.

### METHODS

A case was defined as a person with two days of fever over 38°C and two other symptoms (headache, body ache, rash, vomiting, bleeding). Clinics reported cases daily. Serology and PCR were performed on selected samples. We determined the percentage of households with vector larvae (house index) and the average number of breeding sites per household.

### RESULTS

From May 14th to July 10th, 831 cases were reported by Tarawa clinics; 35% were 10-18 years old and 69% were female. Seven of 16 foreign physicians had dengue. Several children reportedly died without seeking regular medical care but none could be verified. Dengue serotype 4 was confirmed in 12 samples (29%). *Aedes aegypti* was the main vector. In South Tarawa, the house index was 100%, with 3.4 breeding sites per household. The most important breeding sites were rainwater containers with absent or ill-fitting covers.

### CONCLUSIONS

High density of susceptible persons and vectors facilitated this explosive outbreak with a serotype not identified in Pacific islands since 1996. A substantial proportion of the population was likely affected but not all sought medical care. Efforts were directed at application of larvicides and improving public awareness through community and church leaders. Appropriate covers for rainwater catchment systems would provide longer term benefits.

Reference: 20080269

Track: Late Breakers

## Risk assessment for TB contacts during air passenger travel: when do we need contact tracing?

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### BACKGROUND

Notifications of TB-cases related to air travel increasingly trigger contact tracing (CT) and challenge Epidemic Response within the EU Member States. Existing guidelines recommend contact tracing of passengers seated within +/- 2 rows of TB cases if the flight duration exceeds 8 hours. We examined, if this can sufficiently cover onboard transmission.

### METHODS

We conducted an extensive literature search to retrieve events where CT was initiated for onboard contacts of TB cases. In addition, questionnaires addressing PH experts in the EU-MS were launched to retrieve unpublished events and grey literature. All identified events were systematically reviewed for evidence of onboard transmission, index case's symptoms, contact's seating position and flight time. Recommendations were based on the analysis of the reviewed events and epidemiologic attributes of mycobacteriae.

### RESULTS

We identified 27 events where CT was undertaken. In 6 events onboard-transmission from sputum positive index-cases to 18 contacts was reported. Five of 18 contacts were seated >2 rows from the index (12/13/15/23/29 rows) but 2 of the 5 had a known special exposure to the index-patients during flight. We retrieved one event with a flight time below eight hours where transmission might have taken place.

### CONCLUSIONS

It should be considered if the existing guidelines should not extend their recommendation on CT to passengers seated beyond 2 rows of index-patient if contacts experienced special exposure in flights  $\geq 8$ hrs. If the flight duration is below 8 hours, CT of contacts seated within +/- 2 rows of index-patient and of contacts with special exposure should be considered, if an increased PH risk (MDR/XDR TB or increased infectivity through cavernous TB, sputum-smear and culture-positive TB or repetitive cough during flight) exists.

Reference: 20080278

Track: Late Breakers

## A Multi European country outbreak of Salmonella Agona associated with a large food company

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### BACKGROUND

In July 2008, an upsurge of *S. Agona* cases with a new specific PFGE profile was notified by Ireland and the UK. In April 2008, the same strain was isolated in precooked meat produced by an Irish food company with an international distribution network, plants were cleaned. The appearance of cases in July caused concern that the company may be the source. An international control outbreak team headed by Ireland investigated the outbreak to assess its extent, investigate all possible sources and implement control measures.

### METHODS

A confirmed case was defined as person with an isolate of *S. Agona* with the outbreak-specific PFGE profile. We posted Enter-net and Early Warning Response System alerts for active international case finding. Confirmed cases received a descriptive questionnaire. A matched case control study on the Irish cases matching controls on age and living place tested the association between the disease and exposure to food produced by the company. Food samples taken at the company and in outlets were tested using PFGE.

### RESULTS

A total of 157 confirmed cases were diagnosed in 10 European countries, 11 in Ireland. Median age was 27 years (3 months to 87 years), 57% were male. Eating sandwiches with precooked meat from the company was associated with infection (matched OR 18.3, 95%CI 2.2 - 149.2) in Ireland. The outbreak strain was isolated in samples of precooked beef, bacon and pepperoni taken in the plants and outlets.

### CONCLUSIONS

Results from the epidemiological investigation justified closure of the plants and recalls on 1st August. The globalisation of food distribution increases the risk of international outbreak. A standardized epidemiological approach, close and timely international collaboration are necessary to control these outbreaks.





**Poster**

**Abstracts**



**01.1 Reference: 20080038****Track: Antimicrobial resistance**

## **Antibiotic use in Lithuanian general hospitals**

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### **BACKGROUND**

Misuse of antimicrobial agents in hospital may lead to emergence of antimicrobial resistance as well as increased costs, treatment failures or complications due to resistant microorganisms. There is well known relation between antibiotic use and resistance, so surveillance of antibiotic use is considered as important tool for resistance control. In Lithuania information on antibiotic use in hospitals is minimal. So the main aim of our study was to determine antibiotic consumption rates and structure in Lithuanian hospitals.

### **METHODS**

All 65 general hospitals were invited to take part in this study. Nursing as well as specialized hospitals (e.g. psychiatric, infectious etc.) we excluded. Data on the consumption of antimicrobials agents for systemic use (ATC group J01) in 2007 were collected by means of a questionnaire distributed to all hospital pharmacists. Data from 46 hospitals were received giving the response rate of 70.7%. The ABC Calc from the WHO, version 3, was used to calculate the number of DDD of the various antibiotics.

### **RESULTS**

The total systemic antibiotic consumption in Lithuanian hospitals was 41.03 DDD per 100-bed days. There were big variations between different hospitals revealed ranging from 11.5 to 79.5 DDD per 100-bed days. Structure of antibiotics was analyzed showing big variations between hospitals as well. The results indicated that three most commonly used groups were penicillins – 22.2 DDD per 100 bed days (in different hospitals ranged 3.4-61.9), first generation cephalosporins 3.2 (0.1-75.0) and aminoglycosides 5.8 (0.5-20.4).

### **CONCLUSIONS**

The study revealed big variations in antibiotic consumption and structure of antibiotics used in different hospitals. The second phase of the study is planned to determine the most important factors influencing antibiotic usage.

01.2 Reference: 20080215

Track: Antimicrobial resistance

## Trends in the transmission of primary drug resistance in patients with a known date of HIV-1 infection.

### Data from the German HIV-1 Seroconverter Cohort

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#### BACKGROUND

To monitor trends in the transmission of primary drug resistance (TDR) in a long term observational multi centre cohort of patients with a known date of HIV-1-infection in Germany.

#### METHODS

As of 31.12.2007, 1563 individuals with a last negative and a first positive HIV antibody test within an interval of maximum three years, as well as individuals with an acute seroconversion confirmed by laboratory criteria were defined as HIV-seroconverters. Genotypic resistance testing was performed in treatment naïve patients (Stanford algorithm, version 4.3.1, 2007).

#### RESULTS

The majority of patients were male (92%, 1447/1563) belonging to the risk group of men having sex with men, MSM (82%), followed by heterosexuals, IDU and patients from high prevalence countries (7.8%, 3.8% and 2.5%, respectively). 1043/1563 (67%) samples were analysed by genotypic resistance testing. Resistant strains were identified in 143/1043 individuals. The overall prevalence of TDR in Germany 1996-2007 was 13.7% (CI 11.7-15.9) with a declining trend over time ( $p=0.05$ ). The prevalence of TDR in 2007 was 10.8% (CI 5.3-20.5). Mostly NRTI resistance was reported followed by NNRTI and PI resistance (6.3%, 3.1%, 2.4%, respectively). Dual- and multi-drug resistance appeared in 1.6% and 0.4% of patients, respectively. In contrast to NNRTI resistance ( $p=0.18$ ), a significant decline in NRTI- as well as in PI-associated resistance was observed over time (NRTI  $p=0.02$ ; PI  $p=0.007$ , respectively).

#### CONCLUSIONS

In contrast to many studies of prevalent HIV-infections, the German HIV-1 Seroconverter Cohort provides data on trends of TDR among newly infected patients. The significant decrease of NRTI- and PI- resistance might be related to changing prescription practice, new generation PIs and broader application of genotypic resistance analysis before the start of first line antiretroviral therapy.

01.3 Reference: 20080194

Track: Antimicrobial resistance

## Transferable carbapenem-resistance in gram-negative pathogens – the threat of tomorrow

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### BACKGROUND

In recent years carbapenem-resistance in nosocomial Enterobacteriaceae is an increasing problem. Intensive use of carbapenems in therapy results in more frequently occurrence of metallo-beta-lactamases and different OXA-enzymes as well. These carbapenemases were also found in *Acinetobacter baumannii* often causing severe infections. Here we report on analysis of multidrug-resistant isolates of different gram-negative species containing a fatal combination of various beta-lactamase-types.

### METHODS

Carbapenem-resistant isolates of *Klebsiella pneumoniae* and *A. baumannii* were collected from different hospitals in 2007. Different beta-lactamase genes were amplified by Multiplex-PCR. Furthermore, macrorestriction analysis, conjugation experiments, plasmid analysis and southern blot hybridisation of resistance genes were carried out.

### RESULTS

The macrorestriction analysis showed that four *Klebsiella pneumoniae* strains are closely related. These multiresistant strains exhibited susceptibility only to colistin and tigecycline. Via PCR and sequencing the genes *blaSHV-1*, *blaCTX-M-9*, *blaCMY-4* and *blaVIM-1* could be identified. Via conjugation the multiresistance was transferred in *E. coli*. The transconjugants contained one plasmid on which *blaCMY-4* and *blaVIM-1* genes were detected. In not related *Acinetobacter baumannii* we could identify the genes *blaVIM-2*, *blaOXA-23* and *blaOXA-58* as well. In one single isolate the carbapenem-resistance was due to overexpression of the intrinsic *blaOXA-60*-like gene caused by insertion of an *ISAba1*-sequence.

### CONCLUSIONS

The results indicate a clonal spread of *K. pneumoniae* expressing a cephalosporine-hydrolyzing AmpC-beta-lactamase (*CMY-4*) and a carbapenem-resistance mediating *VIM-1* metallo-beta-lactamase. The identification of prevalent OXA-types in multidrug-resistant *Acinetobacter baumannii* is probably a result of spread by travelling. The common localization of this beta-lactamase genes and further resistance genes on a single plasmid causes the multidrug-resistance limiting the therapeutic options. The transferability of such multidrug-resistant plasmids into other enterobacterial species might exacerbate the resistance situation in near future.

01.4 Reference: 20080048

Track: Antimicrobial resistance

## Streptococcus pneumoniae carriage and antimicrobial resistance among community children in rural Vietnam

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### BACKGROUND

*Streptococcus pneumoniae* is the most common cause of pneumonia among children under 5. The global emergence of *S.pneumoniae* antibiotic resistance was a serious clinical concern. This study investigated the carriage rate and antibiotic resistance prevalence of *S.pneumoniae* from the nasopharynx of children in Bavi district, Vietnam.

### METHODS

Children aged 6-60 months in households were surveyed for drug use and symptoms during 4 weeks. In the 3rd week, they were invited for a clinical health examination and taken of nasopharyngeal samples. E-tests and disk diffusions were used to test the antibiotic susceptibility among *S.pneumoniae* isolates.

### RESULTS

Of the 818 children, 31% had respiratory infection symptoms and 52% were *S.pneumoniae* carriers. 58% of the children had used antibiotics in the last 3 weeks. On average, antibiotics were given for 2.4 days (SD:1.7), median 2.0 days. In 420/421 isolates resistant bacteria were found. A high level of resistance was found to tetracycline 75%, ampicillin 50%, co-trimoxazol 78%, erythromycin 70%, gentamycin 85%, and ciprofloxacin 28%, whereas resistance to penicillin and cefotaxim were below 4%. The multidrug resistance rate (MDR), which resistant to at least 3 antibiotics, was 87%. Among those, isolates that were resistant to three antibiotics 16%, four antibiotics 38%, five antibiotics 24%, and six antibiotics 9%. The most common pattern of MDR was resistance to gentamycin, cotrimoxazol, tetracycline and erythromycin.

### CONCLUSIONS

Resistance rate to commonly used antibiotics and MDR of *S.pneumoniae* in the area are among the highest in the world. High susceptibility to penicillin could be used for guiding clinicians in the choice of antibiotic for empirical treatment. Strategies to minimize further spread of drug resistant *S.pneumoniae* in the region are urgently needed.

01.5 Reference: 20080044

Track: Antimicrobial resistance

## Increasing multidrug-resistance in *Acinetobacter baumannii* isolates from four German University Hospitals, GENARS-project, 2002-2006

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### BACKGROUND

*Acinetobacter* (A.) *baumannii* is a common cause of nosocomial infections and hospital-acquired outbreaks. Clinical manifestations of A. *baumannii* infection frequently include pneumonia and bloodstream infections. Treatment is complicated by multidrug-resistance (MDR). We wanted to assess potential risk factors for MDR in A. *baumannii* isolates in order to provide appropriate recommendations.

### METHODS

We analysed data collected by the German Network for Antimicrobial Resistance Surveillance of A. *baumannii* isolates tested with the DIN method from inpatients between 2002 and 2006. We defined MDR as resistance to  $\geq 3$  classes of recommended drugs. We investigated the association between MDR in A. *baumannii* and year of isolation, hospital, ward type (invasive, non-invasive, ward with immunocompromised patients, intensive care), specimen (respiratory, blood, urine, others) and demographics (age, sex). We performed descriptive analysis, bivariate and multivariable logistic regression using STATA.

### RESULTS

MDR was found in 5.3% (63 of 1189) of analysed A. *baumannii* isolates and increased from 2.6% in 2002 to 8.7% in 2006. Highest proportions of MDR were found in hospital A (8.0%), in intensive care units (7.1%), in isolates from blood (7.0%) and urine (6.8%), and in patients aged 30-39 (10.3%) or 60-69 (6.7%). In multivariable analysis, we identified yearly increase in time (OR 1.3, 95% CI 1.1-1.6) and intensive care units (OR 1.9, 95% CI 1.1-3.2) to be associated with higher risk of MDR in A. *baumannii*.

### CONCLUSIONS

The increase of MDR in A. *baumannii* isolates from 2002-06 in four hospitals suggests that clinicians in Germany should expect a rising proportion of MDR in A. *baumannii* isolates among inpatients. Complete antimicrobial resistance testing of A. *baumannii* isolates combined with in-house antimicrobial resistance surveillance is needed to provide appropriate treatment.

02.1 Reference: 20080263

Track: Contribution of modelling to applied epidemiology

## Significant regional differences in mixing patterns among residents of Poland

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### BACKGROUND

Contacts between people are an important way of spread of infectious diseases. Mathematical modeling is often used for describing epidemics and investigating different preventive options such as vaccination campaigns. The models rely on structure of the mixing patterns between people. POLYMOD survey established empirically contact patterns of residents of different countries (BE, DE, FI, GB, IT, LU, NL, PL). General similarities in the structure of contacts were noted, despite significant differences in the mean number of contacts (from 7.95 in DE to 19.77 in IT), which could influence the spread of epidemics. The aim of this study was to evaluate possible regional differences in the number of contacts in Poland.

### METHODS

Cross-section survey was carried out as a part of POLYMOD project on a representative sample of 1012 residents of Poland, using face-to-face recruitment and paper diary methodology. Each participant recorded characteristics of every person that they met during an assigned day. We analyzed the total number of contacts, the number of physical contacts and the number of regular and irregular contacts.

### RESULTS

Mean number of contacts in regions ranged from 13.9 to 24.4 and significant difference persisted after adjusting for age, gender, household size, day of week, urban/rural residence. In contrast to other contacts adjusted number of irregular contacts increased with the age and did not differ by the day of the week. Adjusted number of irregular contacts was significantly higher in urban than areas, but number of daily contacts was comparable.

### CONCLUSIONS

Regional differences are comparable to the differences among countries. In some countries parameters for modeling of epidemics may have to be adjusted to regional differences in the mixing patterns.

02.2 Reference: 20080168

Track: Contribution of modelling to applied epidemiology

## Modelling a pneumonic plague outbreak in Great Britain: dispersion, transmission and intervention

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### BACKGROUND

The potential for pneumonic plague to be used as a bioterrorist weapon causes an ongoing risk to public health. Previous modelling studies have demonstrated the importance of rapid detection and response in minimising transmission and casualties during a pneumonic plague outbreak. Here, we build on this work by considering the spatial distribution of index cases following an aerosolised release of the causative agent, *Yersinia pestis*, and compare possible intervention strategies in order to minimise the total number of casualties.

### METHODS

Firstly, we use atmospheric dispersion modelling to demonstrate the estimation of the initial casualties and the extent of their spatial distribution. Secondly, we model the onward transmission from these index cases and analyse the impact of tracing and treating contacts of cases in addition to isolating and treating cases themselves.

### RESULTS

We found that regular population movement resulted in a wide spatial spread of initially infected individuals. Consistent with earlier studies, onward transmission approximately doubled the number of cases caused by the initial release, even when contact tracing interventions were combined with the isolation of cases. Up to half of the total cases died due to early misdiagnosis and inappropriate treatment.

### CONCLUSIONS

In the event of an aerosolised release of *Yersinia pestis*, the spatial distribution of index cases is unlikely to coincide with the anticipated path of the dispersion cloud if such cases are infected near their work locations but then seek treatment close to home. Contact tracing and prophylaxis could help to reduce the number of deaths but only if implemented quickly. If such resources were delayed then isolating cases and treating them with appropriate antimicrobials is likely to efficiently curtail an epidemic.

02.3 Reference: 20080199

Track: Contribution of modelling to applied epidemiology

## Cardiovascular mortality and spatial distribution of lead levels in public water supplies in Spain

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### BACKGROUND

The neurological effects of environmental lead poisoning are well known, but information about vascular effects is scarce. We aimed to describe the geographical distribution of lead levels in drinking water and its association with cardiovascular disease mortality in Spain.

### METHODS

Average annual lead concentrations at municipalities were obtained from the national drinking water information system for 1996-2002. We categorized lead levels according to thresholds defined by legislation. Deaths due to cardiovascular disease and demographic information were obtained from the National statistics institute. Expected deaths were calculated based on age-specific mortality rates (2001 Census). Using Bayesian models, we estimated relative risks (RR) adjusted for municipalities.

### RESULTS

We obtained 39,297 water samples from 1,831 municipalities covering a total of 25 million inhabitants. The annual lead overall average±standard deviation =  $3.03 \pm 8.76$  µg/l. lead average (ranged from 0-161.2 µg/l). Only 7 municipalities (comprising 1.6% of total population) presented an average exceeding legal threshold (50µg/l). Cardiovascular mortality maps showed a North–South spatial gradient with similar patterns for both genders and major disease groups (ischemic heart disease and cerebrovascular disease). Two regions presented higher vascular mortality and higher lead levels (Canary Islands and Asturias).

### CONCLUSIONS

We have identified two regions presenting higher lead levels and cardiovascular mortality, Analysis for causal associations are currently being investigated taking known confounders into account. Some regions presented lack of lead levels data which could have been a limitation for spatial analysis.

02.4 Reference: 20080056

Track: Contribution of modelling to applied epidemiology

## Using a national multivariate model to provide a benchmark for local HAI prevalence surveys

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### BACKGROUND

Prevalence surveys provide a quick and easy way of determining the burden of healthcare associated infection (HAI). The Scottish National Healthcare Associated Infection (HAI) Prevalence Survey was carried out between October 2005 and October 2006. The study found that 9.5% of patients in acute hospitals had a HAI at the time of survey. The survey reported that sex, age, patient's specialty of care and the time of year when the survey was undertaken were associated with the prevalence of HAI. The objective of this study was to develop a HAI prevalence survey tool for use by local Infection Control Teams including a valid methodology to benchmark the local adjusted prevalence figure against the Scottish National Survey prevalence results.

### METHODS

The local data were stratified by the categories of variables associated with HAI prevalence in the national survey. The regression coefficients from the national data logistic regression model were used to calculate an expected number of infections enabling the calculation of an adjusted prevalence figure.

### RESULTS

The report produced by the stand-alone data collection tool provides a specialty specific HAI prevalence figure adjusted for age, sex, specialty of care and calendar quarter of survey. The adjusted figure is plotted on a specialty specific funnel plot of 95% and 99% confidence limits of the national prevalence survey.

### CONCLUSIONS

This study has provided local teams with a method of monitoring HAI in areas of concern or interest. The tool allows the teams to benchmark their results against the national data providing them with evidence for the implementation of local initiatives to prevent and reduce infection.

02.5 Reference: 20080026

Track: Contribution of modelling to applied epidemiology

## Dynamics of Infectious Disease Transmission by Respirable Droplets

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### BACKGROUND

Transmission of respiratory infectious diseases in humans, for instance influenza, occurs by several modes. Respirable droplets, droplets whose pre-evaporation aerodynamic diameter is less than 20 microns, provide a vector of transmission of an infectious pathogen that may contribute to different transmission modes. Larger droplets either evaporate very fast or gravitationally settle, their effect being rather limited except for very close contacts between susceptible and infected persons.

### METHODS

An epidemiological model with explicit consideration of the dynamics of respirable droplets is developed to assess their relevance in the infectious process. Respirable droplets are divided into three classes: fine, coarse and settled. Droplet dynamics is determined by their physical properties (size), whereas the population dynamics by the infectivity of the pathogen. The size and number of droplets shed by an infected person via expulsion events (e.g. sneezing, coughing, talking) are important physical parameters as they determine the residence time a droplet remains airborne, its regional deposition in the respiratory tract, and the amount of pathogen carried.

### RESULTS

We argue, using estimates from experimental studies, that respirable droplets are a dynamically possible transmission vector for influenza. Airborne coarse droplets may provide the dominant transmission mode, the relative importance of transmission modes depending on model parameters. The impact of settled pathogen-carrying droplets depends on the inactivation rates of the pathogen in different environmental media.

### CONCLUSIONS

The model provides an expandable theoretical framework, which in combination with better experimental data, could contribute to understanding the transmission of respiratory infectious diseases, to evaluate the effects of associated control strategies, and to assess the relative importance of transmission modes.

03.1 Reference: 20080161

Track: Vectorborne Diseases

## The epidemiology of tick-borne encephalitis in Hungary, 1982-2007

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### BACKGROUND

In Hungary, tick-borne encephalitis (TBE) surveillance is included in mandatory syndromic surveillance of "encephalitis infectiosa" which also requires laboratory testing for etiology in the national reference laboratory (NRL). The objective of this study was to describe the epidemiology of TBE in Hungary in 1982-2007 and to compare NRL TBE data to the syndromic surveillance.

### METHODS

NRL provided data on all serologically confirmed TBE cases in 1982-2007 supplemented with basic demographics. We obtained aggregated syndromic surveillance data from the Department of Epidemiology of OEK and population statistics from Hungarian Central Statistical Office. We calculated number of cases and yearly incidence by county.

### RESULTS

During 1982-2007, 5031 TBE cases (yearly range 54-422, mean=191) were diagnosed. Of these, 71% were males. Mean age was 39 years (range 0-84). Yearly incidence was 0.5 - 4.0/100 000 cases with a peak in 1984. Incidence showed a decreasing trend ( $p < 0.000$ , linear regression). The decline in incidence took place in 1993-2000 being first slow (from 3.3 to 2.4/100 000) in 1993-1995, but then steep in 1996-2000 (from 2.4 to 0.6/100 000). After that the incidence was 0.6-1.1/100 000. Four most affected counties were in Transdanubian region and Northern Hungary with mean incidence 7-14/100 000 by county. TBE season is in March-November with the highest peak in June and a small peak in October. Laboratory and syndromic surveillance data correlated strongly during 1982-1998 ( $r = 0.96$ ) but weakly thereafter ( $r = -0.24$ ).

### CONCLUSIONS

TBE incidence in Hungary decreased within last 15 years. Decreasing incidence and the discrepancy between surveillance and laboratory data may reflect changes made in PH system. An enhanced surveillance should be considered in order to find out magnitude of underreporting and possible gaps in surveillance.

03.2 Reference: 20080042

Track: Vectorborne Diseases

## Validation of routine laboratory diagnosis in notified cases of tick-borne encephalitis, Bavaria, 2007

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### BACKGROUND

Tick-borne encephalitis (TBE) is statutorily notifiable in Germany. The case definition requires flu-like symptoms or symptoms of central nervous system infection (CNSS) and serological detection of TBE virus specific IgM and IgG antibodies or a rise in IgG antibodies. From 2004-2006, TBE incidence in Bavaria increased from 0.8-1.6 cases/100,000 population. Our study aimed to estimate the proportion of false positive notified TBE cases in Bavaria in 2007 in the context of clinical picture and patient history in order to validate the existing surveillance case definition.

### METHODS

We asked TBE cases notified in Bavaria in 2007 for additional information on clinical manifestation and potential exposure to other viruses interfering with TBE virus antibody testing. To reconfirm laboratory results, we retested original serum samples on which diagnosis was based and follow-up samples with four commercial ELISA IgM and IgG kits and avidity testing. Retesting was considered positive when all ELISA kits concordantly confirmed elevated TBE-specific IgM and IgG antibodies, when an increase in TBE-specific IgG antibodies was observed, or when avidity was low.

### RESULTS

We received questionnaires from 107/109 (98%) notified TBE cases. Cases were 3-83 (median 43) years old, 63% were male, 68% reported CNSS. TBE vaccination (TBE-V) was reported for 8%. In 83/88 cases, serological retesting confirmed the diagnosis of acute TBE (positive predictive value (PPV): 94%). The only factor associated with non-reconfirmation of TBE was previous TBE-V (Fisher's exact  $p < 0.0005$ ).

### CONCLUSIONS

PPV of TBE laboratory diagnosis as required by the surveillance case definition is high in Bavaria. Case information obtained with the current surveillance system is sufficient for case evaluation. Positive tests in persons with previous TBE-V should be reconfirmed using additional laboratory testing.

03.3 Reference: 20080104

Track: Vector borne diseases

## Epidemiological situation of Bluetongue disease in Germany

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### BACKGROUND

Bluetongue disease (BT) is a notifiable animal disease caused by an orbivirus transmitted by midges. In 2006 BT occurred for the first time in northwestern Europe. The epidemic was caused by serotype 8 (BTV-8), which was previously restricted to the sub-Saharan region, Asia and South America. In Germany, BT was first detected on 21 August 2006. By the end of the year 2006, a total of 890 BT outbreaks had been recorded.

### METHODS

A cross sectional study (CSS) and an entomological monitoring with black light traps was performed. For the early detection of potential new cases in 2007 a sentinel program was conducted.

### RESULTS

The CSS revealed a BT prevalence of up to 66% in cattle. Entomological monitoring helped to identify members of the *Culicoides obsoletus* complex as the main putative vectors of BTV in Germany. *Culicoides* midges were caught the whole year round with a maximum trapped in October. In May 2007, antibodies against BTV and viral genome were detected in the first sentinel cow. A few days later, clinical cases of BT were detected in sheep in the same region. Since then the disease has continued to spread rapidly over most of Germany. In 2007, a total of 20,623 new cases were registered, i.e. 25 times more than in 2006.

### CONCLUSIONS

In May 2008 Germany started to implement a compulsory vaccination program for cattle, sheep and goats. The animals are immunized with an inactivated monovalent BTV-8 vaccine of three different manufacturers (CZ Veterinaria, Fort Dodge, Merial). The current epidemiological situation of BT in Germany after the start of the vaccination campaign will be presented.

03.4 Reference: 20080028

Track: Vectorborne Diseases

## Two cases of cutaneous and visceral leishmaniasis imported into Guatemala from South America and its possible public health implications

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### BACKGROUND

Leishmaniasis is a zoonotic disease endemic to 88. One case of human cutaneous leishmaniasis and one case of canine visceral leishmaniasis imported from French Guiana and Brazil respectively were detected in Guatemala in 2008. The human patient referred to be infected while completing military exercises in Guiana's forests and the dog was infected in Ceara, Brazil.

### METHODS

Clinical evaluations were performed by a medical and veterinary doctor for each case; samples for smears, cultures and PCR were obtained from the cutaneous lesion in both cases. Bone marrow and spleen aspirates were obtained from the dog. Diagnosis was performed following standard methods.

### RESULTS

The human patient showed a typical cutaneous leishmaniasis lesion on the left arm. The dog showed clinical signs of both cutaneous and visceral leishmaniasis such as extreme weakness, loss of appetite, emaciation and typical dermal lesions of cutaneous leishmaniasis in legs. Diagnosis was confirmed by the observation of parasites in different clinical samples. The human patient and dog were treated with pentavalent antimonials resolved in a clinical cure.

### CONCLUSIONS

These are the first reported cases of imported leishmaniasis to Guatemala from South America. Both cases were from a region where different species of *Leishmania* parasites other than those occurring in Guatemala can be found. Implications of the transmission of new strains can vary from more aggressive clinical presentations, a wider geographical distribution, and resistance to current treatment schedules to outbreaks of the disease. Consequently, examination of dogs imported from endemic countries and possible cases of imported human leishmaniasis is needed. We insist on the development of guidelines for the detection, clinical/laboratory examinations, quarantine and managing of leishmaniasis imported cases by the Ministry of Health and Agriculture.

03.5 Reference: 20080067

Track: Vectorborne Diseases

## Infection with *Rickettsiae* after a tick bite: a possibly pathogenic bacterium in the Netherlands

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### BACKGROUND

*Rickettsia* (*R.*) *helvetica* has been isolated from ticks in the Netherlands, with varying rates of contamination (4% to 79%). Although little is known about the pathogenicity of *R. helvetica*, it has been associated with fatal perimyocarditis, sarcoidosis and flu like symptoms (fever, headache, arthralgia and myalgia). The frequent occurrence of mild and non-specific clinical symptoms after tick bites, combined with infrequent use of diagnostics could cause an underestimation of the role of *Rickettsia* as a pathogen.

### METHODS

For the National Tick Bite Study, a prospective case-control study, ticks and paired blood samples were collected from 350 persons who consulted their general practitioner for a tick bite or erythema migrans. At enrollment and after 11 weeks, subjects completed two questionnaires about clinical symptoms and risk factors. 180 ticks were analyzed by polymerase chain reaction and reverse line blot. Paired serum samples of fifty-eight subjects were tested for IgM and IgG antibodies, using immunofluorescence assays with *Rickettsia conorii* as the antigen.

### RESULTS

Out of an initial sample of 178 participants with a tick, *Rickettsiae* were detected in ticks from thirty-two participants (18%), of which the majority was genotyped as *R. helvetica*. IgM or IgG antibodies, at or above a titer of 1/32 as cut-off, were detected in twenty-six (45%) serum samples. So far, we did not find any associations between the serological outcome, clinical symptoms and having a tick in which *Rickettsiae* were detected.

### CONCLUSIONS

We detected antibodies against *Rickettsiae* in a surprisingly large fraction of subjects. A substantial part of the ticks contained *Rickettsiae*, whilst until recently it was thought that these were not present in ticks in the Netherlands. The consequence for public health will be further investigated.

03.6 Reference: 20080112

Track: Vectorborne Diseases

## Dengue in Reunion Island: surveillance strategy challenges to prevent outbreaks

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### BACKGROUND

The first dengue epidemic (DEN-2) described in Reunion occurred in 1977-1978 and could have affected 30% of inhabitants. In 2004, a dengue outbreak (DEN-1) occurred on West Coast. Presence of competent mosquito vectors, increase of travellers and unknown population immunization rate raise the likelihood of future outbreaks. The objective of the enhanced dengue surveillance set up in 2006 was to precociously detect clusters. We report results of this surveillance in 2007-2008 acknowledging the need to discuss dengue virus (DENV) transmission in Reunion.

### METHODS

Ongoing surveillance system is based on laboratory surveillance. A probable case is a clinically compatible case with positive IgM antibodies. A confirmed case has: isolation of DENV OR demonstration of DENV antigen by viral nucleic acid detection OR demonstration of a seroconversion or fourfold increase of IgG antibody titers in paired serum. If laboratory cases are detected, active research of symptomatic persons around cases is conducted.

### RESULTS

In 2007, we identified 26 probable and 2 DEN-1 confirmed cases. In 2008 (January to June), we detected 25 probable, 3 autochthonous confirmed (DEN-1=2) and 3 imported (Thailand=2; Cambodia) confirmed (DEN-3=1) cases. Furthermore, we identified two clusters, both in the city of Saint-Louis, in June 2007 and April 2008. Sequencing of DEN-1 genotype isolated in 2008 shows homology with those from 2004 and 2007 (Reference Centre for Arboviruses).

### CONCLUSIONS

Our data suggest that in a community with sporadic dengue transmission, laboratory surveillance is useful to initiate detection of clusters and rapidly organise control measures. Introduction of new DENV genotypes and serotypes in Reunion is a major risk factor for dengue epidemic and severe disease. Increased surveillance for such introductions is critical to allow public health authorities to intervene in impending epidemics.

04.1 Reference: 20080223

Track: Influenza: causes and interventions

## High Mortality Associated with an Influenza B Outbreak in Prison S, Thailand, October-November 2007

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### BACKGROUND

On 2nd November 2007, Sukhothai Provincial Health Office reported 2 deaths from a cluster of influenza-like illness (ILI) in Prison S. Fears of avian influenza infection in prisoners prompted an investigation. The objectives were to identify an etiologic agent and implement appropriate control measures.

### METHODS

Screening and isolation of ILI cases was performed among inmates and staff of Prison S. A case was defined as an individual who developed fever with sorethroat or cough during 1st October – 9th November 2007. Odds ratios and 95%CI were calculated in a case-control study. Controls were systematically random sampled from a list of male inmates to obtain activities information and blood samples for Hemagglutination inhibition (HI) test. Environmental surveys of sleeping hall, workplace, kitchen, cafeteria were done. Nasopharyngeal swabs were collected from 10 ILI cases and tested by PCR.

### RESULTS

Overall attack rate was 12.5% in Prison S (46/369), highest in the cooking department (27.8%). The median age was 34 years (range 19-58 years). Common symptoms included fever, cough, sorethroat and headache (100.0%, 80.0%, 68.6% and 45.7%, respectively). Sleeping next to ILI cases was a significant risk factor (OR=2.9, 95%CI=1.1-8.1) in highly populated sleeping halls (0.6 m<sup>2</sup>/person). Two death cases (CFR=4.3%) were epidemiologically linked to confirmed influenza B cases. Of 47 sera tested, 9 (19.1%) were positive influenza B antibodies. Influenza B genetic materials were identified in 7/10 nasopharyngeal swabs. No ILI was reported in the staff but their serum samples (5/7) had 4-fold rising titers of influenza B.

### CONCLUSIONS

An unusual outbreak of influenza B with high CFR occurred in Prison S. Increased awareness of prisoners/staff and immediate control measures resulted in limited spread of influenza B to adjacent communities.

**04.2 Reference: 20080246**

**Track: Influenza: causes and interventions**

## **Pandemic flu campaign for Germany**

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### **BACKGROUND**

Situation analysis concerning pandemic threats in past, present and future Public's demand for infection control information.

### **METHODS**

Strategic planning of hygiene and infection control campaign for Germany Conception and production of media Pretesting and evaluation of media.

### **RESULTS**

Public health campaign to promote hygiene and infection control knowledge in the population in Germany - TV-Commercial: 'Wash your hands' - Brochure: 'Self-defence against viruses' - Website: 'Us against viruses' - Poster, Print-Ad, Flyer for pandemic situations.

### **CONCLUSIONS**

Launch of campaign planned for Fall/Winter 2008/2009.

04.3 Reference: 20080025

Track: Influenza: causes and interventions

## Inactivation of Influenza A Viruses in the Environment and Modes of Transmission

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### BACKGROUND

Three different, mutually non-exclusive modes of influenza transmission have been identified and controversially discussed so far: droplet, airborne and contact transmission. One factor contributing to the relative importance of each of the three transmission modes is the inactivation of influenza A viruses in different environmental media.

### METHODS

We systematically review available information on the environmental inactivation of influenza A viruses and combine these data with information on infectious dose and with results from novel mathematical models to evaluate the relative importance of transmission modes.

### RESULTS

Our analysis shows that daily inactivation rate constants differ by several orders of magnitude: on inanimate surfaces and in aerosols daily inactivation rates are in the order of  $1 - 10^2$ , on hands in the order of  $10^3$ , i.e. influenza virus can survive in aerosols for several hours, on hands for a few minutes. Nasal infectious dose of influenza A is several orders of magnitude larger than airborne infectious dose.

### CONCLUSIONS

We conclude that the airborne route is a potentially important transmission pathway for influenza in indoor environments and that the importance of droplet transmission has to be reassessed. Contact transmission can be limited by fast inactivation of influenza virus on hands and is more so than aerosol transmission dependent on behavioural parameters. However, the potentially large inocula deposited in the environment through sneezing and the protective effect of nasal mucus on virus survival could make contact transmission a key transmission mode.

04.4 Reference: 20080130

Track: Influenza: causes and interventions

## The aetiology of flu-epidemic 2008 in Belarus

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### BACKGROUND

Influenza-like illnesses (ILI) are a major cause of respiratory morbidity in Republic of Belarus. We aimed to analyze the viral aetiology of ILI during the flu-epidemic 2008.

### METHODS

Nasopharyngeal swabs were used for virus detection by immunofluorescence and virus isolation on MDCK cells. Haemagglutination inhibition test was performed for typing of isolates. The remantadine and arbidol sensitivity of A(H1N1) was tested by ELISA.

### RESULTS

The flu epidemic 2008 started at 4th week and lasted 6 weeks. The morbidity index was 1510 per 100000 population on the pick of epidemic. The children aged 0-14 were more affected during the epidemic. A and B flu viruses circulation was detected by immunofluorescence (A -17,5%, B -5,4%). Active co-circulation of non flu respiratory viruses was revealed during the epidemic too (adenovirus -31,0%, respiratory syncytial virus -19,0%, parainfluenza viruses -11,8%, mixt -15,3%). But 13 virus strains were isolated in cell culture MDCK during the epidemic: 12 – has been identified as A(H1N1), and 1 - as B/Shanchai/361/02-like virus. Only one strain was resistant to remantadine and arbidol. The other strains had different sensitivity level to these antiviral agents.

### CONCLUSIONS

The epidemic 2008 started at the end of January what is typical for Belarus. Influenza A and B viruses co-circulated with prevalence of A(H1N1). The A(H1N1) isolates posses different sensitivity to remantadine and arbidol widely used in Belarus for flu therapy. It was found active circulation of adeno-, parainfluenza and respiratory syncytial viruses at the same period.

04.5 Reference: 20080064

Track: Influenza: causes and interventions

## Low seroprevalence of avian influenza A/H5N1 among poultry farmers in rural Indonesia

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### BACKGROUND

Since 2003, about a third (>100 cases) of human cases of highly pathogenic avian influenza (HPAI) A/H5N1 worldwide are reported from Indonesia. There is concern for viral reassortment and a pandemic. Seroprevalence studies that may reveal unrecognized cases are lacking. We aimed to measure H5N1 seroprevalence among poultry farmers in rural Indonesia.

### METHODS

The present cross-sectional study is an extension of an agricultural HPAI project by Dutch and Indonesian government institutes, in which 12 farms were recruited in an endemic area in West-Java. In 2007, poultry workers and farm residents were interviewed about possible risk factors. H5N1 seropositivity was defined as having positive results for two hemagglutination inhibition tests by NIHRD Jakarta as well as two positive neutralization tests by NIID Tokyo.

### RESULTS

In the 12 farms, 495 of 622 (80%) farmers participated. No person (0%) had positive serological test results. Of the participants, 95% lived on the farm, 71% were male and median age was 29 years (interquartile range 23-36 years). In the previous six months, confirmation of H5N1 in poultry was available for one farm. Masks were never worn by 54% of participants. Eighty-six percent were afraid to become infected. Asked for symptoms of avian flu, fever, cough and shortness of breath were not reported by 23%, 31% and 33% of the respondents.

### CONCLUSIONS

Our study did not find any seroprevalent cases of avian influenza A/H5N1 among poultry farmers. Incomplete evidence for H5N1 in the poultry sheds doubt on the H5N1 exposure. In light of the severity of human HPAI infection and the risk of a pandemic, we recommend to sustain ongoing efforts to educate poultry farmers about HPAI prevention and symptoms.

04.6 Reference: 20080032

Track: Influenza: causes and interventions

## Adherence with oseltamivir chemoprophylaxis among workers exposed to poultry during avian influenza outbreaks in southern Israel

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### BACKGROUND

Since the first human case caused by the avian influenza (AI) virus A/H5N1 in 1971, 319 human cases with 192 deaths have been reported. WHO, CDC and ECDC have recommended that persons exposed to H5N1 virus be offered chemoprophylaxis with oseltamivir. The potential for the spread of oseltamivir-resistant strains of H5N1, along with the limited world supply of oseltamivir, emphasizes the importance of appropriate use of the drug. In order to help policy-makers estimate the amount of doses of oseltamivir they need to stockpile to mitigate an outbreak of avian influenza, data on adherence with recommendations for prophylaxis is essential.

### METHODS

Epidemiological investigation identified 201 workers exposed to poultry during avian influenza outbreaks. They were interviewed by a public health nurse regarding adherence with recommended oseltamivir prophylaxis, symptoms and possible side effects. Data was collected on type of exposure, age, sex, rate of adherence with oseltamivir prophylaxis and reasons for non-adherence. On 8 workers, paired sera were drawn for antibodies to H5. Data was collected on the efficiency of the distribution of oseltamivir tablets to workers in the community.

### RESULTS

High adherence with oseltamivir prophylaxis (87.6%) was found among poultry workers during outbreaks of AI with no difference by type of exposure, age or sex. There was a low rate of side-effects of oseltamivir prophylaxis (1.5%). No exposed workers developed AI and none of the 8 who had paired sera drawn showed seroconversion. The distribution of oseltamivir prophylaxis in the community was inefficient, with 27.7% of the tablets 'lost' or returned unusable.

### CONCLUSIONS

These data emphasize the importance of developing efficient targeted distribution systems in the community of oseltamivir prophylaxis, in order to prevent human infection during AI outbreaks.

05.1 Reference: 20080029

Track: Influenza: surveillance approaches and outputs

## Evaluating Web-based Surveillance of Influenza

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### BACKGROUND

In previous work we have developed a model for estimating the timing of the peak and the intensity of the yearly influenza outbreaks in Sweden, as approximated by the laboratory and sentinel surveillance. These two sources demand that medical care is sought, and there may be an over-representation of groups vulnerable for severe disease. Our model is based on queries related to influenza submitted to a medical web site, covering two influenza seasons. This study presents an evaluation of the model on previously unseen data, namely the 2007/2008 season.

### METHODS

We calculated the number of influenza-related web queries (twenty types) for the new season, and applied our model to obtain the estimations. The model – which is based on partial least squares regression – consists of two parts: one estimating the number of positive laboratory cases and one estimating the proportion of cases with influenza-like illness as reported by the sentinel GPs.

### RESULTS

The timing of the estimated sentinel peak as well as the estimated laboratory peak coincided with the peaks for the traditional sources. As for the height of the curves, both over-estimated the intensity, especially so the curve for laboratory verified cases.

### CONCLUSIONS

One reason for the over-estimation could be that influenza B, which gives a milder disease and consequently results in fewer persons being tested, dominated the previous season. Another reason could be that the usage of the website is increasing, thus different seasons are not fully comparable. Nonetheless, web queries give a unique access to ill individuals who are not (yet) seeking care, and are a cheap and labour efficient source. Our work demonstrates that web queries can indeed complement the current influenza surveillance.

05.2 Reference: 20080186

Track: Influenza: surveillance approaches and outputs

## Approaching Real Time Flu Surveillance

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### BACKGROUND

The WHO has identified improvements in the quality of surveillance as a priority in preparedness for an influenza pandemic. If a potentially pandemic influenza virus begins to emerge, early interventions such as public health measures, drugs and vaccines could prevent the virus from becoming more transmissible to man. The General Practice (GP) influenza surveillance scheme was started during the winter of 1994 in England and Wales that used cell culture techniques for detection of respiratory viruses. However, for effective surveillance, molecular diagnostics enables increased turnaround times and sensitivity. The 'enhanced' influenza surveillance scheme for London was set up in the winter of 2007-8.

### METHODS

Throat and nasal swabs were taken from patients with suspected upper respiratory tract infections (URTI) from nine London GP surgeries and transported to two testing sites. Multiplex Polymerase Chain Reactions (PCR) were used for simultaneous detection of 10 different respiratory viruses.

### RESULTS

Of the 164 samples processed, 45% were positive for one virus - 35 (21%) influenza A, 17 (10%) influenza B, 11 (6.7%) Respiratory Syncytial Virus A (RSV A), 7 (4.2%) rhinovirus, 1 (0.6%) Human Metapneumovirus (HMPV) and 1 (0.6%) adenovirus. Two samples (1.2%) were positive for 2 viruses - 1 adenovirus and influenza A, and 1 RSV A and Influenza B. GPs were telephoned immediately with positive results and advised on management of cases. Positive samples were referred for further analysis. Use of these molecular techniques considerably reduced the overall turnaround time, however, specimen transport was identified to be the rate limiting factor.

### CONCLUSIONS

This project has been helpful in highlighting the logistical issues that need to be addressed to improve preparedness in anticipation of a possible global influenza pandemic.

05.3 Reference: 20080043

**Track: Influenza: surveillance approaches and outputs**

## Do small children with influenza-like-illness really have influenza?

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### BACKGROUND

Respiratory-syncytial-virus (RSV) can cause influenza-like-illness (ILI) in young children. The National Reference Centre for Influenza (NRC) tested throat swabs from a subgroup of ILI-patients <3 years within the German influenza syndromic-sentinel-system also for RSV. Our objective was to identify the possible role of RSV among ILI-patients <3 years in order to reassess the influenza consultation excess (additional visits to the doctor because of influenza).

### METHODS

We descriptively analysed 1999-2007 NRC data using STATA. Proportions of positive RT-PCR assays for RSV and influenza and simultaneous virus-circulation among ILI-patients <3 years were calculated only for the seasonal influenza waves (SIW, as defined by the Arbeitsgemeinschaft Influenza). Due to small sample sizes we defined virus-circulation as >2 consecutive weeks with >2 specimens tested and with at least one positive RSV or influenza test result.

### RESULTS

During the seasonal influenza waves in Germany from 1999-2007, 150/728 (20.6%) ILI-patients <3 years tested positive for RSV and 416/1051 (39.6%) for influenza. The proportion of RSV positive ILI-patients was highest in children <1 year (26.1%). RSV- and influenza-proportions did not differ between boys and girls, respectively. Simultaneous RSV- and influenza-virus-circulations occurred in the seasons 1999-2000 in week 52-6 (SIW: week 51-7), 2000-01 in week 52-4 (SIW: week 52-7), 2005-06 in week 9-12 (SIW: week 9-14) and 2006-07 in week 5-11 (SIW: week 5-13).

### CONCLUSIONS

We should expect a relevant proportion of ILI-patients <3 years to be RSV-positive during seasonal influenza waves. Results indicate co-occurrence of other pathogens. Thus, the influenza consultation excess is often overestimated. No recurring pattern of RSV-circulation could be found. We recommend simultaneous testing of ILI-patients for RSV and other pathogens at least from December-April to adjust estimations of the influenza-burden.

05.4 Reference: 20080069

Track: Influenza: surveillance approaches and outputs

## National seasonal influenza vaccination survey in Europe, 2007

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### BACKGROUND

Prior to 2008 there was no comprehensive information on the status, implementation or monitoring of the seasonal influenza programmes in Europe. There was the need to improve knowledge on vaccination target populations, and on the coverage reached.

### METHODS

We conducted in January 2008 a cross-sectional survey to describe seasonal influenza immunisation, identify country-specific recommendations for risk groups and obtain vaccine uptake in the European Union (EU) member states (MSs), Norway and Iceland for 2006/2007 influenza season. We developed a questionnaire that was completed electronically by previously identified VENICE project gatekeepers in each country.

### RESULTS

The response rate was 100%. Twenty-three countries (79%) recommend seasonal influenza vaccination for those aged over 65 years. Most countries recommend influenza vaccination for staff in hospitals (86%), long-term care facilities (86%) and outpatient clinics (79%). More than one-third of countries recommend vaccination for essential (38%), military and veterinary services (34%) and poultry industry workers (45%). All countries (100%) recommend vaccine for patients with chronic pulmonary and cardiovascular diseases. The majority of MSs recommend vaccine for individuals with haematological or metabolic disorders (97%), immunologic disorders (93%), renal disease (93%) residents of long-term care facilities (83%). Vaccination for pregnant women is recommended by 28%. Influenza vaccine uptake among those aged over 65 years was measured in 20 countries (69%) and varied from 2% to 82%. Seven countries reported uptake for Health Care Workers (range 14%-48%) and clinical risk groups (range 28%-75%).

### CONCLUSIONS

This survey shows a core of common target groups but also variability between countries with regard to recommendations for vaccine usage and uptake rates. The data provided can assist in standardising EU policy and recommendations and monitoring influenza immunisation programmes in future years.

05.5 Reference: 20080120

Track: Influenza: surveillance approaches and outputs

## Estimates of influenza incidence in the community in France

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### BACKGROUND

Precise quantification of influenza disease burden is complicated because many different pathogens cause infections with symptoms alike those of influenza. The purpose of this study was to estimate the weekly incidence of consultations for laboratory-confirmed influenza according to age during the 2006-2007 influenza season in France.

### METHODS

The study was based on community physician sentinel network that collect during each influenza season, information on patients with acute respiratory infections seen in their practice and naso-pharyngeal swabs. Laboratory confirmations were done by culture. We established an active population-based surveillance on a two-stage stratified random sampling design. Swabs were collected according to a predefined protocol. For each week, sampling weights were adjusted by post-stratification for the number of consultations and visits made by participating practitioners and for all other private practitioners in France.

### RESULTS

During the 9 week-long period of surveillance, 284 general practitioners and 77 paediatricians collected clinical data and 1266 swabs. The incidence of consultations for laboratory-confirmed influenza was estimated to 2.8/100 inhabitants (95% CI: 1.80; 3.80). The highest incidence was observed in the 5-14 years age group: 7.4 /100 inhabitants (95% CI: 4.6; 10.1), followed by the 0-4 years age group. Increasing incidence was first evident in the 0-4 and 5-14 years age groups, then for the 15-64 years age group and lastly for the 65 years and more age group.

### CONCLUSIONS

Estimates of weekly incidences of laboratory-proven influenza by age-group can be obtained with the implementation of a simple swabbing protocol. Our approach based on a routine influenza surveillance scheme improved the understanding of the spread of influenza in the community without using a costly cohort study design.

05.6 Reference: 20080138

Track: Influenza: surveillance approaches and outputs

## Evaluation of an internet-based surveillance system for influenza-like illness in The Netherlands

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### BACKGROUND

Internet-based surveillance can serve as a potential method to complement existing surveillance systems for specific syndromes. "De Grote Griepmeting" (GGM) is an online voluntary surveillance system for influenza-like illness (ILI) that was introduced in The Netherlands and Flanders in 2003. We evaluated this system in autumn 2007, aiming at assessing the effectiveness of GGM in The Netherlands and its usefulness among other ILI surveillance systems in the country.

### METHODS

We approached the evaluation through the following questions: a) what is required of web-based ILI surveillance systems to be valuable complements of existing surveillance systems? b) which – if any – adjustments would need to take place to make GGM more effective? c) which adjustments could be applied in time for the 2007/2008 influenza season?

### RESULTS

GGM was perceived as being user friendly and flexible to adapt to changes needed on the public health level. Clear agreements on communication and responsibility for data analysis should be made before the integration of GGM to existing ILI surveillance systems. An independent study should validate the representativeness of GGM participants before systematic use of the data for public health purposes would begin. No short-term adjustments were done for the 2007/2008 influenza season. Agreements were made to receive GGM data at national public health institute level weekly to facilitate the evaluation of the system after more intensive use.

### CONCLUSIONS

Web-based ILI surveillance systems could serve as cheap and easy to set up complementary surveillance systems for use in public health. However, public health officials should be cautious when interpreting the results. Further validation of the system is needed internationally.

06.1 Reference: 20080066

Track: Food &amp; water borne diseases

## The epidemiology and burden of rotavirus diarrhoea in Russia

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### BACKGROUND

We aimed to understand the epidemiology and burden of rotavirus disease in Russia to support the assessment of the need for introducing rotavirus vaccination.

### METHODS

We reviewed 2003–2007 rotavirus incidence data from the North-West (NW) Russia obtained through the EpiNorth network. We also reviewed published literature in English or Russian using PubMed, Russian-language medical journals and abstracts of International Rotavirus Symposia, and included studies lasting minimum 1 year and involving children <14 years old.

### RESULTS

Based on laboratory reports, the mean rotavirus incidence in the NW was 52 per 100,000 person-years but reported rates varied greatly (range 7-87) inside the region. In 2006, the highest incidence was in children <2 years (1,417 per 100,000) compared with incidence of entire population (64 per 100,000). Among published data, 16 studies from 1981-2007 fulfilled inclusion criteria, ranging in duration (1-12 years) and size (100-6635 patients). Fifteen studies included European Russia only. Studies using PCR (n=5) had higher detection rates than those using ELISA (n=6) and other methods (n=7). The proportion of rotavirus cases among patients with diarrhea was higher in children <3 years (range 37%-75%) compared to children <1 year (range 31%-54%) and children <5 years (range 33%-46%) old. Children 6-23 months old accounted for half of all rotavirus cases in 2 studies. No study reported rotavirus-associated deaths. G1P8 was the dominant genotype.

### CONCLUSIONS

Large variation in rotavirus incidence is likely to reflect differences in testing and reporting practices. Published studies used a wide range of methods making accurate assessment of disease burden challenging. Standardized methods should be employed to facilitate comparison across Russia and provide evidence for national vaccine policy.

06.2 Reference: 20080185

Track: Food &amp; water borne diseases

## A descriptive study on giardiasis in a large waterborne outbreak in Finland, November 2007-March 2008

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### BACKGROUND

In November 2007, approximately 450,000 liters of filtered sewage effluent entered the municipal drinking water system in Nokia. Analyses of water samples revealed fecal contamination with multiple pathogens and approximately 5000 people acquired gastroenteritis. We describe characteristics of the giardiasis cases related to this outbreak.

### METHODS

A case was a Finn with giardiasis without travel history who had consumed contaminated water in Nokia between 28.11.2007-18.2.2008. Giardiasis cases notified to the National Infectious Disease Registry between 1.12.2007-20.3.2008 were contacted and information on water consumption, household and symptoms was gathered via phone interview.

### RESULTS

Of 98 giardiasis notifications, 53 (54%) persons were reached. Thirty-seven (70%) met the case definition. Median age was 39 years (range 3-61); 28 of 37 (76%) were female. In contaminated area lived 34 (92%) cases, 3 had been working or visiting the area. All households of the cases from Nokia were supplied by the municipal water company. The median amount of unboiled tap water consumed by cases was 1 liter/day (range 0.2-4 l) Gastrointestinal symptoms started within the first week after the onset of water contamination in 35 (95%) cases. Symptoms recurred in 14 of 36 (39%) cases. Median duration of illness for recovered cases was 35 days (range 20-63 days), but most cases had symptoms still at the moment of interview. Of the cases, 84% (27/31) were unable to work or manage normal household tasks because of illness. Seven (19%) needed hospital care.

### CONCLUSIONS

The first time in a waterborne outbreak in Finland, Giardia was detected from stool and water samples. Although the number of cases is probably underestimated, the results show that Giardia can cause long-lasting illness and should be considered in Finnish waterborne outbreaks.

06.3 Reference: 20080057

Track: Food &amp; water borne diseases

## Communication in Nokia during waterborne gastroenteritis outbreak

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### BACKGROUND

A largest gastroenteritis outbreak ever in Finland took place in the town of Nokia (30,000 population) due to sewage contamination of water supply, in November 2007. Of 9000 persons living in the polluted area 5100 persons fell ill with gastrointestinal symptoms. Several media were used by local and national authorities to inform the public. We assessed the channel and speed of communication.

### METHODS

An 11% sample (1000 persons) of the population (N=9195) in the polluted area of Nokia was randomly selected for a postal questionnaire survey. Questions covered means, source and time of receiving the information on the water contamination.

### RESULTS

Response rate was 81%. The respondents were 0-90 years old and 45% of them were men. The fastest and most common information source was neighbours, acquaintances or relatives (71%). Other sources were radio (11%), newspapers (7%), television (5%), internet (3%), health care center (2%), leaflet (1%), and megaphone (0%). The gender did not differ with respect to the source or means message received. Of the population aged 0-60 years, 70% was informed within two days from the leakage, compared with only 56% of elderly people (60-80 years).

### CONCLUSIONS

In a small town the message of water contamination was received as a rumour mainly from neighbours, acquaintances or relatives and it proved to be the fastest way. The radio was slightly more effective for elderly people. Although various media were used, a substantial proportion of the population was still unaware of the incident after two days of contamination. The challenge is to reach the elderly population and expedite the flow of early information.

06.4 Reference: 20080174

Track: Food &amp; water borne diseases

## Trends of salmonella, shigella and campylobacter infections in Czech Republic in three periods from 1983-2007

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### BACKGROUND

Structure of food- and water-borne infections changed considerably over last twenty five years in Czech Republic. Our aim was to analyse trends of salmonellosis, dysentery and campylobacteriosis and risk factors.

### METHODS

Reported individual cases are laboratory-confirmed cases and cases that meet the clinical case definition with an epidemiological link to a laboratory-confirmed case. We analysed the data in three separate five years periods 1983-1987, 1993-1997 and 2003-2007.

### RESULTS

Incidence of salmonellosis and shigellosis in the period 1983-87 was approximately 100/100000 inhabitants. The highest incidence of salmonellosis was in newborn, 500/100000. The most frequent serotype was *S. Enteritidis* and *S. Typhimurium*, 2/3 of all salmonella cases. The most prevalent vehicle of salmonellosis were meat and eggs. The highest incidence of shigellosis was 200/100000 in age group 5-9, transmitted by personal contact and water. In that period campylobacteriosis were not reliably diagnosed in the whole country. In the second period 1993-97 salmonellosis mostly *S. Enteritidis* (96%) peaked at 450/100000. Age specific incidence shifted to 1-4 age group. Shigella incidence dropped to 10/100000. Increase of campylobacter cases partly due to improved diagnostic means. Rates of salmonellosis in the third period 2003-07 reached 170/100000. The most affected age was 1-4 years (1300/100000). The most frequent vehicles were eggs (34%) and poultry (22%). Shigellosis (mainly imported cases) decreased to 3/100000. Incidence of campylobacteriosis (mostly *C. jejuni*) reached the highest rates of 296/100000. The most affected were persons 1-4 years old. Poultry is the most frequent source (64%).

### CONCLUSIONS

Food safety including vaccination of poultry and safe water supply are the important instruments in control of food- and water-borne infections. This we showed in changes of incidence rates of the three diseases.

06.5 Reference: 20080127

Track: Food &amp; water borne diseases

## Ready-to-eat Deli Meat as likely Source of a prolonged Listeriosis Hospital Outbreak

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### BACKGROUND

*L. monocytogenes* is a food-borne bacterial pathogen. Immunocompromised patients are at higher risk of developing invasive listeriosis, with high fatality rates. In October 2007, one local health office in South-West Germany reported that two patients had stayed in the same hospital before onset of listeriosis. We carried out an outbreak investigation to ascertain the extent of the outbreak, identify its source and prevent further infections.

### METHODS

We conducted active case-finding by contacting this hospital and retrospectively investigating listeriosis notifications for any connection to it. We defined a case as a patient with laboratory confirmed listeriosis between 19.07.2006-15.04.2008, who stayed in this hospital shortly before listeriosis onset. Medical records of case-patients were reviewed. The hospital kitchen and its meat supplier (company X) were inspected and food and environmental samples were taken for pathogen testing. All isolated *L. monocytogenes* were characterised by pulsed-field gel electrophoresis (PFGE).

### RESULTS

All eleven identified case-patients had an immunosuppressive disease (e.g. malignancy), but none of seven tested had a severe neutropenia (neutrophilic granulocytes  $<0.5\text{G/l}$ ). All patients were served regular food during hospital stay, which includes ready-to-eat deli meat. Ten case-patients received immunosuppressive corticosteroids and proton pump inhibitors (PPI). Five case-patients died from listeriosis. Identical PFGE patterns (Ascl 17a/Apal 10) were identified in 4/6 case-patients, four environmental and three ready-to-eat deli meat samples from company X.

### CONCLUSIONS

Our investigations suggest that ready-to-eat deli meat from company X was the likely cause of this prolonged listeriosis outbreak and point to the importance of molecular epidemiology. Patients with immunosuppressive diseases, even without severe neutropenia, are at increased risk of listeriosis when taking corticosteroids and/or PPI. Ready-to-eat deli meat should not be part of the routine diet for hospital patients.

06.6 Reference: 20080059

Track: Food &amp; water borne diseases

## A large swimming pool associated *Cryptosporidium* outbreak in Staffordshire, England

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### BACKGROUND

Cryptosporidiosis is a commonly identified cause of gastrointestinal infection in the UK with a number of reported water-related outbreaks. A local outbreak of cryptosporidiosis was identified in 2007 and investigated to describe common risk factors and identify public health measures needed to curtail ongoing transmission.

### METHODS

Laboratory confirmed *Cryptosporidium* cases were interviewed and risk factors for transmission investigated. Strain typing was undertaken on a subset of samples. Drinking water supplies were excluded as a source, and filtration systems at swimming pools inspected. General practices assisted in identifying suspected cases, and sending faecal samples to the laboratory. Cases and their families were given prevention and hygiene advice by the health protection unit and the local authority environmental health officers.

### RESULTS

Thirty-nine cases were identified with onset over a six-week period in November/December 2007. Strain typing was restricted to 22 cases: 18 typed as *C. hominis* and 4 as *C. parvum*. The median age of cases was 13 years and the majority (63%) reside in one large town in Staffordshire. The only common risk factor for cases was swimming pool exposure. 56% of cases reported swimming in the two weeks before disease onset with 64% of these having visited one particularly large water theme park on one or more occasions. Inspection of these pools revealed failure of filtration systems at the theme park.

### CONCLUSIONS

Although this descriptive study could not prove a causal association with swimming, appropriate and early public health action has most certainly contributed to the reduction of *Cryptosporidium* incidence to pre-outbreak levels. Remedial action was recommended with particular emphasis on adequate depth of filtration systems and flow rates needed for extraction of *cryptosporidium* oocysts.

07.1 Reference: 20080113

Track: Health care associated infections

## MRSA control in Lithuanian general hospitals

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### BACKGROUND

Methicillin-resistant *Staphylococcus aureus* (MRSA) is a frequent cause of healthcare acquired infections and is a major problem in hospitals worldwide. Little is known about prevalence of MRSA in Lithuanian hospitals. At the same time the control of MRSA is not regulated by any national guidelines. So the main aim of our study was to describe the situation of MRSA control in general hospitals.

### METHODS

40 general hospitals were randomly selected and invited to take part in survey. Special questionnaire was prepared for this study, which included questions about MRSA detection methods, infection control precautions, screening practices. Data from 30 hospitals were received giving the response rate of 75.0%.

### RESULTS

Hospitals reported 721 MRSA strains isolated in 2007 out of almost 8000 *S. aureus*, giving the MRSA prevalence rate of 9.1%. Most of the hospitals use only disk diffusion method for MRSA detection, while only 5 use media with oxacillin and 4 determine MICs. Half of the hospitals have local MRSA control guidelines approved by hospital's manager. Hospitals reported that MRSA patients are always isolated in less than half hospitals, and in that case most often hand antiseptic (80.0%), gloves (72.0%) and gowns (68.0%) are offered on entrance. Individual medical and nursing equipment for MRSA patients is provided in 45.8% hospitals and separate staff in 12.5%. For MRSA prevention screening of patients is performed only in 7 (25.0%) hospitals (mainly after contact with MRSA, transferred from other hospitals) and screening of staff in 13 (46.4%) hospitals (mainly after contact with MRSA, possibly due to MRSA outbreaks).

### CONCLUSIONS

The control of MRSA is not adequate in most of the hospital emphasising the need of national guidelines and education.

07.2 Reference: 20080054

Track: Health care associated infections

## The Effect of Underlying Co-Morbidity on the Prevalence of Healthcare Associated Infection

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### BACKGROUND

The Scottish National Healthcare Associated Infection (HAI) Prevalence Survey was carried out between October 2005 and October 2006. The study found that 9.5% of patients in acute hospitals had a HAI at the time of survey. The cost of HAI in Scotland was estimated at £183 million per year. The survey reported that sex, age and specialty of care of the patients and the time of year when the survey was undertaken were associated with the prevalence of HAI. The effect of co-morbidity on the prevalence of HAI was not assessed during the Scottish National Survey as the data were unavailable at the time of analysis. Underlying morbidity has been recognised as a risk factor for healthcare associated infection and previous studies have stated the importance of considering all aspects of patient case-mix. The objective of this study was to determine the effect of underlying co-morbidities of acute inpatient hospital population on the prevalence of HAI.

### METHODS

The Scottish National Prevalence Survey data (n=11608) were linked with co-morbidity data (ICD-10) from Scottish Morbidity Record data. A multivariate logistic regression model was created and odds ratios calculated for each co-morbidity grouping compared to a baseline group.

### RESULTS

The study describes the demographics of the Scottish acute inpatient population by co-morbidity group and the adjusted odds ratios for each of the co-morbidity groups.

### CONCLUSIONS

The results of this study can be used to identification of high risk groups in the inpatient hospital population. The identification of these groups will allow prevention and control measures to be targeted at these patient groups and provide an evidence base for the further development of risk assessment protocols.

07.3 Reference: 20080050

Track: Health care associated infections

## Choice of Healthcare Provider Following Reform in Vietnam

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### BACKGROUND

In Vietnam, the health-sector reforms since 1989 have led to a rapid increase in out-of-pocket spending rapidly. This paper examines the choice of medical provider and household healthcare expenditure for different providers in a rural district of Vietnam following healthcare reform.

### METHODS

The study consisted of twelve monthly follow-up interviews of 621 randomly selected households. The households are part of the FilaBavi project sample - Health System Research Project. The heads of household were interviewed at monthly intervals from July 2001 to June 2002.

### RESULTS

The use of private health providers and self-treatment (both episodes and expenditure) are very common (60%/23% and 60%/13% respectively). The poor tend to use self-treatment and commune health centers more frequently than wealthier members of the community. The poor use less public care and less care at higher levels than the rich do. Those with higher education tend to choose healthcare providers rather than self-treatment. Women tend to use drugs or healthcare services more often than men do. Moreover, seriously ill patients frequently use more drugs, healthcare services, public care, and higher level care than those with less severe illness. The education or age of the patients significantly affects healthcare decisions, but not for higher level public healthcare services such as provincial or central hospitals.

### CONCLUSIONS

The results are useful for policy makers and healthcare professionals to (i) formulate healthcare policies – of foremost importance are methods used to reduce self-treatment and no treatment; (ii) improve the quality of healthcare services at all levels, especially at the basic level (commune health station and district health center); and (iii) provide a background for further studies on both short and long-term healthservice strategies.

07.4 Reference: 20080210

Track: Health care associated infections

## Staphylococcus aureus infections following radical mastectomy: a single center experience

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### BACKGROUND

Staphylococcus aureus is the usual pathogen in clean surgical procedures such as breast surgery. The aim of our study was to evaluate the rate of Staphylococcus aureus surgical site infections (SSI) following radical mastectomy for breast cancer.

### METHODS

Retrospective study of radical mastectomies performed in our institution between January 2004 and December 2007. Staphylococcus aureus SSI were identified using clinical and bacteriological criteria of the CDC surveillance case definitions.

### RESULTS

Out of 3443 patients with radical mastectomy, 74 (2.15%) presented Staphylococcus aureus infections involving breast incisions. Methicillin-resistant Staphylococcus aureus (MRSA) was isolated from 19 (25,7%) of these cases. Superficial infections occurred in 72 patients. Deep breast infections occurred only in patients with post-mastectomy breast reconstruction (2/34) and required implant removal. Repeated surgery for debridement was required in 7 patients with superficial infections. Mean time between surgery and onset of infection was  $19.4 \pm 12.5$  days (range 3 - 122). Mean hospital stay was  $19.8 \pm 8.7$  days in patients with SSI and  $11.9 \pm 10.2$  days in patients without SSI ( $p < 0.0001$ ). SSI occurred after discharge in 22 (29.7%) patients (mean time  $25.8 \pm 15$  days; range 7 - 117).

### CONCLUSIONS

Staphylococcus aureus SSI rate following radical mastectomies performed in our hospital was similar to other studies. Occurrence of wound infection increased the length of hospital stay. Prolonged postoperative surveillance is needed even after discharge for early detection of SSI.

07.5 Reference: 20080017

Track: Health care associated infections

## Severe consequences of healthcare-associated infections among residents of nursing homes – a cohort study

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### BACKGROUND

The prevalence of the four most common nosocomial infections in long term care facilities (LTCF) in Norway is similar as in hospitals (around 7%). The aim of this study was to identify consequences of nosocomial infections in Norwegian nursing homes in form of reduced physical condition, transfer to hospital and mortality.

### METHODS

We followed residents of six nursing homes in two major cities in Norway, during the period October 2004 to March 2005. For each resident with an infection we randomly selected two controls among residents who did not have an infection. The cases and the controls were follow-up for 30 days as a cohort in order to measure the incidence proportion of complications and the risk ratio in the two groups.

### RESULTS

The incidence of infection was 5.2 per 1000 resident-days. After 30 days follow-up 10.9% of the residents who had undergone any infection were found to have a reduced physical condition, compared to 4.8% in the unexposed group (RR 2.3). Altogether 13.0% of residents with infections were admitted to hospital, compared to 1.4% in the unexposed group (RR 9.2). Among residents with an infection 16.1% died in the nursing home during the 30 days follow up, compared to 2.4% in the unexposed group (RR 6.6). Consequences were most frequently identified among residents with lower respiratory tract infections.

### CONCLUSIONS

Healthcare associated infections cause severe consequences for people living in nursing homes. This underlines the importance of implementing infection control measures in LTCF.

07.6 Reference: 20080201

Track: Health care associated infections

## Prevention of occupational exposures to bloodborne pathogens through the adoption of needlestick-prevention devices in Italian healthcare workers

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### BACKGROUND

In Europe approximately 8 million healthcare workers are potentially at risk of needlestick injuries (NSI) and consequent infection with more than 20 dangerous blood-borne pathogens (including HBV, HCV and HIV which account for most cases). Needlestick-prevention devices (NPD) were only recently introduced on a wider scale in Europe and data are still scarce.

### METHODS

Twenty-three hospitals participating in the Studio Italiano Rischio Occupazionale da HIV (SIROH) which adopted NPD provided the following information: NPD adopted, year of introduction, involved units, replacement of conventional devices (CD), users training. The number of devices used annually (NPD and CD, by type of device), was used as denominator to calculate NSI rates per 100,000 devices.

### RESULTS

All adopted NPD to replace hollow-bore, blood-filled needles, mostly after 2002; 12 implemented > 3 NPD. Twenty percent of NPD were adopted in specific units only (emergency department, infectious diseases) based on risk assessment. In 58.5% of cases CD were completely replaced by NPD. Intensive training was carried out in all hospitals before implementation, and repeated after 6-12 months. Average NSI rate per 100 beds decreased from 15.3% in 2003 to 10.0% in 2006 (Chi-square for trend=75.84; p<0.0001). 6,000,000 NPD used, NPD-specific NSI rates showed a significant decrease from the baseline corresponding CD rates (Chi-square for trend=51.1; p<0.0001), were significantly lower (-75% on average) than the corresponding CD rates (intravenous catheters 3.71 vs. 11.09; blood-collection butterfly needles 1.92 vs 6.09; arterial blood gas syringes 1.14 vs 8.59) and were maintained for at least 6 years following NPD introduction. CD-specific NSI rates remained stable after NPD introduction.

### CONCLUSIONS

Combined education and repeated training and NPD implementation can significantly decrease NSI rates.

07.7 Reference: 20080128

Track: Health care associated infections

## Nosocomial outbreak of extended-spectrum beta-lactamase (ESBL)-producing pathogens among premature newborns due to unhygienic infusion practices, Hungary, 2008

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### BACKGROUND

On 30-31 May, 2008, several infants presented with symptoms of systemic infection on a premature newborn ward. All infants had received infusion therapy. Our outbreak investigation aimed to confirm the suspected vehicle and implement targeted control measures.

### METHODS

We conducted a retrospective cohort study among all newborns present on the ward on 30 May. A case-patient had clinical features suggestive of infection (fever, abdominal distension, respiratory symptoms) on 30-31 May. Data were collected on patient characteristics and possible exposures occurring since 26 May. Clinical, screening and environmental specimens were taken. Pulsed-field gel electrophoresis was used for molecular strain typing.

### RESULTS

Among 22 newborns, 13 case-patients were identified, one of them died. Twelve had received infusions on 29 and 30 May, which were risk factors for systemic infection (relative risk [RR]=8.3, 95% confidence interval [CI]: 1.3-53.1). Hemocultures of 8 case-patients contained ESBL-producing [+] and/or non-producing [-] *Klebsiella pneumoniae* (KP) and/or *Citrobacter freundii* [+] and/or *Enterobacter cloacae* [+/-]. Except for [+]KP P clone, identical clones were identified in one 500 ml infusion bottle used on 29 May, from which the fluid was distributed manually to individual infusion pumps. The [+]KP P clone was isolated from 2 hemocultures and 6 stool samples, and from the hand of a nurse on-duty on 1 June. Nasogastric feeding tube (RR=3.3, CI: 1.2-9.5) and having received infusion (RR=3.8, CI: 1.0-13.8) on 27 May were risk factors for acquiring the [+]KP P clone.

### CONCLUSIONS

Breaches observed in infection control (IC), particularly in hand hygiene, led to multiple contaminations and a severe outbreak on the ward. Strict adherence to IC practices is key to preventing nosocomial spread of the emerging and difficult-to-treat ESBL-producing organisms.

o8.1 Reference: 20080148

Track: HIV, STI and blood-borne viruses

## Incidence of hepatitis C virus infection among HIV-infected men who have sex with men in France in 2006 and 2007

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### BACKGROUND

In European countries, incidence of hepatitis C virus infection (HCV) remained very low until 2000 among cohorts of HIV-infected men who have sex with men (MSM) who were not drug injectors. However, recent reports describe acute infections among HIV-infected MSM suggesting that HCV may be sexually transmitted.

### METHODS

A prospective study was conducted in 2006 and 2007 in France to assess the incidence of HCV among HIV-infected MSM. Acute infection was defined by positive anti-HCV or HCV polymerase chain reaction within one year of a documented negative anti-HCV. A sampling frame of 115 medical wards was constructed according to the number of HIV and AIDS cases in MSM reported to the National HIV surveillance system between 2003 and 2005. Estimates of HCV incidence and its 95% confidence interval were calculated firstly using sampling weights then post-stratified by yearly activity of HIV care and by the number of HIV-infected patients and MSM followed-up per year, at each ward.

### RESULTS

In 2006 and 2007, respectively, 91 and 86 wards participated and reported 50 and 39 cases. Preliminary HCV incidence is estimated at 0.53 per 100PY, 95%CI=[0.27;0.79] in 2006 and 0.35 per 100PY, 95%CI=[0.22;0.48] in 2007. These estimates are similar to those obtained in two European cohorts but should be improved by taking into account the number of medical contacts for HIV care and of liver function tests during the year preceding HCV diagnosis, which were also collected for each MSM included in the study.

### CONCLUSIONS

This survey has shown evidence of ongoing HCV transmission in HIV-infected MSM in France. Complementary analyses on at risk exposure are under progress to better define prevention measures among this population.

08.2 Reference: 20080142

Track: HIV, STI and blood-borne viruses

## Knowledge, hygiene behaviours and risk of blood-borne infections in barbers of Palermo (Sicily, Italy)

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### BACKGROUND

Hepatitis B virus, hepatitis C virus and HIV infections are one of the most devastating health problems in the world are spreading mainly via blood. Barbers and their customers, during shaving and cutting hair, may often be exposed accidentally to the blood and bodily fluids. The aim of this study was to examine hygiene practices and knowledge of blood-borne infections in a sample of traditional barbers of Palermo, by answering to an anonymous questionnaire handed out.

### METHODS

The questionnaire included a total of 13 questions that were related to infective risk knowledge (n=8) and safety behaviours (n=5) and, in addition, 11 demographic-social questions. Of the 375 barbers officially registered with the local chamber of trade in the Palermo city, 75 were included in the study from March to May 2008. All the subjects were selected randomly; 72 espondents (96%) participated. Their age and duration of employment ranged from 23 to 69 and from 5 to 50, years respectively; only 8,3% had an educational level high. Data were analyzed by EpiInfo 3.4.

### RESULTS

Most of the participants showed a low knowledge of the transmission pattern of blood-borne viruses. Almost 37% of the respondents didn't know of their occupational risk related to HIV,HBV,HCV ; only 6,9% exhibited excellent hygiene behaviours. Moreover, nearly 57% of the interviewed declared to have not made vaccination against Hepatitis B virus infection and only 17,5% wished to participate to course of training toward the risk of infection with blood-borne viruses.

### CONCLUSIONS

Data suggest the need to promote safety educational strategies to reduce infectious risk associated with blood exposure for barbers and their customers in Palermo city.

08.3 Reference: 20080123

Track: HIV, STI and blood-borne viruses

## Trends in Chlamydia trachomatis diagnosis by general practitioners vs STI clinics in Rotterdam, The Netherlands

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### BACKGROUND

In the Netherlands STI testing is provided by general practitioners (GP), medical specialists and STI clinics. Since Chlamydia trachomatis (CT) is not notifiable, epidemiological data are not readily available. The Rotterdam STI clinic provides data to the Dutch STI sentinel surveillance system, while other testing occurs in laboratories not linked to an existing surveillance system. Our objective was to explore trends in CT testing and positivity by sex and age-group in relation to testing by GP's and specialist facilities.

### METHODS

The laboratories provided aggregated CT test data by sex and age group from 2004-2007. Comparable data were extracted from the STI clinic surveillance.

### RESULTS

From 2004 to 2007 the number of CT tests performed increased with 29% from 22115 to 28554, with a range from 5% (STI clinic) to 57% (laboratory for GP and STI). The number of CT cases detected increased with 41% from 1891 to 2657. Overall CT positivity-rate increased from 8.6% in 2004 to 9.3% in 2007. In 2007, CT positivity-rate in men was 11.5% and highest in those 15-24 year old (18%). CT positivity-rate in women was 9% and highest among 15-19 year olds (18%). Preliminary analysis shows that in 2007 52% of testing was performed by GP's versus 49% in 2004 ( $p < 0.001$ ). Extrapolating from data of a population study the estimated percentage of diagnosed cases among all Ct infections increased from 29% to 40%.

### CONCLUSIONS

Providing test facilities has led to an increase in uptake of testing, half of these by GP's. The increase of CT positivity rates suggests ongoing transmission, and CT remains a public health problem especially in the younger age groups.

**08.4 Reference: 20080143****Track: HIV, STI and blood-borne viruses****2003 -2007 tendencies HIV transmission in women in Lithuania***Irma Caplinskiene, Saulius Caplinskas*

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**BACKGROUND**

Women represent an increasing group of HIV patients in many countries, most of them being of childbearing age. Number of female HIV cases has steadily increased in Lithuania, as well. Objective of the study was to analyse the characteristics of HIV transmission trends in women in Lithuania.

**METHODS**

Retrospective descriptive epidemiological analysis of female HIV cases by statistical EpiInfo 2002. Data originate from the national HIV/AIDS surveillance system.

**RESULTS****MOTHER-TO-CHILD TRANSMISSION****CONCLUSIONS**

Male/female HIV case ratio has increased along with increasing number of sexual HIV transmission in females. Along with increasing number of women living with HIV, the risk of mother-to-child transmission also grows.

08.5 Reference: 20080265

Track: HIV, STI and blood-borne viruses

## An attempt to evaluate point hiv prevalence for poland in 2005

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### BACKGROUND

The level of HIV epidemic in Poland is slowly increasing, as documented by a growing number of newly diagnosed HIV cases, but is still one of the lowest in Europe. The majority of the cases, recorded from the beginning of the epidemic are injecting drug users (IDU), but the pattern of current transmission categories may be different with greater significance of sex between men or heterosexual contacts. The actual number of people living with HIV in Poland is unknown. The aim of the study was to evaluate a point prevalence of HIV infected people in Poland.

### METHODS

To size up the total number of people living with HIV, we used the WHO/UNAIDS Workbook Model for countries with low-level and concentrated epidemics. Published and grey literature was searched for estimates of HIV prevalence and population size for IDU, prisoners, MSM and FSW. Most of available data referred to the time period 2004 – 2006, thus we decided to make a point prevalence for 2005.

### RESULTS

Workbook estimate for HIV prevalence for Poland is 0,2% of adult population aged 15-49, which corresponds to 35 thousands infected people. The total number of registered cases as of the end of 2005 was 9.798. Based on this the undiagnosed fraction could be higher than 2/3.

### CONCLUSIONS

Our result indicates higher HIV prevalence than previous experts estimations (26 000). The new estimate can be exaggerated because of overlap between the risk groups. The undiagnosed fraction can be lower if there is a significant level of underreporting. However, the result coupled with an increasing number of late presenters should trigger active promotion of HIV testing.

o8.6 Reference: 2008o118

Track: HIV, STI and blood-borne viruses

## Characteristics of Early and Late Newly Diagnosed HIV Infections

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### BACKGROUND

Many individuals with HIV are late diagnosed and little is known about early diagnosis and its determinants. The aim of the study is to highlight the characteristics of HIV-infected persons diagnosed at different stages of their infection.

### METHODS

Since January 2004, a multisite study has been conducted in newly-diagnosed HIV-infected adults, in Italy. At diagnosis, for every patient epidemiological, socio-demographic and behavioural data are collected and antibodies Avidity Index (AI), to identify recent infections (within 6 months after seroconversion), is measured. Newly diagnoses were classified early when  $AI < 0.80$ , late when they had AIDS or  $CD4 < 200$ , and others. A multinomial logistic regression was performed. The analysis is restricted to 607 subjects, whose AI were available, out of 1307 diagnosed until June 2007. For 385 subjects we have also behavioural data.

### RESULTS

133 (22.0%) and 154 (26.7%) were early and late diagnoses, respectively. In univariate analysis, compared to others individuals, late-diagnosis were more likely to be older ( $p < 0.001$ ), with a poorer education level ( $p = 0.007$ ), not homosexual ( $p = 0.002$ ), never been tested before ( $p < 0.001$ ), nor diagnosed for a STI ( $p = 0.014$ ); moreover they had a smaller number of sexual partners or occasional intercourse in the past 12 months ( $p < 0.001$ ), and have used drugs lifetime and in the past 12 months ( $p = 0.002$ ). No association was found according to early diagnosis. At multivariate analysis, older age and no HIV testing before were associated with late diagnosis ( $p < 0.001$ ); previous negative test was associated with early-diagnosis ( $p = 0.038$ ). No significant association was found according to behavioural data.

### CONCLUSIONS

Early and late diagnoses represent more than one fifth and than one fourth of newly-diagnoses, respectively. Further studies are needed to encourage persons to be tested, favouring an early diagnosis.

08.7 Reference: 20080154

Track: HIV, STI and blood-borne viruses

## HIV infection trends by age groups in Lithuania

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### BACKGROUND

HIV is affecting many age groups in Lithuanian. The objective is to describe the HIV infections trends by age groups in Lithuania.

### METHODS

Retrospective analysis of the national HIV surveillance database (1988-2007). Statistical data analysis was performed by EPIInfo 2002.

### RESULTS

From 1988 to 01/01/2008 total of 1306 cases of HIV infection were reported (prevalence 34.9/100 000 population). Age distribution of HIV cases at the moment of diagnosis ranges a little but is stable. The mean age at HIV has varied (1995-2007) approximately from 30 to 35 years. The mean age of women has increased from approximately 30 years (in 2007) up to 26 since 1997. Women cases are on average 2-4 years younger than men at HIV diagnosis. The mean age differs by mode of transmission: among persons infected via heterosexual-37 years (varied from 31 years in 1997 to 44 years in 2001), homosexual-36 (varied from 28 years in 1995 to 48 years in 2004) and among IDU-30 years (varied from 26 years in 1997 to 34 years in 2007). By age group, 25-49 year olds have always predominated totalling to 964 cases. HIV infection is relatively rare in youth aged 15-24 (270 cases totally). The peak in youth (15-24 years old) seen in the 2002 (79 HIV cases identified) should be attributed to the outbreak among inmates of Alytus Correctional Facility. Only one child with HIV was diagnosed in Lithuania.

### CONCLUSIONS

HIV surveillance data indicate that only small share of reported HIV cases are attributable to youth (aged 15-24) in Lithuania. Majority of people with HIV in Lithuania are 25-49 years old, which proves a need for public health education and prevention programs targeted at this group.

o8.8 Reference: 20080192

Track: HIV, STI and blood-borne viruses

## Evaluation of HIV, HBV, HCV and syphilis prevalence in IDUs in Lithuania using respondent driven sampling (RDS)

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### BACKGROUND

During the last decade majority (71% in 1998 - 55,6% in 2007) of new HIV cases in Lithuania were related to injecting drug use (IDU). The study is aimed at evaluating the prevalence of HIV, HBV, HCV, syphilis and HIV-related risk behaviours among IDUs.

### METHODS

A cross-sectional anonymous survey (interview and testing) of current IDUs (n=400) recruited using respondent driven sampling (RDS) was carried out (10/2007 – 01/2008) in Vilnius, the capital city of Lithuania. All participants were tested for HIV, HBV, HCV and syphilis. Statistical analysis was performed with SPSS 14.0 for Windows.

### RESULTS

The mean age of the participants was 30.5 years, with 82.25% male and 17.75% female. 70.8% of the participants had been in jail or prison; income (main source of income during the last 4 weeks): 23.75% of the participants regular or temporary job, 38.3% - theft, robbery, or stealing, 3.3% sex work. The main injecting drugs were poppies (57.4%) and heroin (32.2%). The average number of days in the last 4 weeks when participants injected drugs was 27 days. 2.25% reported receptive sharing syringes and/or needles in last 4 weeks. 5.9% reported using sterile syringes/needles during the first injection. 51.6% had injected together with a person they knew was HIV-infected. Only 1.5% of participants were vaccinated for HBV (selfreporting). Testing for HIV, VHC, VHB antibodies: HIV prevalence – 8%, HCV – 98.8%, anti-HBC-core – 82%, syphilis (RPR) - 7%.

### CONCLUSIONS

Survey shows high prevalence of blood-borne infections and related risk behaviour: HIV prevalence in IDU population is 8%, HBV-82%, HCV-98.8%, syphilis-7%. Majority respondents are young men injecting poppies and heroin.

09.1 Reference: 20080251

Track: International Health

## Improving capacity for foodborne disease surveillance and outbreak detection and response in Europe through WHO Global Salm-Surv

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### BACKGROUND

WHO Global Salm-Surv is a global partnership of the World Health Organization (WHO), the European Centre for Disease Prevention and Control, Institut Pasteur, the National Food Institute-Denmark, Central Veterinary Institute-Netherlands and five additional internationally recognized non-European public health organizations to enhance the capacity of countries to detect, respond to and prevent foodborne diseases.

### METHODS

Partners work to promote integrated, laboratory-based surveillance and foster intersectoral collaboration among human, food and veterinary scientists through international and national training courses and other program components. These include a global Salmonella databank (Country Databank); an external quality assurance system (EQAS) for Salmonella serotyping, species identification of Campylobacter and antimicrobial susceptibility testing; a global listserv (Electronic Discussion Group); focused regional and national projects; and reference testing.

### RESULTS

Since its inception in 2000, WHO Global Salm-Surv has conducted 54 training courses for >1000 participants in over 120 countries. In Europe, 11 courses have been held for Central and Eastern Europe (Warsaw) and the Commonwealth of Independent States and the Russian Federation (St. Petersburg and Moscow); more than 150 participants have attended training. Organizations such as EpiEt, the European Food Safety Authority, WHO EURO, and others have partnered with WHO Global Salm-Surv in its efforts to train in Europe. From 2002-2003, 38 European institutions contributed to the Country Databank. Twenty-eight European countries participated in the 2007 EQAS. An enhanced surveillance project was launched in the Russian Federation to strengthen laboratory-based surveillance for Salmonella.

### CONCLUSIONS

Future WHO Global Salm-Surv plans for Europe include follow-up training courses for Central and Eastern Europe, as well as the Commonwealth of Independent States and the Russian Federation. Additional plans are also underway for training in Western and Southern Europe.

09.2 Reference: 20080020

Track: International Health

## Emerging infectious diseases, travel and fever screening at international airports: results from a literature review indicate poor effectiveness of non-contact infrared cameras

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### BACKGROUND

Non-contact infrared cameras (NCIC) at international airports aim at delaying the introduction of an emerging infection in a country, through the detection of infected passengers. We reviewed the existing publications on the sensitivity and specificity of NCIC used for fever screening (whatever the cause of fever), to discuss their potential effectiveness under a pandemic influenza hypothesis.

### METHODS

Eight publications were identified through a Medline search. In three of them, describing SARS or dengue fever screening in airports, specificity was not available. In five other studies carried out in hospitals, outpatient consultations or sports clubs in South-East Asian countries, the forehead temperatures measured by NCIC were compared to reference auricular temperatures.

### RESULTS

The study populations, ranging from 176 to 72,327 persons, included patients or healthy subjects. Fever prevalence varied from 1.2% to 16.9%. Sensitivity of NCIC varied from 4.0% to 89.6% and specificity from 75.4% to 99.6%. To allow comparisons between studies, we fixed the fever prevalence at 1% and derived the predictive values from the respective sensitivity and specificity values. The derived positive predictive value was below 66% and the negative predictive value  $\geq 99\%$ .

### CONCLUSIONS

At the very early stage of a pandemic influenza, poor performances of NCIC can be expected given an initially low number of infected travelers and an overall fever prevalence  $<1\%$  among international passengers. External factors (epidemiological, sociological) can also impair the effectiveness of a NCIC-based screening strategy: infected passengers can cross a border before their symptoms occur or can hide their symptoms to bypass controls. Strengthening the surveillance and health care systems in countries of departure and destination to improve early detection and isolation of infected persons, appear more appropriate.

09.3 Reference: 20080177

Track: International Health

## Risk of schistosomiasis among recreational users of the Nile River in Uganda

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### BACKGROUND

Travelers who raft and kayak in contaminated freshwater bodies in schistosomiasis-endemic countries are at risk of acquiring the disease. Acute or chronic infection can cause serious sequelae. Because many think the risk of schistosomiasis infection from fast-moving water is low, we assessed this risk during an international kayaking competition on the Nile River in Uganda, December 2007.

### METHODS

A questionnaire was administered to a cohort of competitors and spectators, and a blood sample taken to test for schistosome antibodies, using ELISA to screen and immunoblot to confirm. Three months later, antibody negative individuals completed a questionnaire covering the intervening period and provided a second blood sample. Local public health agencies assisted in collecting the second blood samples. Evidence of infection was defined as being first sample negative and second sample positive/indeterminate. Exposure risk during the period two weeks before enrolment until second sample collection was categorized as, no water exposure, swam/waded only, kayaked/rafted only, or had both exposures.

### RESULTS

The 149 individuals enrolled were from 22 countries; mean age 27 years (range 16–72). Fifty four (47%) of 114 individuals who were first sample negative provided a second blood sample. Of these, there were no infections among nine individuals without water exposure, one of seven who swam/waded only (attack rate [AR]=14%), three of 21 (AR=14%) who kayaked/rafted only, and four of 17 (AR=24%) with both exposures. The differences were not statistically significant. No individuals reported acute schistosomiasis illness.

### CONCLUSIONS

These findings suggest that exposure to fast-moving freshwater in schistosomiasis endemic countries may pose a risk of infection. Without vaccination or chemoprophylaxis currently available, post-exposure schistosomes-testing should be considered for adventure travelers.

09.4 Reference: 20080014

Track: International Health

## Cholera outbreak, Sekong Province, Lao PDR, December 2007-January 2008

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### BACKGROUND

The last cholera outbreak in Laos was in 2000 in Sekong and Savannakhet province. On December 27 2007, the National Center for Laboratory and Epidemiology received the notification of a cluster of acute watery diarrhea, including one death, in Thateng District, Sekong province. An investigation was launched in order to identify the size of the outbreak, implement control measures and prevent new cases.

### METHODS

Active surveillance acute watery diarrhea cases was established at village level, at health centers and hospitals. Stool samples from new cases and water samples from rivers and water pumps in the affected villages were tested. Medical interventions included the treatment of severely dehydrated patients, the distribution of oral rehydration salts, training for health staff and infection control. Community awareness campaigns to improve access to safe water were also conducted.

### RESULTS

A total of 367 cases and 3 deaths of acute watery diarrhea were reported between 19 December 2007 and 3 February 2008 in 31 villages in Thateng and Lamarm Districts of Sekong province. Seventeen out of 29 stool samples were positive for *Vibrio cholerae*, Ogawa strain. Two rivers also contained *Vibrio cholerae*, Ogawa strain. All villages in these districts received chlorine solution and health education during the outbreak and for one month after the last case was reported.

### CONCLUSIONS

Cholera continues to be a public health problem in countries such as Laos. This cholera outbreak was caused by contaminated water sources and person to person transmission. Public health interventions were effective in maintaining a low case fatality rate and reducing the duration of the outbreak. Coordination of surveillance, clinical management and safe water initiatives was crucial for successful cholera outbreak management.

09.5 Reference: 20080049

Track: International Health

## Household out-of-pocket payments for illness: Evidence from Vietnam

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### BACKGROUND

In Vietnam, illnesses create high out-of-pocket healthcare expenditures for households. In this study, the burden of illness in the Bavi district, Vietnam is measured based upon individual household health expenditures for communicable and non-communicable illnesses. The focus of the paper is on the relative effect of different illnesses on the total economic burden of healthcare on households in general and on households that have catastrophic health care spending in particular.

### METHODS

The study was performed by twelve monthly follow-up interviews of 621 randomly selected households. The households are part of the FilaBavi project sample - Health System Research Project. The heads of household were interviewed at monthly intervals from July 2001 to June 2002.

### RESULTS

For the population in the Bavi district, communicable illnesses predominate among the episodes of illness and are the reason for most household healthcare expenditure. This is the case for almost all groups within the study and for the study population as a whole. However, communicable illnesses are more dominant in the poor population compared to the rich population, and are more dominant in households that have very large, or catastrophic, healthcare expenditure, compared to those without such expenditures.

### CONCLUSIONS

The main findings indicate that catastrophic healthcare spending for a household is not usually the result of one single disastrous event, but rather a series of events and is related more to "every-day illnesses" in a developing country context than to more spectacular events such as injuries or heart illnesses.

09.6 Reference: 20080175

Track: International Health

## The EpiSouth Project in the Mediterranean and Balkans: monitoring the progress of Network development

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### BACKGROUND

The Project, co-financed by DGSANCO and supported by the Italian MoH, started in October 2006 aimed at improving communicable diseases surveillance and control in the Mediterranean Area. A Network of Epidemiologists from 25 European and non-European Countries plus 3 International Organisations (DGSANCO, ECDC and WHO) was established.

### METHODS

In order to assess how members perceive the progress toward the Network building a questionnaire was prepared and distributed among the participants during the First (Rome, March 07) and Second EpiSouth Meeting (Athens, December 2007).

### RESULTS

The questionnaire was compiled by 24 out of 65 (37%) and 43 out of 75 (57%) participants in Rome and Athens respectively. The majority of Athens respondents (83%) think that EpiSouth's goals were set in a participatory fashion compared to the 68% in Rome. The 83% and 55% of respondents in Athens and Rome, respectively, believe that EpiSouth is creating a supportive culture. The 80% in Athens sense that members are considerate toward others compared with the 70% in Rome. The 78% in Athens feel that cohesion is already solid, compared to half in Rome. The 65% in Athens and 68% in Rome believe that opinions are confronted explicitly and successfully. Half of participants both in Athens and Rome think that all members have significant control over decisions. The 80% and 70% in Athens and Rome, respectively, look at the Network as a great opportunity for personal and organizational creativity and evolution.

### CONCLUSIONS

Networking is vitally important to ensure active and balanced participation, information sharing and coordinated response to health threats. This assessment shows that critical aspects such as supportive culture, cohesion and creativity are perceived as growing by the EpiSouth Network's members.

09.7 Reference: 20080141

Track: International Health

## Pakistan is still averting a heterosexual HIV epidemic- a study from Lahore

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### BACKGROUND

UNAIDS estimates that 33.2 million people were living with HIV in 2007. Studies indicate a relationship between HIV and STIs. In Pakistan, the HIV epidemic follows the "Asian epidemic model" with a concentrated epidemic among IDUs and MSM. The aims of this study were to estimate the prevalence of HIV/STIs and assess risk behaviours among women selling sex in Lahore, Pakistan.

### METHODS

The 730 participants were recruited through respondent driven sampling. Women in three areas of Lahore were included, where an HIV/STI prevention intervention packages of services was initiated in 2004. A structured questionnaire was administered by face-to-face interviews. Samples were obtained from all participants and tested for HIV, *Treponema pallidum*, *Neisseria gonorrhoeae*, *Chlamydia trachomatis* and *Trichomonas vaginalis*.

### RESULTS

HIV prevalence was 0.7%, 4.5% were infected with *T. pallidum*, 7.5% with *N. gonorrhoeae*, 7.7% with *C. trachomatis* and 5.1% with *T. vaginalis*. The participants had been selling sex for the latest 7 years (median) and had a mean of 3.3 clients per day. Consistent condom use was reported by 65%. The median fee per sexual contact was Rs 250 (1 € = Rs 106). Women working at area "B", having 4 or more clients per day and not using condoms had an increased risk of chlamydial infection and gonorrhoea. Among the participants, only 19% and 83% had heard of HIV and AIDS, respectively, and 55% did not recognise themselves at risk of getting AIDS.

### CONCLUSIONS

The prevalence of HIV was <1% in our sample. A relatively high condom use, low number of sexual partners, and low as well as decreasing prevalence of STIs may have contributed to the low HIV prevalence.

10.1 Reference: 20080162

Track: Intervention and Policy

## Common training needs in diseases surveillance among Episouth countries in the Mediterranean and Balkan regions

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### BACKGROUND

Episouth is an EU-funded project aiming to improve communicable diseases surveillance, communication and training across the Mediterranean and Balkan regions. "Training in field/applied epidemiology" is one of eight areas of activity with the objective of strengthening early response capacity to health threats of participating countries through organising short-term trainings/workshops. We aimed to identify common institutional training needs in surveillance and early warning among Episouth countries in order to ensure consensus and necessary support for surveillance activities in the region.

### METHODS

Between June-July 2007 we carried out a survey among 22 Episouth countries. We used a self-administered, semi-structured questionnaire sent to decision-makers/senior epidemiologists at central level. The core part allowed for prioritisation of training topics using a score based on perceived need of training, perceived importance of the topic, existent skills at central level, undertaking of the related activity in the unit.

### RESULTS

We received 21 questionnaires from 19 countries. A total number of 779 professionals worked in surveillance at central level in respondent countries, 70% of them concentrated in four countries. In 9 countries, less than 25% of personnel in surveillance have received training in the last two years. The majority (81%) of institutions deliver training in surveillance and 52% of them developed training programmes for their staff. In order of priority, based on calculated score, topics identified by participants were quantitative risk assessment, modelling of environmental risks and infectious diseases, epidemic intelligence and advanced data analysis.

### CONCLUSIONS

We identified training needs and topics for Episouth training modules. We also observed a need for coordinating activities with major public health institutions/organizations involved in surveillance at international level. This assessment could serve for further national or regional training projects.

10.2 Reference: 20080158

Track: Intervention and Policy

## Challenges in implementation of International Health Regulations (2005) among EPISOUTH countries in the Mediterranean and Balkan regions

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### BACKGROUND

The revised International Health Regulations (IHR2005) emphasize the necessity to detect and respond to public health threats. The Episouth project intends to create a framework of collaboration on epidemiological issues to improve communicable diseases surveillance, communication and training in the Mediterranean and Balkan regions. As part of Episouth activities, a workshop on IHR2005 took place in Madrid in June 2008 involving 29 participants from 18 countries. Among other objectives, we aimed to identify difficulties encountered by Episouth countries in IHR2005 implementation.

### METHODS

We conducted focus group discussions among participants distributed into four groups of similar decision-making capacity. Seven were IHR2005 focal point team members (FP), nine worked for ministries of health, 18 at national health institutes and two at intermediate/regional level. A moderator led discussions based on a common discussion-guide covering IHR2005-related legislation, surveillance and response, points of entry, communication and integration of alternative information. One "recorder" per group assisted the moderator. Groups summarized discussions in a plenary session.

### RESULTS

Understanding of IHR2005 principles and knowledge on its implementation process varied widely between groups, increasing with decision-making level. The central level perceived the IHR2005-related awareness at intermediate level as higher than it actually was. Among FPs, main concerns were external communication, quality and capacity for efficient response. Main obstacles to IHR2005 implementation mentioned in central-level groups were weaknesses in national surveillance systems and difficult inter-/intra-institutional communication and poor dissemination of IHR2005-related information for the intermediate level.

### CONCLUSIONS

As proper implementation implies commitment of national surveillance systems to IHR2005 principles, homogeneous awareness and active involvement of all actors across various country levels is essential. Our results may complement WHO's annual assessment of the first year of IHR2005 implementation.

**10.3 Reference: 20080087****Track: Intervention and Policy****Standards for outbreak and incident investigation in England***Maguire H. (1), Oliver I. (2), Gorton R. (3), Cohuet S. (1), Fraser G. (1).*

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2. Health Protection Agency, South West region
3. Health Protection Agency, North East region

**BACKGROUND**

A review of the strength of evidence relating to vehicle of infection in *S. enteritidis* outbreaks in England was carried out in 2007 at HPA London. Reports of such outbreaks and of cases had increased. Among fifteen *S. enteritidis* outbreaks affecting 260 people, final reports were available or in preparation for just 10, and an analytic study conducted in only four (two case-control and two cohort studies).

**METHODS**

The epidemiology group of the Local and Regional Services (LaRS) of the Health Protection Agency established a working group to develop standards for outbreak and incident investigations in LaRS. Standards were developed relating to both the generic and specific aspects, and these were categorised according to whether they applied to planning or response.

**RESULTS**

Standards were developed in various domains including: plans and policy, incident management teams, incident recognition and alerting, early investigation, data handling, epidemiological investigation, control measures, documentation, communications, declaration incident ended, and audit. They were endorsed by the LaRS Senior Management Team and are being implemented across LaRS at present.

**CONCLUSIONS**

Standards have been set to improve the application of appropriate risk assessment to determine the nature, extent and causation of outbreaks and incidents in England. Mechanisms to assist and ensure their implementation are now being developed.

10.4 Reference: 20080241

Track: Intervention and Policy

## Considering Field Assignments for National Training Programs

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### BACKGROUND

The U.S. Department of Health and Human Services/Centers for Disease Control and Prevention's (CDC's) Epidemic Intelligence Service (EIS), headquartered in Atlanta, Georgia, USA, is a program comprising clinical professionals and doctoral-level scientists serving in a 2-year fellowship.

### METHODS

This year, 47 of 160 EIS officers are stationed outside CDC headquarters at state, city, or county health departments across the United States. Having EIS officers stationed throughout the United States allows more rapid response to public health problems, increases epidemiologic capacity in less-populated areas, and promotes federal-state cooperation.

### RESULTS

CDC supports EIS-type programs in other countries through its field training programs. These programs and other epidemiologic training programs might be interested in assigning officers to regions of their country away from headquarters as CDC does. Unique problems can occur for field EIS officers who might have different resources from the headquarters' trainees. To counteract these problems, CDC assigns a supervisor from headquarters to provide additional support to field EIS officers and his or her local supervisors. Headquarters supervisors provide timely and appropriate supervision, mentorship, and scientific oversight for all field EIS officer activities.

### CONCLUSIONS

Training program managers who wish to increase their organization's field epidemiology capacity by assigning epidemiologists to regional health facilities will receive information for how to effectively train epidemiologists when they are stationed offsite, and they will receive guidance in determining the need for a field assignment, setting up a field assignment, and monitoring assignments. This information will help ensure that the field assignee meets the program goals, receives high-quality training, and provides service to the community to which they are sent.

10.5 Reference: 20080211

Track: Intervention and Policy

## Review of investigations into *Salmonella enteritidis* phage type 8 outbreaks in England in 2006-07: nature and strength of evidence for outbreak vehicle

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### BACKGROUND

Since 2006 an increase in non-travel related *Salmonella enteritidis* Phage Type 8 (SPT8) infections has been observed in England. The number of reported infections has risen from 842 in 2006 to 1255 in 2007. Previous investigations of national rise in *Salmonella enteritidis* PT1 and PT14b infections had implicated eggs imported from Spain leading to recommendations from European Union Food Safety Authorities in 2006. The Health Protection Agency conducted a national review of SPT8 outbreaks during 2006-07 to identify a suspect vehicle and assess the nature and strength of the evidence obtained.

### METHODS

All SPT8 outbreaks reported to a volunteer outbreak surveillance system were obtained. Active enquiry for further unreported outbreaks was undertaken. Data was abstracted on type of investigation and suspect outbreak vehicle. Evidence was considered 'very good' if there was concordant environmental (microbiological evidence in food and surfaces samples) and analytical epidemiological evidence for the outbreak vehicle; 'good' if there was either environmental (food or surfaces) or epidemiological evidence; 'equivocal' in the absence of environmental and epidemiological findings.

### RESULTS

Fifteen outbreaks involving 184 confirmed and 76 suspected cases of SPT8 were identified. Environmental microbiological investigation was undertaken in 12 premises. Four cohort or case control studies were implemented. 'Very good' evidence was found in one outbreak (suspect vehicle: chicken) and 'Good' evidence in eight investigations (chicken, eggs with unknown provenance, duck). Evidence was equivocal in six outbreaks.

### CONCLUSIONS

Evidence for outbreak vehicle was insufficient for international action where both epidemiological and microbiological evidence are required. More attention should be given to the use of analytical epidemiological and microbiological methods in outbreak investigations.

10.6 Reference: 20080181

Track: Intervention and Policy

## **An assessment of European capabilities to deal with Highly Infectious Diseases: the role of the European Network for Highly Infectious Diseases (EuroNHID) project**

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### **BACKGROUND**

EuroNHID is an EC-funded network (contract N° 2006205) of experts in the management of Highly Infectious Diseases (HIDs), involving 15 European countries (Austria, Bulgaria, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Malta, Poland, Slovenia, Spain, United Kingdom), aimed to conduct an on-the-field assessment of current capabilities in isolation, infection control procedures and healthcare worker (HCWs) management in the hospitals designed to deal with HIDs, as fundamental issues for HID control.

### **METHODS**

A "networking strategy" was adopted in order to develop specific checklists to be applied in HID referral hospitals in participating countries. Topics had been attributed to a participant with specific expertise, who sent preliminary drafts to all participants, requesting suggestions and amendments. Final agreement had been reached during meetings.

### **RESULTS**

Main achieved result is the development of checklists as a standard and shared tool for the appropriate assessment of referral hospitals. Particularly, technical features (i.e. existence of structures for airborne isolation), logistic features (i.e. location of isolation rooms), availability of skilled workforce (including the number and the specialty of them), infection control procedures (i.e. waste management) and HCW safety protocols (i.e. post-exposure management) have been explored. The survey of referral hospitals is currently ongoing using the checklists.

### **CONCLUSIONS**

The added value of the project consists in providing an "on-the-field" evaluation of European capabilities that could allow to pass from a theoretical to a practical approach and from a quantitative to a qualitative evaluation of hospital capability in dealing with HIDs. The checklists and the Final Report will be disseminated, and will allow other centres to assess their situations, adding their experience and solutions to the common know-how.

**11.1 Reference: 20080109****Track: Novel epimemiological and lab methods****Evaluation of the web tool for the Norwegian outbreak notification system***Thale Madssen (1, 2), BT Heier (1), H. Meldal (3), K. Nygård (1)*

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**BACKGROUND**

Notification of infectious disease outbreaks to the Norwegian Institute of Public Health is mandatory for municipal medical officers, and a web-based reporting system was established in 2005. In 2007 we evaluated the system's objectives, attributes and usefulness in order to describe the function of the system and identify possible needs for improvement.

**METHODS**

We reviewed data on outbreaks reported before the system was implemented (2004) and one year after (2006). To assess usefulness and acceptability, we emailed an electronic questionnaire to all 173 registered users. To reach "non-users" and assess reasons for not reporting, we sent emails with another questionnaire to all 422 municipalities and hospitals, addressing the person responsible for notification.

**RESULTS**

The number of reported outbreaks increased from 114 in 2004 to 160 in 2006. More variables were included in the new system, but data entering was still incomplete in most reports. Fifty-six percent of the registered users responded, and 58% reported that notification was easier with the web-based tool. Ten percent found it more difficult, while 33% did not know. In addition, 88% would like to be able to generate reports from the database. Eighty-five "non-users" responded, and 46% were unaware of the new web tool. Thirty-five percent reported that an outbreak had occurred in their area. Half of them had not notified the outbreak; the other half used other means of notification.

**CONCLUSIONS**

The surveillance of infectious disease outbreaks has been improved by the web-based system. Areas that need improvement are completeness of data entering and reporting from the database. As the system is still unknown to many, continued promotion and training is needed.

**11.2 Reference: 20080152****Track: Novel epimemiological and lab methods****Binomial CUSUMs for the surveillance of infectious diseases***Michael Höhle (1), M. Paul (2), J. Dreesman (3)*

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**BACKGROUND**

Automatic algorithms for the monitoring of infectious diseases are an important tool for handling the massive amounts of data available from routine public health surveillance. In this work we focus on detecting changes in the behaviour of a binomial time series. An application of this in influenza surveillance is monitoring the proportion of positive throat swabs. Other areas of application in sentinel surveillance are the investigation of antibiotic resistance or the study of vaccine efficacy.

**METHODS**

Taking the seasonality of a disease into account is an aspect of outbreak detection often not handled by standard methods originating from statistical process control. Rogerson and Yamada (2004) use the cumulative sum (CUSUM) method as basis for developing a surveillance method for Poisson distributed data with time varying mean. We adopt their approach to the monitoring of a time varying proportion  $p$  in a binomial setting. This is done by re-weighting each contribution to the binomial CUSUM in order to maintain average run length properties. By estimating parameters of a seasonal logistic model from historic data one is thus able to on-line detect aberrations from such a model.

**RESULTS**

A flexible time varying binomial CUSUM is provided, which allows one to detect changes from a given seasonal binomial time series model. Results from our proposal are compared to a likelihood-ratio based CUSUM using a simulation study and by applying both methods to the monitoring of throat swabs tested positive for the influenza virus in Lower Saxony, Germany.

**CONCLUSIONS**

An implementation of the method is made publicly available through the add-on package 'surveillance' for R -- the free software environment for statistical computing and graphics.

**11.3 Reference: 20080036****Track: Novel epimemiological and lab methods****Modelling Verotoxigenic Escherichia coli (VTEC) infections in Finland between 1997-2006***Katri Jalava (1), M. Eklund (1, 2), J. Ollgren (3), A. Siitonen (2), M. Kuusi (1)*

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**BACKGROUND**

Verotoxigenic Escherichia coli (VTEC) is causing 10-20 infections in Finland annually. The aim of this study was to identify risk factors for domestically acquired sporadic VTEC infections using demographic and agricultural explanatory variables.

**METHODS**

The outcome variable was a case of microbiologically confirmed sporadic VTEC infection with no history of foreign travel as reported to the National Infectious Disease Register in Finland by municipality between 1997 and 2006. The explanatory variables included cattle and pig density, agricultural land, persons working in agriculture, children attending day care, income per household, level of education, proportion of surface of unsalted water and rainfall. The modelling was done using hurdle model with poisson distribution with robust standard errors to account for overdispersion of zero counts in the data with R through SPSS and Stata.

**RESULTS**

Altogether 136 sporadic cases of VTEC were identified in 70/416(17%) municipalities with 0-10 cases in each, 65 (48%) were 5 years or less. In single variable analysis, bulls per population, income per household, proportion of children not attending school lunch, proportion of persons working in agriculture, fields under agriculture and children attending day care were significant in the hurdle model. In the multivariate hurdle model, bulls were significant in the logit/poisson part (95% CI 1.1-12.1/5.5-6.5) and income per household values were (95% CI -0.000053-0.000016/-0.00052--0.00012), respectively. The ln alpha value of the negative binomial distribution ( $p=0.142$ ) indicated that poisson distribution was appropriate.

**CONCLUSIONS**

Bull density is the main risk factor for occurrence and level of income is inversely correlated with spread of the VTEC infections in Finland. The infection does not seem to spread significantly in the day care facilities. Food variables and socioeconomic factors would be advantageous.

11.4 Reference: 20080224

Track: Novel epimemiological and lab methods

## Improvement of listeriosis surveillance by subtyping *Listeria monocytogenes* by Pulsed-Field Gel Electrophoresis with a third restriction endonuclease: SmaI

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### BACKGROUND

For microbiological and epidemiological surveillance of *L. monocytogenes*, Pulse-field gel electrophoresis (PFGE) is the reference tool for detecting and investigating clusters of human cases or outbreaks. Even if there's a current standardized PFGE protocol based on the utilization of the restriction endonucleases *Ascl* and *Apal*, the PFGE results are not sufficient to investigate sometimes a cluster of human cases or an outbreak. To increase the discriminatory power of PFGE, the use of a third restriction endonuclease *SmaI* has been studied and the protocol used inside the WHO Collaborating centre for foodborne listeriosis since 2004 has been improved in this study.

### METHODS

Reference strains for *Lm* serotypes, main strains from French outbreaks and 200 isolates from human, food and environmental origins have been studied with *SmaI* PFGE after adaptation and optimization of PFGE parameters for *SmaI*.

### RESULTS

Based on the analysis with BioNumerics software, all strains had distinct bands. Such as the PFGE with *Ascl* and *Apal*, a clustering by serotypes of the *SmaI* PFGE pattern has been noted. The combination of *Ascl*, *Apal* and *SmaI* provides a greater discriminatory power that is useful for epidemiological surveillance.

### CONCLUSIONS

*SmaI* PFGE patterns give information about isolates with markedly different PFGE patterns with *Ascl* and/or *Apal* which suggests that these isolates could be included in this cluster or this outbreak. Then, this incorporation may be confirmed by the use of epidemiological information that is sufficiently strong. It is fruitful for the exhaustiveness of human cases of this outbreak or the determination of its origin such as a contaminated food.

## 11.5 Reference: 20080080

Track: Novel epimemiological and lab methods

## Identifying transmission pairs in hepatitis B source and contact tracing: agreement of epidemiological and phylogenetic analysis in the multi-ethnic community of Rotterdam (2002-2005)

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### BACKGROUND

The transmission of the hepatitis B virus (HBV) can be traced using epidemiological and molecular information.

### METHODS

We assessed the congruence between HBV sequence data and epidemiological information resulting from source and contact tracing of acutely and chronically infected patients seen at the Municipal Public Health Service in Rotterdam between 2002 and 2005. Molecular support for epidemiological transmission pairs derived from source and contact tracing was assessed by using topological constraints in parsimony analyses in agreement with epidemiological information.

### RESULTS

HBV genotypes of 62 acute and 347 chronic HBV patients indicated that acute infections were predominantly with an endemic genotype (A<sub>2</sub>; 52%) and a non-endemic genotype (D; 32%). Chronic HBV infections largely involved non-endemic genotypes (A<sub>1</sub>, B, C, D and E). Epidemiological transmission pairs differed greatly in the level of molecular support. Of 22 epidemiological clusters, six could be refuted (three harbored multiple genotypes, three conflicted with the epidemiological data in constrained analyses), four clusters received support from the molecular analysis and the support for the remaining 12 was ambiguous. Two of the four epidemiological pairs that also received molecular support had diverged considerably (3 and 15 mutations respectively).

### CONCLUSIONS

Our results show that levels of divergence can not be simply used as an indicator of the likelihood that groups of sequences constitute transmission pairs. Instead, it is necessary to assess the likelihood of a common origin of HBV variants in epidemiologically defined transmission pairs, relative to the HBV diversity in the local community to identify transmission pairs. The combined approach of source and contact tracing and molecular epidemiology provides insight in HBV transmission routes in a multi-ethnic community and allows a refinement of the identification of transmission pairs.

**11.6 Reference: 20080164****Track: Novel epimemiological and lab methods****Generic preparedness to health threats – The European Project REACT**

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**BACKGROUND**

The EU-coordinated response to communicable diseases has experienced major challenges in the past. Differences in public health preparedness and response have repeatedly been seen within the EU (e.g., SARS), which are difficult to explain to the EU citizens and result in delayed public health interventions.

**METHODS**

To provide evidence and tools towards a common European standard for the response of emerging public health threats, a European project was implemented and started in April 2008 to address areas where harmonised best practices and tools are not in place.

**RESULTS**

The project will provide instruments and tools to detect and respond to public health: (i) a tool box of core capacities essential to cover surveillances needs for mass gatherings and a training module; (ii) a frame work model and an indicator list to detect unusual or clusters of communicable illness in HCWs; (iii) a tool for reporting events from the local to the national level relevant for the IHR; (iv) a criteria list for the necessity and extent of contact tracing after exposure to infectious diseases and definition of a minimum set of variables for international contact tracing.

**CONCLUSIONS**

The REACT project will enable discussion of the best practices and tools developed within the project with the scientific community and stakeholders during different expert and general meetings. International organisations from the health sector as well as the transport sector and 12 European member states will cooperate in the project; therefore there will be ownership of the outcomes facilitating the adoption at the member state level. The project has received funding from the European Union, in the framework of the Public Health Programme.

**12.1 Reference: 20080193****Track: Outbreak investigations****First outbreak of Salmonella infantis in a big elderly house in Spain - 2007**

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**BACKGROUND**

In the last 12 years, 5 Salmonella infantis outbreaks have been reported in Spain. The last one occurred in October 2007 in the biggest elderly house in Tenerife. It was the first outbreak involving elderly. The objective of the investigation was to confirm and describe the outbreak.

**METHODS**

We carried out a descriptive study. A case was defined as any resident in the elderly house with diarrhoea, abdominal pain, fever and vomiting developed from October 22 to 27. The data sources used were: reports of Public Health Direction of Canaries; Clinical Histories of cases; Nurse, Nutrition and Kitchen Recordings, Surveillance Reports of Notifiable Diseases of Canaries, laboratory test (cultures) and non structured interviews administered to health workers.

**RESULTS**

The elderly house has 10 pavilions and 10 canteens. Among the 788 residents in the facility, 65 were affected and 4 were laboratory confirmed with Salmonella infantis. Median age was 78 years (range:43-95) for residents; 82.6 (range:28-101) for cases, 67% of cases were immobilized in bed. The highest Attack Rate (AR) was in men (AR:13.11%), residents of one of 10 pavilions (AR:72.22%), and related to the canteen of this pavilion (AR:32.5%). Exposure period and common exposure source could not be identified by any data sources. Epidemiological curve did not exclude person to person transmission. All food samples and kitchen workers specimens were negative for S. infantis.

**CONCLUSIONS**

An outbreak of Salmonella infantis was confirmed in an elderly house in Spain. The outbreak was controlled with health and hygienic measures. As result of the investigation, a unique register of health events was implemented to be used in case of new events.

12.2 Reference: 20080209

Track: Outbreak investigations

## A previously unidentified risk group for measles transmission. Lessons from a measles outbreak investigation

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### BACKGROUND

Elimination of measles in the European Region is targeted by 2010. In the autumn of 2007, a measles outbreak occurred in Jewish Communities in Antwerp. Information on vaccine coverage in this subgroup in Belgium was not available, but there were no reasons to suspect opposition to vaccination. During the outbreak investigation we evaluated reasons for non-vaccination.

### METHODS

Between October 2007 and May 2008, we conducted an outbreak investigation as a result of notification of suspected cases of measles in Jewish schools in Antwerp. We collected patient characteristics through a structured questionnaire, did active case finding and laboratory tests with virus isolation and genotyping. Using the questionnaire we explored MMR vaccination status and reasons why children were not vaccinated.

### RESULTS

A total of 138 cases were identified, aged 0 to 35 years. For at least 7 cases, a link with an outbreak in the same community in the UK and Israel was established. Vaccination status was known for 129 cases, of which 22% were vaccinated. The main reasons for not having vaccinated children were: doctor's advice or vaccination not presented (37%), forgotten (26%) and allergy or frequently ill (24%). In only 9 cases (13%), belonging to 4 families, parents opposed to vaccination. The absence of follow-up of vaccination in private Jewish schools contributed to a lower vaccination coverage in the Jewish communities.

### CONCLUSIONS

The elimination of measles poses the challenge of identifying and vaccinating particular risk groups. This outbreak investigation provided important information and guided the implementation of control measures, such as information and vaccination campaigns. Fortunately, high overall MMR coverage (94%) in Antwerp prevented spread of the outbreak to the general population.

**12.3 Reference: 20080083****Track: Outbreak investigations****A UK-wide Outbreak of Salmonella Typhimurium phage type (PT) U320 infection, February-March 2008***Naomi Boxall, Katy Hutton, Iain Gillespie, Chris Lane, Elizabeth de Pinna, Bob Adak*

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**BACKGROUND**

Between 01 and 17 March 2008, the HPA Centre for Infections reported 79 isolations of a newly-identified phage type (PT) of Salmonella Typhimurium, defined as PT U320, from cases of infection in England and Wales. Cases were also reported from Scotland and Northern Ireland. Onset dates indicated a point source epidemic, from 14-27 February 2008.

**METHODS**

We conducted a retrospective, unmatched case-control study by telephone. Cases were symptomatic residents of the UK whose strain of *S. Typhimurium* PT U320 was received and confirmed after 01 March 2008, with no history of foreign travel or close contact with other symptomatic individuals in the 3 days before onset. Controls were non-diarrhoeic UK residents who did not travel outside of the UK or have contact with a diarrhoeic person in the 3 days before interview. Exposures to a variety of food items were obtained during telephone interviews, collated in MSAccess and analysed using Stata v10.

**RESULTS**

We interviewed 42 cases and 85 controls. Cases ranged from 1-79 years (mean=40) and controls from 9-91 years (mean=54, Students T test  $p=0.0004$ ). There were more females than males in both sets (cases 74%, controls 76%). Cases were more likely to report the consumption of pre-packaged egg sandwiches (OR: 3.77, 95%CI: 1.34-10.57), with 8/15 reporting consumption of egg sandwiches from one retailer.

**CONCLUSIONS**

The identification of one vehicle did not explain all cases in the outbreak. Collaborative work with the retailer is underway to identify the source. This, in conjunction with the duration of the outbreak, suggests that the vehicle of infection had a short shelf-life.

12.4 Reference: 20080259

Track: Outbreak investigations

## An outbreak of Influenza-associated epidemic myositis in Germany, 2007/2008

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### BACKGROUND

Epidemic myositis (EM) is a rare syndrome following several viral infections, primarily affecting children. The characteristic severe muscle pain and walking difficulties can be misjudged as a severe neurological disorder. EM is not notifiable in Germany. In February 2008, an increase of EM cases was seen by paediatricians in North Rhine-Westphalia. A nationwide investigation was started to verify the outbreak and its extent and identify whether influenza virus contributed to this outbreak.

### METHODS

We performed active case finding through local health authorities and a paediatric internet platform. Cases were defined as children up to 18 years of age with acute onset of severe pain in calf muscles developing after a febrile illness between 1.10.07–1.6.08. Clinicians were asked to send back questionnaires on symptoms, laboratory results and number of EM-patients seen in previous years. The National Reference Laboratories offered PCR-testing of patients' samples for Influenza- and Enterovirus.

### RESULTS

Altogether 357 cases were recorded by 258 physicians from all regions in Germany, whereas in 2003-2007 only 2-43 cases/yr had been seen by those physicians. Fifty % of cases presented between 18.2. and 19.3.2008, 59% appeared in 3 western federal states. Among cases were 258 (72%) boys, median age was 8 years. Symptoms resolved completely after a mean of 4,5 days, only one severe complication (rhabdomyolysis) was reported. Of 92 cases tested for Influenza, 48 (52%) were positive for Influenza B, 3 (3%) for Influenza A. Enterovirus-PCR was negative in all tested 67 stool samples.

### CONCLUSIONS

This unusual manifestation of Influenza may cause a substantial burden among children and their families. Increased awareness among paediatricians about the generally benign outcome could prevent unneeded diagnostic procedures and parental anxiety.

12.5 Reference: 20080094

Track: Outbreak investigations

## Rubella outbreak nested in a measles outbreak in Algeciras, Spain, 2008

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### BACKGROUND

In 2005 the World Health Organisation (WHO) European Region published a new Strategic Plan 2005-2010, with the objectives of eliminating measles and rubella and preventing congenital rubella infection. A measles outbreak has been notified in February 2008 in Algeciras, in the south of Spain. The laboratory identified rubella cases. Objectives: to confirm and to describe a rubella outbreak nested in the Algeciras measles outbreak.

### METHODS

Case definition: a rubella laboratory-confirmed case is a ruled out measles case with IgM negative and a positive laboratory result for rubella; a rubella epidemiologically linked case is a rubella clinical case who contacts with a rubella confirmed case. A descriptive study was made and the main variables analysed

### RESULTS

In mars 2008 the rubella outbreak was declared. To date a total of 18 cases has been reported, 15 laboratory confirmed and three epidemiologically linked. The cases age ranges from 20 months to 39 years old; plus 70% of cases were more than 20 years old. A half of cases were female. Of the confirmed cases only one case had been vaccinated previously. In samples taken from 13 patients a 2b rubella virus genotype has been isolated. In a sample from a recently vaccinated case was isolated 1a rubella virus genotype similar to the vaccine Spanish genotype.

### CONCLUSIONS

We confirmed a rubella outbreak nested in the Algeciras measles outbreak tanks to a correct application of Plan of Measles and Rubella Elimination. The control measures include isolation of the case and protection of susceptible contacts. Outbreak spread could be explained regarding the susceptible groups age distribution: people born before the MMR vaccine introduction or in the period with very low rate coverage vaccine.

12.6 Reference: 20080037

Track: Outbreak investigations

## Pseudo-outbreak of *Salmonella enterica* subspecies *diarizonae* caused by contamination of commercially-prepared blood agar culture media

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### BACKGROUND

*Salmonella enterica* subspecies *diarizonae* (S. IIIb) is known to cause infection in reptiles, sheep and other animals and is an uncommon human pathogen. The objective of the study was to investigate the cause(s) of an increased incidence of human cultures growing S. IIIb in France in 2008.

### METHODS

A case was defined as a person with S. IIIb serotype 61:k:1,5,7 or monophasic 61:-:1,5,7 isolated from a clinical specimen between 01/01/08 and 15/05/08 and confirmed by the National Reference Center for Salmonella. We reviewed medical records of case-patients and identified the material used during surgical or other invasive interventions and for bacterial culture.

### RESULTS

Ten cases were reported, in 10 hospitals in 7 regions. SIII was isolated from various anatomical sites. None of the case-patients had symptoms suggestive of salmonella infection. 1 patient received a 6 week course of antibiotics. Trace back investigations have not revealed a common surgical material used among the 10 case-patient but have indicated the use of culture media containing sheep blood agar coming from a manufacturer. This manufacturer has confirmed having identified contamination by S IIIb of certain batches of its media related to the sheep flock providing blood for their production. On 11/06/2008, the manufacturer informed its customers about the potential contamination by S. IIIa or S.IIIb of these blood agars.

### CONCLUSIONS

Our investigation strongly suggests that the increased number of S. IIIb serotype 61:k:1,5,7 or monophasic 61:-:1,5,7 isolates resulted from contamination of sheep blood agars. Our findings emphasize the need for early reporting of such incidents to health authorities, in order to avoid unnecessary treatment of patients.

12.7 Reference: 20080222

Track: Outbreak investigations

## Shigella sonnei-outbreak in a kindergarten in Berlin, Germany, October – November 2007

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### BACKGROUND

On 05.11.2007 a laboratory diagnosed case of *Shigella sonnei* infection in a staff member of a kindergarten was reported to the Health Office Friedrichshain-Kreuzberg, Berlin. Screening of stool samples from individuals associated with the kindergarten found additional cases. An investigation was conducted to determine dimension of the outbreak and to identify a common vehicle or any other causes for transmission, in order to control the outbreak.

### METHODS

A case was defined as a person associated with the kindergarten with laboratory confirmed *S. sonnei* infection and the date of onset of gastrointestinal symptoms or laboratory diagnosis 25.10.-27.11.2007. The kindergarten and households of cases were visited. Data about symptoms, food consumption, travel history and personal hygiene management were collected through exploratory interviews. *S. sonnei* isolates were subtyped by phage typing, antibiotic resistance profile, plasmid-analysis and pulsed-field gel electrophoresis.

### RESULTS

Over 6 weeks, 13 cases were identified: 7 children (2-9 years) and 6 adults (23-54 years). Eight were children or staff members of the kindergarten (attack rate:  $8/25=32\%$ ). Five were family contacts. Ten showed gastrointestinal symptoms. One case was admitted to hospital. No point source of infection could be identified. In the kindergarten, no hygiene plan was implemented, and no supervised hand hygiene of children after defecation was carried out. Sanitary practices in a family with 3 cases were poor. Five isolates were subtyped and found to be identical.

### CONCLUSIONS

Our results suggest person-to-person transmission. The poor hygiene management in the kindergarten and the family probably contributed to maintaining the chain of infection. We recommended implementing a hygiene plan in the kindergarten and controlling hand hygiene of children both in kindergarten and household.

12.8 Reference: 20080093

Track: Outbreak investigations

## Measles outbreak in Algeciras, Spain, 2008

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### BACKGROUND

A Plan of Action for Measles Elimination was approved in Spain with the objective of eliminating indigenous measles by 2005. On February 2008, the Andalusia Epidemiological Surveillance Network was notified of a measles outbreak in Algeciras, in the south of Spain. Objectives: to confirm and to describe a measles outbreak.

### METHODS

Case definition: a measles case is a suspected clinical case confirmed by laboratory or by epidemiological link. A descriptive study was ruled out.

### RESULTS

The first two cases notified were young adults belonging to the crew of a shipping company covering the Algeciras-Tangiers route. To date 243 suspected cases had been reported. The highest incidence rate occurred among children younger than two and adults between 20 and 39 years old. The outbreak has been restricted to the town of Algeciras and the nearby municipalities. The 32% of cases have been shown to be epidemiologically related. Cases have been confirmed: 114 by laboratory, 15 by epidemiological link and one by being clinically compatible. Of the suspected cases, 13% had been vaccinated previously. A D4 measles virus genotype has been isolated in samples taken from at least 55 patients; this genotype had an identical sequence to that identified in the United Kingdom in 2007. The control measures include isolation of cases and vaccination of susceptible contacts and infants between six and 15 months.

### CONCLUSIONS

A measles outbreak was confirmed in the area. Because the measles virus circulates in the areas with a high person traffic like Algeciras harbour, is necessary the maintenance of a high immunity rate: at least 95% of the not immune population should receive two doses of the combined measles, mumps and rubella (MMR) vaccine.

13.1 Reference: 20080012

Track: Respiratory Diseases

## Impact of PCV7 on Invasive Pneumococcal Disease in Scotland

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### BACKGROUND

In September 2006, the 7-valent pneumococcal conjugate vaccine (PCV7) was introduced into the Scottish Routine Childhood Immunisation Programme with a catch-up campaign to two years of age. There is a concern that there will be an emergence of serotypes not contained in the 7-valent vaccine. This study evaluated the impact of the 7-valent pneumococcal conjugate vaccine on invasive pneumococcal disease (IPD) in Scotland in children less than two years of age.

### METHODS

Health Protection Scotland has routinely collected data on IPD as part of the European Antimicrobial Resistance Surveillance System (EARSS) since 2003. Data collected between September 2004 and March 2008 inclusive were analysed for this study. Serotype distribution and antimicrobial resistance was investigated.

### RESULTS

The total number of cases of IPD in Scotland has decreased since the introduction of the PCV7 into the Scottish Routine Childhood Immunisation Programme. The number of cases in the under two year old population has statistically significantly reduced. There has been an increase in some serotypes not covered by the vaccine. This is particularly the case with the emergence of serotype 35B where a significant increase in the number of cases was observed.

### CONCLUSIONS

The introduction of PCV7 into the routine childhood vaccination schedule in Scotland has resulted in a decrease of the incidence of vaccine-serotype IPD, and consequently a fall in the overall incidence of IPD. A decline in IPD incidence in children less than two years of age has also been observed. There has been an increase in susceptibility to penicillin, erythromycin and ciprofloxacin. An increase in the numbers of serotypes not covered by the vaccine has been observed which highlights the fact that continued surveillance of IPD is essential.

13.2 Reference: 20080245

Track: Respiratory Diseases

## Chlamydia pneumoniae infections in Taiwan: high prevalence in eastern regions

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### BACKGROUND

Chlamydia pneumoniae is a species of chlamydiae bacteria that infects humans and is a major cause of respiratory infections worldwide. This bacterium is considered responsible for about 6-20% of community-acquired pneumonia cases. This atypical bacterium commonly causes pharyngitis, bronchitis and atypical pneumonia mainly in elderly and debilitated patients but in healthy adults also. Re-infection is common after a short period of immunity. In this study, seroprevalence of C.pneumoniae in eastern Taiwan was investigated.

### METHODS

A total of 200 plasma samples were collected in the years 2007-2008 and tested for specific C.pneumoniae antibodies by Enzyme-linked Immunoassay (ELISA). IgG titer was quantitatively measured according to different reference standards (100 U/ml, 250 U/ml, 500 U/ml and 1000 U/ml). These samples were derived from blood donors residing three major cities in the eastern parts of the island Taiwan: Yi-lan, Hua-lien, and Tai-tung. Acute C.pneumoniae infections were judged by high titer of IgG antibody and/or presence of IgM titer.

### RESULTS

The results showed that 88% of the subjects were IgG positive. Of those, 59% with high titer of IgG (> 500 U/ml) were estimated to have subsequently acquired a current or acute infection during this study period. The high titers of IgG (>500 U/ml) are shown to be correlated with the presence of IgM.

### CONCLUSIONS

The study provided the status of current respiratory infections of C.pneumoniae in eastern Taiwan. The high prevalence rate underscores the continuous circulation of the infection in these regions. Our data implicated, alternatively, that re-infections or chronic infections of the bacterium around these areas may occur in a frequent way. These results can help healthcare authorities constructs a new strategy for preventing outbreaks or limiting the spread of C.pneumoniae.

13.3 Reference: 20080196

Track: Respiratory Diseases

## Risk factors associated with the sputum smear and culture conversion of tuberculosis patients in Valencian Community (Spain) - 2007

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### BACKGROUND

Epidemiological Surveillance Analysis (AVE) system of Valencian Community recollects data of notifiable diseases from primary care, hospitals and Microbiological Surveillance Network. This system provides useful information for control measures of public health problems such as tuberculosis, which requires decrease of infectiousness in order to control the disease. The objective of this study is to determine factors associated with the time of conversion sputum smear and culture in patients treated for respiratory tuberculosis.

### METHODS

Using data from AVE, we studied cases of respiratory tuberculosis with sputum smear and culture positive tests. Conversion time was defined as time of follow up between start of treatment and the first negative test. We estimated the cumulative risk of conversion by the method of product-limit and Kaplan-Meier curves. We compared the survival curves by factors associated with the time of conversion by log-rank test. We evaluated the factors associated with the time of conversion calculating Cox-proportion Hazard Ratio (HR).

### RESULTS

We studied 295 cases with an age average of 39.0 years (SD=15.22), 67.16% were men and 26.78% were immigrants. We found conversion in 143 cases (48.4%). The median time of conversion was 86 days (SD=9.27). Adjusting for age and sex, we found that immigrants had a HR of 2.16 (95%CI=1.44-3.25) times higher than Spanish to conversion.

### CONCLUSIONS

Epidemiological Surveillance System of Valencian Community has demonstrated its importance as a source of information for development of future research in tuberculosis. The time conversion is higher than reported by others studies. Results suggest that immigrants test of tuberculosis turned negative earlier than Spanish regardless other variables. An explanation of these findings requires a more comprehensive analysis in future studies.

13.4 Reference: 20080075

Track: Respiratory Diseases

## Prevalence of silicosis among silica exposed workers in high risk enterprises at Thai Nguyen province North of Vietnam

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### BACKGROUND

Silicosis is a fibrotic disease of the lung caused by the inhalation, retention and pulmonary reaction to crystalline dust; and commonly known as crystalline forms. Thai Nguyen is one of the first industrialized provinces in the North of Vietnam. The working environment of workers were polluted and over controlled also by silica dust. This study to determine the prevalence of silicosis among silica dust exposed workers in high risk enterprises at Thai Nguyen.

### METHODS

The study population was a systematically selected group of 890 exposed workers from 3 enterprises (metallurgy, coal mine and machinery manufacturing occupations). Selected workers were taken health examination, full size posterior chest X-ray, and a lung function test. Total dust, respirable dust and free silica concentration were measured and analyzed. Prevalence rate ratio with 95% confident intervals and Chi-square test were used in the data analysis.

### RESULTS

Dust samples exceeded national standards 2-4 times, especially in casting workshop. Free silica content was range from 0.2-9.6%. The prevalence of silicosis was 8.4%. There is significant relationship between duration of exposure and risk of silicosis (Chi-square test for trend,  $p=0.001$ ). Workers with more than 10 years of exposure were found to have increased rate of silicosis compared with workers who have less, prevalence rate ratio = 2.45 (95% CI=1.24-4.85). There is higher rate of restrictive and obstructive disorders in lung function test, prevalence rate ratio=3.66 (95% CI=2.07-6.47) and =32.87 (CI=15.46 95% CI=15.46-69.90) respectively. Prevalence of silicosis is highest at machinery occupation: 14.3%.

### CONCLUSIONS

Prevalence and risk of silicosis among exposed workers in enterprises at Thai Nguyen province is high. Preventive measures and medical surveillance should be implemented for all of silica dust exposed enterprises in location of Thai Nguyen.

13.5 Reference: 20080190

Track: Respiratory Diseases

## Multidrug-resistant Tuberculosis (MDR TB) incidence in Rome

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### BACKGROUND

Resistance to antituberculosis drugs is increasing globally, and transmission of drug resistant tuberculosis has been shown among marginalised groups in urban areas, such as Rome.

### METHODS

We report a retrospective analysis of 25 MDR/XDR-TB patients followed at the National Institute for Infectious Diseases L. Spallanzani (INMI) in Rome from 2003 to 2007.

### RESULTS

In the last 5 years (2003-2007), 601 culture proven TB patients were cared for. Out of them 25 (4.16%) had MDR-TB. During this period the proportion of MDR-TB rose from 1.8% in 2003 to 6.4% in 2007. Age of MDR-TB patients ranged from 15 to 51 years with a mean of 22 years; 12 were women and 4 were coinfecting with HIV. Strains of M tuberculosis isolated from MDR-TB patients were resistant on average to 3 first line TB drugs, and one strain had a resistance pattern matching the definition of "extremely drug-resistant" TB; 14 patients had received a previous antituberculosis treatment. Only 2 patients (8%) were born in Italy, 12 (48%) were from Eastern Europe, 6 (24%) from South America and 5 (20%) from Africa and Asia; 8 patients were lost to the follow up (32%) and one non-HIV died for respiratory complications in spite of converting to negative sputum culture.

### CONCLUSIONS

In Rome, Italy, we observed a sharper increase in MDR-TB incidence. This increase is primarily related to migration from countries with high prevalence such as Romania, Perù and Ukraine. This observation underlines the importance of improving the quality of TB care in high MDR-TB burden countries and of setting up surveillance for possible spread of MDR-TB strains in low incidence countries.

13.6 Reference: 20080058

Track: Respiratory Diseases

## A cluster of Tuberculosis infection in Sandwell, England. A frontline investigation

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### BACKGROUND

Prospective typing of new isolates of *Mycobacterium tuberculosis* is undertaken regionally to support the timely identification of clusters of TB infection and improve the effectiveness of public health control measures. A routine review of typing data identified a local cluster of tuberculosis, which was investigated to identify any epidemiological links between cases.

### METHODS

A descriptive/analytical study was undertaken retrospectively. Demographic and clinical data were collected from the regional enhanced tuberculosis surveillance database with clinical information from the local TB clinic. Data analysis was undertaken using Microsoft © Excel and Analyze-it ©.

### RESULTS

18 cases of TB infection caused by the cluster strain were identified in the area between January 2003 and June 2007. The mean age of cases was 39 years and 55% were male. Compared with controls, cases were more likely to be aged 35 to 54 years (OR 3.58, 95% CI: 1.26 to 10.15). 55% of cases were of South Asian ethnicity and 39% were White. Compared with controls, there were more South Asian (OR 2.63, 95% CI: 0.93 to 7.55) and fewer Black Caribbean cases (OR 0.19, 95% CI: 0.025 to 1.55), although these differences were not statistically significant. Geographically, cases resided in areas surrounding six pubs, which cases visited on a regular basis. An analysis of risk factors for infection did not identify any other epidemiological links.

### CONCLUSIONS

The findings from the study revealed that cases did not share any common risk factors other than their patronage of a group of pubs in the area, which may have been the setting for transmission of infection. This has led to increased public health campaigns and outreach work in social settings in the area.

13.7 Reference: 20080082

Track: Respiratory Diseases

## Analysis of epidemiological patterns during a century of scarlet fever

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### BACKGROUND

In light of an upsurge in scarlet fever cases seen in the UK in 2008, a longitudinal analysis of notifications and mortality statistics was undertaken.

### METHODS

Notifications of scarlet fever from 1912 to 2008 (week 24) collated successively by the Registrar General's Office, the Office for National Statistics and the Health Protection Agency were analysed to identify a) cyclical patterns of disease over time b) trends in age and sex patterns c) changes to the seasonal patterns of infection. Death registrations for scarlet fever (underlying cause) coded according to successive ICD classifications from 1901 onwards were examined alongside notifications.

### RESULTS

Between 1912-1950, rates of scarlet fever notifications fluctuated from 139 to 447 per 100,000 population. Although the overall trend in notifications over the century was one of dramatic decline, interesting cyclical patterns are evident, with cases showing an upsurge every 3-9 years (mean 6 years). Seasonal patterns were broadly consistent, peaking at week 11-14 (1982-2007). Preliminary data for 2008 indicate this season to have been a peak year for notifications; 85% of cases were less than 10 years old (mode 4 years; range 0-79) and 50% male. Deaths attributed to scarlet fever broadly mirrored the same cyclical pattern of notifications, falling dramatically from 13/100,000 in 1901 to become exceptionally rare; 16 deaths were recorded from 1960-2006, with the last recorded death in 2000.

### CONCLUSIONS

The public health burden of scarlet fever in the UK has fallen markedly over the past century, a likely reflection of improved living conditions, improved treatment and control strategies, and a possible diminution in virulence of circulating strains. Scarlet fever continues to have an impact, however, with outbreaks in schools occurring each year.

14.1 Reference: 20080115

Track: Surveillance

## Prevalence of syphilis in a population of intravenous drug users (Lisbon, Portugal)

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### BACKGROUND

Syphilis is an infectious disease caused by *Treponema pallidum*. This disease is primarily sexually transmitted, however, among intravenous drug users (IDUs), transmission by contact with contaminated body fluids, such as blood, can occur. The prevalence of cases in the Portuguese population is about 13 per million inhabitants. The objective of this work was to evaluate the prevalence of syphilis among a IDUs population during 5 years (2002-2006).

### METHODS

A total of 3269 IDUs, attending drug users support centres in Lisbon, were included in this study (mean age 35 years, 77.0% male). The VDRL assay was used for screening and positive results were confirmed with TPPA (*Treponema pallidum* Particle Agglutination).

### RESULTS

The mean prevalence observed was 8.8%, but during the 5 year period the prevalence has shown a tendency to decrease (11.0% to 7.3%). Approximately 50% (n=143) of the individuals with positive results were included in the age category 30-39 years. In all age categories, the percentage of positive results in women was higher than in men. Overall, 21.5% of the women presented positive results but only 5.1% of the men were positive.

### CONCLUSIONS

The positive cases prevalence has been decreasing since this IDU support programme started (2001), perhaps as a result of several disease control policies, such as syringe exchanges programs. Despite the smaller number of women included in this study (n=752, 21%), the percentage of women positive for syphilis was much higher than the percentage observed in the male population, probably due to female prostitution. This study shows that syphilis is still common in individuals with high risk behaviours, indicating that, to improve public health, successful control and eradication programs must maintain the focus on these populations.

14.2 Reference: 20080072

Track: Surveillance

## Population-based assessment of incidence and outcome of bloodstream infections in Finland, 2004-2007

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### BACKGROUND

Bloodstream infections (BSI) cause major morbidity and mortality. However, there are few population-based data assessing trends in incidence and adverse outcomes.

### METHODS

All Finnish clinical microbiology laboratories notify bacterial and fungal blood-culture isolations to the National Infectious Disease Registry (NIDR). Each mandatory notification contains date of specimen, National Identification Number and place of treatment. A case of BSI was defined as a patient with bacteria or fungus isolated from blood culture and reported to NIDR during 2004-2007. Possible date of death was obtained from the National Population Information System using the unique personal identifier.

### RESULTS

A total of 36,268 BSI cases were reported (average annualized incidence, 172/100,000 population). Of BSI cases, 53% occurred among persons aged >64 years. Rates were higher in males than in females (182 vs 163/100,000). The most common etiologies were *Escherichia coli* (27%), *Staphylococcus aureus* (12%), coagulase-negative staphylococci (11%) and *Streptococcus pneumoniae* (8%). Of the BSI cases, 13% died within 30 days of culture; 32% of the deaths occurred within 3 days and 50% within 7 days. Case fatality increased by age beginning at age 35-44 years and was higher in males than in females (17% vs. 13%). *E. coli* and *S. aureus* were most common causes of death (17% and 16% of all fatal cases).

### CONCLUSIONS

Incidence and case fatality from BSIs were highest in the elderly and they were also higher in males than in females. Case fatality was substantial within the first few days. *E. coli* was the most common etiology of BSI, while *E. coli* and *S. aureus* were equally common causes of fatal BSI. Population-based surveillance information should be used to set research priorities and allocate resources.

14.3 Reference: 20080225

Track: Surveillance

## Assessment on exhaustivity of the surveillance system for pulmonary tuberculosis using "capture-recapture" method, Balearic Islands, Spain, 2005

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### BACKGROUND

Epidemiologic Surveillance System (ESS) for TB in Balearic Islands includes The Mandatory Notifiable Diseases (MND) and the Hospital Basic Data Set (HBDS). The computerised system of medical records, Primary Health Care (eSIAP), could be used as other source of information. The objective of this study is to assess the exhaustivity of the surveillance system using those three sources of data.

### METHODS

We conducted a capture-recapture study (C-R) on pulmonary TB cases during 2005. We have used three sources of data: MND, HBDS and e.SIAP. We applied a log-linear regression using EPIDAT 3.1. We determined the likelihood ratio (G<sub>2</sub>) and the Bayesian Information Criterion (BIC) to select the model that better fits our data sources. We estimated the total number of tuberculosis cases with a 95% confidence interval (95%CI) and the exhaustivity of data sources.

### RESULTS

The most appropriate log-linear model seems to be the one that assumes MND and eSIAP a independent of HBDS. This also is in accordance with our knowledge of these sources. The total estimated number of TB cases is 295 (CI 95%: 260- 330).The exhaustivity of MND is 51.5%, 39.7% for HBDS and 35.6% for e.SIAP. The highest exhaustivity (73.9%) is estimated using both MND and HBDS.

### CONCLUSIONS

Results suggest a low exhaustivity of the system. Adding e.SIAP source does not increase the exhaustivity because all tuberculosis cases are reported to MND or referred to hospital (HBDS). We recommend the reinforcement of TB cases monitoring in all sources specially in Hospitals.

14.4 Reference: 20080229

Track: Surveillance

## Invasive Group A Streptococcus Infections in France in 2007

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### BACKGROUND

Invasive Group A Streptococcus (iGAS) infections cause severe, life threatening diseases and can be clustered. We did a prospective survey to estimate incidence of iGAS infections incidence in France, describe clinical manifestations and characterise the GAS strains.

### METHODS

The study was conducted between November 2006 and November 2007 in 214 hospitals covering 57% of French medical care inpatients admissions. iGAS infections corresponding to the case definition were identified by hospital microbiologists who completed a questionnaire with the infectious diseases specialists. GAS strains were characterised by their molecular markers and sensitivity to antibiotics. Incidence of iGAS infection was estimated using the proportion of french medical care inpatients admissions covered by the participating hospitals.

### RESULTS

We identified 665 iGAS infections corresponding to an annual incidence of 2/100 000 population. GAS was isolated from blood cultures (69%), from other sterile sites (19%) and from non sterile sites (11%); cases median age was 55 years (range: 0-103 years). The two most frequent clinical presentations were bacteraemia without focus (26%) and skin/soft tissue infections (26%). The case fatality ratio at 7 days was 14%, reaching 43% in case of shock. In 16% of the cases, a risk factor for GAS infection was found in one of the household members of the case. Nine clusters were identified: six post-partum clusters, two in families and one in a nursing home. Of 625 GAS strains, 60% belonged to three emm genotypes: emm1, emm 89 and emm28; 7% of the strains were resistant to Erythromycin and 11% to Tetracyclin.

### CONCLUSIONS

Our study confirms the severity of iGAS infections, estimates it's burden in France and assessed the risk of secondary cases, mainly through nosocomial transmission.

14.5 Reference: 20080242

Track: Surveillance

## Increase of proportion of hospital admission in a 600 bed hospital due to *Clostridium difficile* associated diarrhea (CDAD). Retrospective cohort study 2004-2007

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### BACKGROUND

*Clostridium difficile* associated diarrhea is a rising problem in German hospitals. We investigated time trends in the proportion of *C. difficile* as admission diagnosis, hospital acquired cases, and arisen complications.

### METHODS

All laboratory confirmed *C. difficile* infections (stool samples positive for toxin A/ B) from January 2004 up to June 2007 were selected in a 600 bed hospital. Hospital discharge summaries were reviewed for: hospital acquisition of *C. difficile*; recurrent infections of *C. difficile*; antibiotic therapy given three months prior to diagnosis of CDAD; complication of CDAD like severe enterocolitis e.g., death caused by CDAD within 30 days of diagnosis, CDAD as cause of hospital admission, and therapy of CDAD. Proportions were calculated on a half year basis; trends over time were determined by regression analysis.

### RESULTS

In total 298 CDAD cases were investigated. There was a sharp increase in numbers of cases from 2004 (37 cases) to 2005 (93 cases) and a plateau of about 55 cases per half year since the first term of 2006 (1/2006). Comparing the first half year of 2004 to that of 2007, the proportion of hospital acquisition decreased from 0.95 to 0.78, ( $p=0.09$ ). In the same period the proportion of CDAD as a cause of hospital admission increased from 0.10 to 0.42, ( $p=0.01$ ). The proportion of antibiotic therapy given in the three previous months of admission did not change significantly 0.80 to 0.87, ( $p=0.45$ ) as well as the proportion of complication 0.70 to 0.58, ( $p=0.34$ ).

### CONCLUSIONS

Proportion of CDAD as cause of hospital admission increased. Possible explanation might be a hidden source outside the hospital or sensitivity of admission diagnosis.

**14.6 Reference: 20080178****Track: Surveillance****Recent increase of listeriosis en France; what are the reasons?**

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**BACKGROUND**

An increase in listeriosis in several European countries has been observed recently. In France, incidence that was stable, from 2001 to 2005 has increased in 2006 and 2007. This increase affects essentially persons > 60 years of age (+51%, between 2001-2005 and 2006-2007) presenting with bacteraemia. We explored reasons for this increase in France.

**METHODS**

Available data on factors that could contribute to this increase were reviewed. Data from mandatory reports of listeriosis, from the national insurance scheme, and from food surveys and product recalls were gathered. As a new regulation on salt intake was recently established at EU level, data on the growth of *Listeria monocytogenes* (Lm) on food according to NaCl were analysed.

**RESULTS**

Surveillance data did not show an increase in the proportion of cases with immunosuppressive treatment or of cases with consumption of products that could be contaminated by Lm. An increase in blood cultures (+15%) in persons aged  $\geq 60$  years was observed in 2006. There was no increase in the proportion of food contaminated by Lm at retail or in the number of product recalls made. *Listeria* growth is dependant on the proportion of salt but the effect of lower salt proportion seems to contribute less to *Listeria* growth than other factors such as refrigeration temperature or shelf life.

**CONCLUSIONS**

We did not identify any factor that could account for the increased incidence of listeriosis in persons aged  $\geq 60$  years from 2001-2005 to 2006-2007. Some factors like increased blood culturing may have contributed. Exchange of information between European countries concerned by this increase could be informative in exploring more hypotheses on other factors not considered by this study.

14.7 Reference: 20080188

Track: Surveillance

## Duration and severity of common *Salmonella* serotypes from sentinel surveillance in England

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### BACKGROUND

Every year, the Health Protection Agency receives over 10,000 reports of salmonella from England and Wales. Recently, studies of the invasiveness of salmonella serotypes have been conducted across Europe. We conducted an investigation into differences between severity and duration of the most frequently occurring serovars in England using sentinel surveillance data from a project run between November 2004 and October 2007 involving 57 local administrative authorities.

### METHODS

Questionnaires were completed for 2,419 cases of salmonella infection where the serotype was identified. We excluded serotypes infecting fewer than 15 cases. These were linked to blood test results for the same people, and the nature, severity and duration of illness amongst the most common serotypes was compared descriptively.

### RESULTS

The mean duration of symptoms by serotype ranged from 7 to 14 days. Serotypes with the longest duration were Senftenberg (14 d) and Schwarzengrund (12.6 d). Schwarzengrund had the highest proportion of individuals hospitalised (33%), the second highest was Typhimurium (20%). Four percent of cases included had a blood sample taken. *Salmonella* Typhi and Paratyphi (A and B) cases had the most blood isolates at 64% and 50% respectively, followed by Montevideo (5%), Virchow and Stanley (both 3%). All serotypes reported high levels of diarrhoea (86%). Montevideo infections led to the highest proportion of bloody stools (36%), whereas Kentucky led to none. Stanley had a high proportion of cases under 10 years old (38%) where as Schwarzengrund had the highest proportion in the elderly (over 65y, 33%).

### CONCLUSIONS

Understanding differences in salmonella serotypes can help us assess economic and public health impact. Further progress could be achieved through the introduction of routine national surveillance addressing severity and duration.

14.8 Reference: 20080226

Track: Surveillance

## Enhancing surveillance of Hepatitis B infection in pregnant women: adding case-based data for public health action - London, England, 2008

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### BACKGROUND

United Kingdom (UK) Hepatitis B virus (HBV) infection prevalence ranged from 0.03% to 1.75% in 1999, being highest in London. Antenatal Infection Screening surveillance (AISS) screens pregnant women for hepatitis B, reporting aggregate data. There is incomplete data on women tested, and difficulty assessing uptake of testing and vaccination for family contacts. We present preliminary data from a pilot enhanced surveillance initiative, aiming to provide case-based information on HBV infection in pregnancy, to improve public health interventions and guide policy development.

### METHODS

The population under surveillance comprises HBsAg-positive pregnant women attending 31 London Maternity Units (estimated at 1200 annually). Since early 2008, Units report individual antenatal (acute and chronic) HBV diagnoses using routine surveillance case definitions. Data submission, analysis and feedback occur quarterly.

### RESULTS

During first quarter of 2008, 120 pregnant women diagnosed HBsAg-positive were reported. Country of birth was known for 103 (86%). Four (4%) were UK-born, 11 (11%) from other (East European) EU countries, and 88 (85%) from outside the EU. Among 102 reporting ethnic group information, 48% were 'Black/Black British', 15% 'Chinese', and 14% each 'Asian/Asian British' or 'White – Other'. Where level of English was known, 52 (51.5%) of 101 recorded 'Basic' or 'Less than basic' level. Twenty (17%) of 115 were HBeAg-positive. Of these, 11 (55%) reported previous pregnancy.

### CONCLUSIONS

The proportion of HBsAg-positive pregnant women is higher among certain ethnic groups and those with less command of English. More than half of highly infectious HBeAg-positive women reported previous pregnancy, raising issues about other family members at risk of infection. Further analysis and merging of this data with AISS may facilitate audit of follow-up of babies born to HBsAg-positive mothers to ensure vaccination uptake.

## 15.1 Reference: 20080144

Track: Vaccine preventable diseases

**Varicella vaccine effectiveness: an assessment in Sicily**

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**BACKGROUND**

Since 2003 the vaccination schedule of Sicily has provided the varicella vaccination for toddlers (starting from fifteen months) up to susceptible twelve year old adolescents.

**METHODS**

A retrospective observational study was implemented - based on the Discharge Card Database, 2002-2006 – to assess the impact on hospitalizations related to varicella diagnosis (ICD-9:0.52). The data are divided by year, clinical seriousness and age: 0-15 months, 16-48 months, 5-14 years, 15-40 years, >40 years. Only for residents in the province of Catania was a check of the vaccination coverage carried out.

**RESULTS**

A total of 1,165 hospitalization data were collected. Considering the 346 registered in 2002 (the year before the introduction of vaccination) as baseline, an increasing reduction was observed: 2003 (-29%), 2004 (-35%), 2005 (-54%), and 2006 (-56%). Of the patients resident in the province of Catania none were vaccinated. The percentage reduction in the hospitalizations associated with a more severe clinical situation is more significant. Considering the 57 cases in 2002, the proportional reduction was: 2003 (-7%), 2004 (-30%), 2005 (-61%), 2006 (-67%). Concerning the trend of hospitalizations according to age, we observed that in the 0-15 month group the cases went from 69 in 2002 to 34 (-51%) in 2006. In the >15 years groups, for whom active proposal vaccination is not contemplated, the cases went from 94 in 2002 to 65 (-31%) in 2006.

**CONCLUSIONS**

The study shows that in Sicily varicella vaccination (2007, average 70% coverage in toddlers) is effective in reducing both simple and complicated cases of hospitalization. Moreover, now the vaccination is associated to herd immunity, which works in both individuals who cannot be vaccinated and those whom it is not offered to.

## 15.2 Reference: 20080045

Track: Vaccine preventable diseases

**Vaccination coverage in minority groups in Greece:  
A cross-sectional study**

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**BACKGROUND**

Childhood vaccination coverage in Greece is estimated using ad-hoc population-based surveys. We conducted a National Vaccination Coverage Survey using stratified cluster sampling, to estimate vaccination uptake in children belonging to minority groups and the general population attending the first year of Grammar School (about 6 years of age).

**METHODS**

The country was stratified into 6 regions and each region was subdivided into urban and rural areas. Each cluster contained a school classroom randomly selected from each region with probability proportional to size. All pupils of the selected clusters were asked to provide their vaccination booklet, recording their vaccination status. Weighted proportions were calculated to allow for sampling weights and clustering.

**RESULTS**

Of the 3,878 participants (response rate 88.4%), 303 (7.8%) were immigrants, 290 (7.5%) Greek Muslims and 52 (1.4%) Roma. The weighted proportion of children vaccinated with 2 doses of MMR was 78.5% (95% CI 76.1-80.7%) in the general population. The uptake in immigrants, Greek Muslims and Roma was 32% (RR 0.68 ; 95%CI 0.61-0.76), 3% (RR 0.97; 0.93-0.99) and 48% (RR 0.52 ; 0.37-0.76) lower than in the general population, respectively. Three doses of HBV vaccine were administered in 96.1% (95.3-96.9%) of the general population. The coverage in the three groups was 5% (RR 0.95; 0.92-0.98), 1% (RR 0.99; 0.97-1.00) and 34% (RR 0.7 ; 0.54-0.82) lower than in the general population, respectively. Similar patterns were observed for most, but not all, vaccines.

**CONCLUSIONS**

Uptakes in Roma may have been overestimated, as school children might not be representative of all children belonging to this group. Further policies are warranted to enhance vaccine uptake in some minority groups.

## 15.3 Reference: 20080155

Track: Vaccine preventable diseases

**Rubella outbreak in North-eastern Italy**

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**BACKGROUND**

In Italy, Rubella vaccination has been recommended since the early 1990s for all children in the second year of life. In Friuli Venezia Giulia (FVG) the MMR coverage in children ranged 89.0%-92.9% between 2000 and 2006. From January to June 2008 several cases of Rubella had been notified in the western province of the region.

**METHODS**

After the first cases had been notified in an institution for mentally retarded patients an active surveillance of rubella was established. Blood, pharyngeal swabs and urine samples were collected from cases and submitted for diagnosis confirmation to the regional reference laboratory. Serological and virological analysis was performed.

**RESULTS**

The first case of Rubella was notified on Jan 25th 2008 in a 29 yrs old unvaccinated male, who was resident in a protected structure. Epidemiologic investigation could detect a previous case in a 25 yrs old male in the same structure. Since then 129 cases of Rubella has been notified involving the open population too, 107 laboratory confirmed. The majority were males (75%), the mean age being 26 yrs in males and 24 in females. Three pregnant women had been infected at different gestational weeks, two terminated.

**CONCLUSIONS**

Laboratory assisted epidemic investigation is a an important tool in Rubella control when immunization levels are very high but not sufficient for eradication. In FVG about 90% of the cohorts born after 2000 had been vaccinated determining a reduction of Rubella circulation. The 2008 epidemic started in a structure for mentally handicapped patients but soon interested the open population with three cases in pregnant women. Epidemiological and laboratory investigation could describe the epidemic and individuate, among the contacts, susceptible subjects to whom the vaccination should be offered.

15.4 Reference: 20080234

Track: Vaccine preventable diseases

## Parental knowledge and attitudes towards childhood immunizations in Poland

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### BACKGROUND

Exceptionally high coverage for virtually all vaccines included in the childhood immunization schedule indicates their good acceptance in Poland. The parents' attitudes toward immunization were however not appropriately investigated previously. The main objective of the present study was to obtain information on parents' knowledge and their attitudes towards vaccinations.

### METHODS

Computer-assisted telephone interviews were collected from parents of children under 2 years of age. Two-stage sampling was used: first, a list of 3,000 households with children <2 years was quota-selected from a consumer database collecting contact information from 95% mothers during deliveries; random digit dialling was used to attempt the interview with parents. The 30-item questionnaire covered spontaneous awareness of parents, sources of information, and parents' attitude towards vaccinations.

### RESULTS

A total of 1045 interviews were collected, 960 from mothers, and 85 from fathers. Mean age of parents was 28.9 ( $\pm 5.4$ ). Mandatory vaccinations spontaneously recognized were: MMR 63%, DTP 58%, hepB 56%, TB 41%, polio 30%, PV (incorrectly) 10%. The main sources of information about immunization were GPs (83%), printed media (21%), primary care nurses (18%), and the Internet (16%). In terms of parents' perception of risk related to vaccines, pneumococcal vaccine was considered as risky by 27 persons (2.6%), and polio vaccine by 17 (1.6%). Only 17 parents (1.6%) have ever refused immunization their child has been offered, and 398 parents (38.0%) have paid for a vaccine recommended for their child.

### CONCLUSIONS

The present study revealed poor knowledge on childhood immunizations among Polish parents. This situation may lead to high impact of anti-vaccination argumentation. It needs to be addressed by improvement of reliable information on vaccines and vaccine safety in the Polish language.

15.5 Reference: 20080238

Track: Vaccine preventable diseases

## Measles - Related Hospitalisations and Complications in Children and Adolescents in Germany in 2007

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### BACKGROUND

Elimination of measles in Europe by the year 2010 is a major goal of WHO. The aim of this study was to evaluate hospitalisations of children due to complications of measles in Germany in 2007, emphasizing SSPE (subacute sclerosing panencephalitis) over the past five years. SSPE is a rare, late-onset, fatal neurological complication of natural measles infection.

### METHODS

Since 2003 active surveillance on hospitalised measles cases up to age 16 is conducted by the German Paediatric Surveillance Unit (ESPED). Data are collected monthly in children's clinics throughout Germany employing standardised questionnaires.

### RESULTS

In 2007 fourteen hospitalisations were reported. Hospitalisation of 11 children (median age 14 years [range: 1.6-15.7]) was due to acute measles infection. The most frequent acute complications were pneumonia (3) and other bacterial and viral infections (6). During this period 382 cases of measles were notified for Germany in this age range. Hospitalisation of 3 children (median age 8.9 years [range: 7.9 -14.1]) was due to measles related SSPE. Exploring SSPE further, surveillance by ESPED revealed 17 children with SSPE over the past five years (2003-2007), corresponding to approximately 3 cases per year [range: 0-7]. 71% (n=12) were male; 71% (n=12) had migrational background. All children had measles specific antibodies in cerebral fluid. The latency between measles infection and onset of SSPE were 9.1 years [range: 5.3-12.5]. 76% (n=13) of the children had received measles vaccination; according to the available records (n=8) vaccination were performed after measles infection.

### CONCLUSIONS

Measles surveillance by means of ESPED gives a rough estimate of measles-associated complications requiring hospital treatment including SSPE. The data emphasize the importance of a widespread immunisation against measles in Germany to reduce severe complications e.g. SSPE.

15.6 Reference: 20080121

Track: Vaccine preventable diseases

## Epidemiology of tetanus in Slovenia, 1998-2007

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### BACKGROUND

Tetanus is severe and often fatal disease, present worldwide. Tetanus is preventable through routine vaccination and appropriate management of contaminated wounds. Despite widespread availability of safe and effective vaccine the disease is still present in EU. Our aim was to present Slovenian surveillance data on tetanus.

### METHODS

Tetanus is mandatory reportable disease under Communicable Disease Law in Slovenia. Notified cases of tetanus that were reported to Communicable Disease Surveillance System (IVZ RS) in last 10 years were analysed. Additional epidemiological data were provided by regional epidemiological service.

### RESULTS

From 1998 through 2007, a total of 36 cases of tetanus were reported in Slovenia (annual incidence rate ranging from 0.05/100.000 to 0.45/100.000). All of these tetanus cases were diagnosed in persons older than 55 years, age varied from 56 years to 90 years (median, 76 years). The overall incidence by gender showed that 14% of these cases occurred in men and 86% in women. Most of the reported cases occurred in August and September (36%). There were 3 deaths among 36 cases; the overall case-fatality rate was 8%. For the 21 cases the data about mode of transmission (more than 50% cases had minor injuries; puncture 23%, abrasion 19%, and laceration 10%) and vaccination histories before injury (only one person was vaccinated) were available.

### CONCLUSIONS

Because tetanus is a serious disease the passive surveillance data most probably reflects the real epidemiological situation in Slovenia. We observed a decrease in incidence and mortality over 10 years. Tetanus is the disease of elderly, most of them had never been vaccinated. Health-care providers should be encouraged that every visit of the elderly should be used to review vaccination status against tetanus.

15.7 Reference: 20080252

Track: Vaccine preventable diseases

## Impact of Haemophilus influenzae type b (Hib) immunization on the incidence of Hib meningitis in Poland, 1997-2007

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### BACKGROUND

Since 2004, Hib vaccine was provided for free only to infants from orphanages and since 2005 to infants from families with more than 3 children. A substantial number of parents were paying for their children being vaccinated against Hib disease. As the last country in EU, Poland introduced the Hib conjugate vaccine in the universal childhood immunization schedule (2, 4 and 6, and 16-18 mo) in 2007. The study aims to assess the impact of Hib immunization on the epidemiology of Hib meningitis.

### METHODS

Aggregated data on Hib vaccination coverage and aggregated data on Hib meningitis from 1997 to 2007 were used in the study. In total 769 cases of Hib meningitis and encephalitis were included. The analysis was limited to meningitis cases because the whole-spectrum of Hib invasive disease was covered by the surveillance system only in 2005.

### RESULTS

In 1997-2006 the number of vaccinated children under 15 years of age has increased from 9,557 to 263,453. The preliminary data from 2007 indicate that 73,9% of 3-year olds were immunized against Hib. In the studied period the number of reported cases has decreased from 95 in 1997 to 33 in 2007. The highest incidence was recorded among children <2 years. The male:female ration has decreased from 2.0 in 1997 to 1.1 in 2007.

### CONCLUSIONS

Following a systematic increase in the proportion of children immunized against Hib, Hib meningitis incidence has dropped significantly in 1997-2007. At this stage a more detailed, individual-level analysis of epidemiological data on Hib disease is not possible. A more thorough monitoring of Hib incidence is currently implemented, with collection of individual-level reports and strain monitoring implemented at the new reference laboratory.

15.8 Reference: 20080084

Track: Vaccine preventable diseases

## Survey on the performance of the National immunization program in infants of Roma and Bulgarian origin in Sofia region

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### BACKGROUND

The immunization coverage administrative estimate, reported in Sofia region annually is high. However data about pockets of low coverage in some population groups and immunization's timeliness could not be obtained using administrative method only. The study objective is validating administrative coverage estimate, assessing immunization timeliness and identifying possible gaps in immunizations of Roma origin infants through conducting immunization coverage survey.

### METHODS

Personal cards were completed with information related to particular child immunizations, obtained from maternity hospitals and GPs. Vaccine coverage and timeliness were estimated for all infants in Sofia region born in 2006 – a total of 1,258 Bulgarian and 739 Roma children. The survey covers 1st January 2006 – 30th June 2007 and includes vaccine doses given to 0-18 months old children following the national vaccine schedule. On-time immunization is defined as receipt of vaccine within 30 days after the time fixed in the schedule. EpiData, EpiDataAnalysis, Excel and Chi-square statistics with confidence level 95% are applied.

### RESULTS

The survey shows lower vaccine coverage than estimated – 97.70% (HBV<sub>3</sub>), 98.40% (OPV/IPV), 98.10% (DTP<sub>3</sub>) and 98.70% (MMR). Almost 50% of the infants were immunized later than recommended. The proportion of fully and on-time immunized Roma infants is significantly lower. Fully immunized infants (%)\* Bulgarian Roma HBV<sub>3</sub> 88.16 80.11 OPV/IPV<sub>3</sub> 93.80 82.54 DTP/DT<sub>3</sub> 96.18 85.38 MMR 80.90 68.83 Immunized on-time (%)\* Bulgarian Roma HBV<sub>3</sub> 61.77 41.41 OPV/IPV<sub>3</sub> 53.34 28.01 DTP/DT<sub>3</sub> 57.15 29.23 MMR 68.81 50.00 \*p < 0.05

### CONCLUSIONS

The limited accuracy of routine administrative coverage estimates should be supplemented by coverage surveys, regularly conducted regionally and nationally. Coverage surveys will help to better monitor the immunization timeliness and to identify the clusters of population with lower vaccine coverage.

16.1 Reference: 20080023

Track: Surveillance Methodology

## Electronic hospital and deaths records as tools to identify an increasing incidence of zygomycosis in metropolitan France, 1997-2006.

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### BACKGROUND

Zygomycetes are common ubiquitous fungi which can cause severe opportunistic infections, particularly among immunocompromised or diabetic patients, with high lethality (up to 60%). The incidence of zygomycosis among these patients is seemingly increasing but population-based estimates are scarce. We analysed the hospitalisation and deaths records to estimate the incidence and case fatality rates (CFR) of zygomycosis in metropolitan France.

### METHODS

The electronic hospitalisation and death records linked to zygomycosis in metropolitan France from 1997 to 2006 provided information on patients' age, gender, underlying medical conditions and outcome.

### RESULTS

Over the ten-year period, 531 new zygomycosis cases were admitted in French hospitals: 283 men and 248 women. Median age was 60 years. Incidence increased from 0.7 cases per million persons in 1997 to 1.2 per million in 2006. Among 242 patients presenting at least one underlying disease (diabetes, neutropenia, other immunosuppressive conditions), incidence increased from 0.2 to 0.6 per million persons from 1997 to 2006. Ninety-two deaths were identified through both datasources (CFR:17.3%). The specific CFR was higher when patients presented a neutropenia (40.6%), acute leukaemia (28.6%), other blood disorders (41.7%) or a transplantation history (26.7%).

### CONCLUSIONS

The characteristics and outcomes of patients with underlying diseases are similar to those reported elsewhere. Improved diagnostic techniques and prolonged survival of immunocompromised patients may explain the increasing incidence of zygomycosis in the French population. Despite reporting biases, administrative data are valuable tools to estimate the trends of rare and severe diseases. This study has underlined the need to monitor the occurrence of severe fungal infections in vulnerable groups. In parallel, a retrospective study of patients identified through hospital datasets has started in order to get more information on this emerging infection.

16.2 Reference: 20080216

Track: Surveillance Methodology

## How can surveillance data comparability between countries be improved?

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### BACKGROUND

Controlling communicable disease is impossible without good surveillance. Recent reports using official epidemiological data derived from national surveillance systems in Europe showed that direct comparisons between countries is difficult. The purpose of this study is to review the literature on data comparability, outline the main determinants of incomparability, provide examples of measures to correct underestimates of disease incidence and to obtain some possible interventions to counter these factors that have been evaluated.

### METHODS

A systematic search of electronic databases was conducted using MEDLINE, EMBASE and Scopus database. Several query combinations related to known data comparability factors were used. Relevant references quoted in the papers retrieved were also reviewed.

### RESULTS

Completeness, accuracy and representativeness of the data, consistency of reporting and timeliness affect the general quality of the national surveillance system data. In addition 12 specific country factors (such as the use of protocols for epidemiological follow-up and investigation, the degree of automated reporting and the level of IT support or adequacy of resources and infrastructure) and 8 mainly behavioural factors (like physicians' perception of the importance of the disease, patient care seeking behaviour, attitudes to certain diseases, self-referral practices or physician awareness of their obligation to notify) were identified that all impact on the completeness of national surveillance data. 19 key factors were identified that can make a difference (examples: introducing automated electronic laboratory based notification systems or allowing greater flexibility in method of notification: web, email, phone or post).

### CONCLUSIONS

A well funded on-going broad-ranging programme of activities focussing on these key factors should help ensure that the European Union will be in a better position to effectively deal with the prevention and control of communicable diseases.

16.3 Reference: 20080171

Track: Surveillance Methodology

## Event-based Surveillance at the National Centre of Epidemiology, Spain, 2007

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### BACKGROUND

Epidemic Alert and Response unit (EAR) was established within Spanish National Centre of Epidemiology in 2003 in the context of international concern related to diseases emergence. This study describes the activity of EAR for 2007.

### METHODS

We carried-out interviews with team members and reviewed the weekly epidemiological bulletins and event-related correspondence for 2007. Set-up according to Resolution 143/2003, EAR aims at early detection of syndromes, diseases and other events presenting a risk of propagation and requiring rapid communication and response. EAR performs rapid risk assessment, early dissemination of information, control measures proposal and evaluation of their implementation. Information is provided by routine surveillance and alternative sources (media, non-health data). An event is defined as an outbreak or any situation occurring in an Autonomous Community (CCAA) that presents potential risk of supra-communitary or international spread. Data collected are number and description of cases, possible exposures and actions taken. No standard questionnaires or procedures are in place.

### RESULTS

In 2007, EAR performed risk assessment for 82 events. Thirty-nine (48%) events were considered of supra-communitary interest and prompted further response activities at national level. Another 43 events did not result in further actions at national level. Among the 39 events of interest, CCAA reported 31(79%) and other sources (Enter-net, Food Safety Agency, laboratories) reported eight. 87% events were of infectious aetiology. Food-borne diseases accounted for 44% of supra-communitary events.

### CONCLUSIONS

Our results show that routine surveillance provides most of the information for EAR and it is complemented by alternative sources. Development of an information management tool and undertaking of a proper evaluation of EAR are in progress in order to reinforce event-based surveillance as an important component of Spanish national surveillance.

16.4 Reference: 20080221

Track: Surveillance Methodology

## Proposed Human Papillomavirus surveillance in Scotland, including strategies for monitoring the hard-to-reach population

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### BACKGROUND

Human papillomavirus (HPV) causes over 95% of cervical cancer. From September 2008, the bivalent HPV vaccine, that protects against HPV-16 and 18, will be included in the routine immunisation schedule in Scotland, for females aged 12 to 13 years, with a catch up campaign for females up to 18 years. The development of a national HPV surveillance system is required to evaluate the impact of the immunisation programme. In addition to surveillance of attendees at cervical screening, the system will aim to monitor those who decline screening (the hard-to-reach), who may be at increased risk of cervical cancer.

### METHODS

Scottish women are invited for cervical screening at age 20 and are recalled every 3 years using a population based register; the Scottish Cervical Cancer Call and Recall System (SCCRS). The proposed system will operate from 2010 when the first vaccinated birth cohorts enter the screening programme. The system will monitor the incidence and prevalence of type-specific HPV infection and HPV related disease (abnormal cervical smears, pre-cancerous lesions and cervical cancer). Data will be captured from SCCRS and will be anonymously linked to a national immunisation database using the individual's personal Community Health Index identification number. Targeted surveys are proposed to determine the type-specific prevalence of HPV infections in, and the characteristics of, the hard-to-reach population who are not captured through routine surveillance of the screening population.

### CONCLUSIONS

This surveillance system will inform the future organisation of the HPV immunisation programme and the development of an integrated cervical cancer prevention programme based on the optimum mix of immunisation, screening and HPV testing. Surveillance of the hard-to-reach population will inform the development of focused interventions for cervical cancer prevention.

16.5 Reference: 20080124

Track: Surveillance Methodology

## Reported cases of Congenital Syphilis in the French National Hospital database, 2004

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### BACKGROUND

In France, the resurgence of syphilis infection since 2000, with reported cases among young women of reproductive age rose fear of an increase of Congenital Syphilis (CS). We described CS cases occurring in France in 2004 recorded in the French national hospital database (PMSI).

### METHODS

All cases under 1 year with a diagnostic of CS in 2004 were extracted from the database. A case was confirmed if *Treponema Pallidum* was identified at delivery either on the umbilicus, the placenta or on skin lesions. A case was compatible if maternal history of syphilis during pregnancy, clinical evidence of syphilis for the child and positive results of serological tests for syphilis were recorded. These informations and corresponding sociodemographic characteristics of mothers were collected from the Medical Informatics Department.

### RESULTS

Among 16 cases identified as CS in the database, three were coding errors; no data were available for two cases; five cases were not confirmed. The remaining six cases corresponded to the compatible case definition of CS: two were adopted from outside Europe. Syphilis infection of the mother was diagnosed during the 3rd trimester of pregnancy for the other four cases: two because of premature delivery. Three mothers among four were born abroad; social integration troubles and undesired pregnancy were mentioned among two of mothers' compatible cases.

### CONCLUSIONS

The number of cases is very low compared to the 767 816 births occurring in France in 2004 suggesting a good screening during pregnancy. However, as the incidence of syphilis infection increases, there is a risk of CS occurrence especially among women in difficult social condition or with limited access to healthcares. Enhanced surveillance is recommended for those women.

**16.6 Reference: 20080070****Track: Surveillance Methodology****How does Europe survey varicella?***Hannah C Lewis (1, 2), H. Bang (3), S. Glismann (3), M. Muscat (3)*

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**BACKGROUND**

Although normally a mild childhood disease, varicella (chickenpox) can cause complications especially in older age groups, pregnancy and the immunocompromised. We aimed to describe varicella surveillance systems, vaccination programmes and epidemiology in European countries to see how prepared they are to monitor future trends.

**METHODS**

A surveillance system and vaccination programme questionnaire was completed by 32 European countries in 2007. Retrospective aggregated varicella data were collected from countries with nation-wide mandatory notification systems for 2000-07. Cases meeting requirements for national surveillance (clinical, laboratory-confirmed and/or epidemiologically-linked) were analysed. Country incidence, age-specific incidence and proportion of hospitalisations were calculated.

**RESULTS**

18/32 countries operate surveillance systems with nationwide mandatory notification, 11 reporting solely clinical cases. Of 13 countries that have or are planning a national varicella immunisation programme, three have mandatory case-based surveillance. During 2000-07, 4,673,969 cases were reported in 14 countries that could provide data for this period. Highest incidence rates (464-772/100,000 inhabitants) were reported from Slovenia and lowest (45-176/100,000 inhabitants) from Malta. There was a peak in the incidence for all countries in 2003 or 2004. The 1-4 year-olds had the highest incidence (2964-3828/100,000) (eight countries' data). Based on four countries' data, 10883 cases (0.7%) were hospitalised, with the highest proportion (4.6%) reported in the 20-24 year-olds. Data on complications was not systematically collected.

**CONCLUSIONS**

Varicella has a high incidence across Europe and there is a large heterogeneity in its surveillance. Although many countries plan to implement universal varicella vaccination programmes, very few have adequate surveillance to inform this decision or assess its impact. Standardised surveillance systems are needed to better describe varicella epidemiology and evaluate vaccination programmes in European countries.

16.7 Reference: 20080085

Track: Surveillance Methodology

## Capture-recapture analysis comparing two paediatric studies: Do we need incentives?

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### BACKGROUND

In 2002-3 a pre-vaccine study was carried out in Belgium to determine the number of cases of invasive pneumococcal disease (IPD) in children <5 years. The 7-valent pneumococcal vaccine was licensed in October 2004. In 2005, post-vaccine paediatric surveillance was introduced. The study and the surveillance were both based on actively seeking reports from paediatricians and the reference laboratory (RL); the pre-vaccine study used incentives, post-vaccine surveillance did not. Using two capture-recapture analyses (CRAs), the sensitivity of the pre-vaccine study was compared to post-vaccine surveillance, to assess comparability of data collected by these two systems.

### METHODS

Two three-source CRAs for IPD in children <5 years were carried out using the sentinel lab network (SLN), RL data and case reports from paediatricians for the pre-vaccine (2002-3) and post-vaccine (2005-6) study periods. Log-linear modelling using Poisson regression was used to find unreported cases and account for between-source dependencies. Co-variate analysis including age-groups and region of residence was also carried out.

### RESULTS

The pre-vaccine study had an 82.7% sensitivity (76.5-86.0%) and post-vaccine surveillance 85.8% (74.9-91.7%). Co-variate analysis showed differences in point estimates between some age-groups and regions, but none of the estimates vary significantly between or within studies.

### CONCLUSIONS

The post-vaccine surveillance showed a very similar sensitivity to the incentive-driven study. Both provided high case ascertainment. The vaccine introduction could have motivated paediatricians to report cases, though no incentives were provided. Using capture-recapture, the calculated sensitivity estimates for these two studies allow correct comparison of epidemiological data from pre- and post-vaccine study periods, in spite of methodological differences.

17.1 Reference: 20080135

Track: Zoonoses

## Outbreak Investigation of a Q Fever Outbreak in a Rural Area in the Netherlands

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### BACKGROUND

A Q fever outbreak occurred in the southeast of the Netherlands in spring and summer 2007. We investigated the outbreak to identify risk factors for the acquisition of a recent *C. burnetii* infection.

### METHODS

Thirty-five clinical cases had been identified at the time of the study setup in the cluster area. In order to recruit seronegative controls for a 1:2 case-control study, 696 inhabitants in the cluster area, frequency matched by sex and age, were invited to fill in a questionnaire and provide a blood sample for serological testing of phase I and II IgG and IgM antibodies against *C. burnetii*. The same questionnaires were also sent to the cases. Environmental sampling and testing was carried out on livestock at two goat farms in the area.

### RESULTS

443 of the invited inhabitants and 30 of the already known clinical cases responded. This resulted in 332 seronegative participants and 103 with a recent infection. Decreasing distance in meters of residence to an area with farms with cattle and small ruminants, was independently associated with acquiring an infection (OR=0.999,  $p=0.012$ ). Currently smoking (OR=2.14, CI 95%: 1.17-3.90) and contact with agricultural products (OR=1.69, CI 95%: 1.03-2.80), mainly manure, hay, straw, were associated with disease.

### CONCLUSIONS

The first documented community acquired Q fever outbreak in the Netherlands appears to have been airborne and is probably attributable to small ruminants. As a result of the outbreak investigation, information leaflets were distributed on a large scale to ruminant farms, including hygienic measures regarding manure handling to reduce the risk of spread between animals and to humans.

17.2 Reference: 20080235

Track: Zoonoses

## A Q fever outbreak in a psychiatric care institution, Nijmegen region

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### BACKGROUND

In May 2008 three clients in a long-term psychiatric institution in Nijmegen, the Netherlands, were hospitalised with an atypical pneumonia, all confirmed for Q-fever by PCR. The Municipal Health Service started an outbreak investigation in order to determine the extent and source of the outbreak and screen possible riskgroups.

### METHODS

Active case finding of clients and employees was performed using the following case definition: presence at, or near the institution in the previous six weeks and symptoms that fit clinical Q-fever. Suspected cases were tested in one of the regional laboratories by PCR, complement fixation or immunofluorescence assays for the presence of *Coxiella burnetii*, the causative agent of Q-fever. Persons screened and considered at risk for chronic Q-fever included pregnant women and persons with valvular heart disease. In addition, sheep and lambs on meadows within and surrounding the institution were tested.

### RESULTS

Forty-two persons fit the clinical case definition, 24 appeared seropositive for Q-fever, including 8 clients, 14 employees and 2 visitors. Disease onset was between 3 weeks prior and 8 days after the beginning of the outbreak. Nine cases (6 clients, 3 employees) were hospitalised. At least 50% had been in direct contact with sheep; others had been in the near vicinity. From the 24 asymptomatic pregnant women one was seropositive. Of the 8 asymptomatic persons with valvular heart disease, one was seropositive. The small sheep herd and lambs on the premises of the institution tested seropositive for *Q. burnetii*.

### CONCLUSIONS

A small sheep herd on the premises of a health care institution, is the most plausible cause of the outbreak. Future preventive measures should focus on human risks of contact with (lambling of) sheep.

17.3 Reference: 20080264

Track: Zoonoses

## Emergence of Q-fever in Bavaria – several outbreaks in the region Aschaffenburg

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### BACKGROUND

Q fever is a zoonosis and is caused by infection with *Coxiella burnetii*. Approximately half of all infected patients show clinical symptoms suffering from unspecific influenza-like illness to atypical pneumonia or hepatitis. Human infections with *Coxiella burnetii* are notifiable in Germany since 2001. In 2008 there has been a significant increase in reported infections in Bavaria, especially in the region of Aschaffenburg (Population 175,000). Several outbreaks in this area were reported with considerable variation in size and duration. Currently an outbreak investigation for the largest outbreak is being implemented.

### METHODS

Intensified surveillance of Q fever infections and additional outbreak investigation by standardized questionnaire and serological investigation of an outbreak-affected community in the region.

### RESULTS

Until 04 July 2008 108 Q fever cases were notified in Bavaria in comparison to seven and 57 cases within the same period of the previous two years. The majority (n=89) of the infected persons live in the region of Aschaffenburg. Forty-two Q fever infections in this region can be related to a herd of sheep in a small community. Another outbreak of Q fever with 20 infected persons occurred in another community. A sheep herd is the suspected source of infection. Beside these two outbreaks, five herds of sheep or goats were suspected to be the cause of another 21 human infections. In all five herds, infections with *Coxiella burnetii* were confirmed.

### CONCLUSIONS

After some years without notifications (2001-2005), Q fever seems to occur in the Aschaffenburg region. In 2008 so far, a large number of sporadic cases and several outbreaks were reported.

17.4 Reference: 20080129

Track: Zoonoses

## EpiSouth Project: selection of zoonoses of priority for the countries involved in the Network

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### BACKGROUND

EpiSouth aims at creating collaboration on epidemiological issues in the area of Mediterranean and Balkans. The Work Package 8, "Epidemiology and preparedness to cross-border emerging zoonoses", shall provide a platform for the communication of human (HPH) and veterinary public health (VPH) officials of the participating countries to improve surveillance of emerging zoonoses. Five zoonoses of priority were identified to initially focus the WP8 activities.

### METHODS

A questionnaire was developed, concerning an extended list of zoonoses. It included questions on the following internationally accepted indices defining emergence of zoonoses: 1) increased incidence in humans 2) spread of the disease in novel geographic areas 3) detection of the pathogen in novel animal species. Additionally, questions were included regarding: 1) possible absence of surveillance systems and 2) necessity for improvement of intersectoral collaboration. The eligibility criterion for inclusion in the list of the priority zoonoses was "three or more countries providing a positive answer for the corresponding pathogen and the corresponding question". The pathogens with at least four eligibility criteria were selected.

### RESULTS

Twenty one countries filled in the questionnaire. Brucellosis and rabies fulfilled four criteria, leishmaniasis five and campylobacteriosis three. However, the latter was included in the zoonoses priority list to provide an incentive for improving its surveillance. In addition, because of the recent climate changes indicating the public health importance of vector-borne infections, the West Nile Virus disease was also included.

### CONCLUSIONS

The zoonoses selected cover a wide spectrum of diseases and are the basis on which the platform of communication and collaboration between HPH and VPH officials will be activated in order to enhance surveillance and control of cross-border emerging zoonoses in the Mediterranean Basin.

17.5 Reference: 20080203

Track: Zoonoses

## Outbreak of Trichinellosis in Álava – Basque Country - Spain, December 2007 – February 2008: The value of the epidemiological investigation versus laboratory test

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### BACKGROUND

Trichinellosis is a zoonotic disease caused by eating raw/undercooked meat that contains larvae of *Trichinella*. Trichinostomy is the major method to detect the infection. Between 1995-2007, 31 outbreaks were notified in Spain. On January 29, 2008 the epidemiology unit of Alava was alerted of a clinical suspicion of trichinellosis. The aim of this study was to confirm the outbreak and to identify the source(s) of contaminated food in order to establish control measures.

### METHODS

We conducted a cohort study conformed by all people consuming meat from any of the three suspected wild boar private hunts held in Álava ending 2007. As all the cohort was exposed to raw meat, exposition was consider as consumption of salami-type sausage, highly-seasoned sausage or both. Confirmed case was a probable case with a positive serologic test result for *Trichinella* antibodies. Parasitological studies were performed in animal samples. Serological studies were performed in human samples.

### RESULTS

Out of 110 people exposed to suspected meat, 42 (38%) were cases (19 probable and 23 confirmed). The main clinical features were: myalgia (93%), fever (74%) and facial edema (74%). Cohort was composed of 79 people: 36 only consumed highly-seasoned sausage and 5 (14%) were cases (RR=0,04;  $p<0.001$ ), 18 only consumed salami-type sausage and 13 (72%) were cases (RR=3,27;  $p=0.037$ ), and 25 consumed both with 22 (88%) cases (RR=14,7;  $p<0.001$ ). Salami-type sausage was negative by trichinostomy but positive using the artificial digestion method.

### CONCLUSIONS

We confirmed an outbreak of trichinellosis transmitted through the consumption of meat derived from the hunt. Trichinostomy did not detect the presence of larvae in the suspected meat so we recommended the use of a more sensitive detection method.

17.6 Reference: 20080237

Track: Zoonoses

## Use of statistical methods for a routinely unusual event surveillance in non human *Salmonella*

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### BACKGROUND

*Salmonella* remains one of the most frequent causes of food-borne zoonoses. The objective of this study aims to develop a routinely surveillance system for non human *Salmonella*, based on statistical methods adapted to unusual event detection.

### METHODS

The 'Salmonella' network collects data from animals, food or environment. Laboratories representing the most stable part of the system and data offering the best reactivity have been selected for statistical analysis. Several methods routinely used for unusual event detection of infectious diseases have been compared: Log-linear regression used by the Communicable Disease Surveillance Centre, the RKI and the Bayes methods designed at the Robert Koch Institute.

### RESULTS

The weekly approach has generated alarms with the three methods. Time series graphs have been automatically generated when at least one alarm was computed and, when concordant, a file has been generated gathering epidemiological data of strains.

### CONCLUSIONS

The development of prospective statistical analyses on agro-food *Salmonella* data appears useful not only to detect trends and unusual events, but also as indicator of the network operating. These results will be used to improve the communication between all network partners.

**18.1 Reference: 20080022****Track: Health care associated infections - Surveillance****Reduction of orthopedic surgical site infections during active surveillance**

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**BACKGROUND**

Since 1999, hospitals in the Finnish Hospital Infection Program (SIRO) have reported data on surgical site infections (SSI) following hip and knee arthroplasties, and open reduction of femur fracture. Hospitals prospectively collected data using common definitions and written protocol and also performed postdischarge surveillance. The aim of the study was to evaluate whether surveillance and feedback of SSI information to the physicians and nurses of participating hospitals has led to reduced SSI rates as many national surveillance networks have recently reported.

**METHODS**

Four categories of operative procedures (total hip, partial hip and knee arthroplasties, and open reduction of femur fracture) performed during 1999-2006 were included into analyses. Only procedures (n=42,285) from hospitals (n=12) previously participating for at least three years were accepted. Age, sex, National Nosocomial Infection Surveillance System (NNIS) risk index, hospital volume, historical SSI rate, and proportion of culture-confirmed SSIs adjusted risk ratios (RR) were calculated for comparison of the SSI rates during 1999-2003 and 2004-2006.

**RESULTS**

The overall SSI rates for total hip, partial hip, and knee arthroplasty and open reduction of femur fractures were 3.5% (range by year, 2.5-4.6%), 3.9% (2.2-6.3%), 2.3% (1.7-3.3%), and 2.3% (1.3-4.2%) respectively, and the corresponding rates for deep SSI were 0.6% (0.4-1.1%), 1.5% (0.9-2.8%), 0.8% (0.6-1.7%) and 0.7% (0.4-1.3%). Range of hospital-specific pooled SSI rates during 1999-2003 was 0.9-7.0% and during 2004-2006 0.6-5.3%. A reduction of 21% in the rates of all SSIs following hip and knee arthroplasties and open reduction of femur fractures was detected (adjusted RR, 0.79; CI<sub>95%</sub>, 0.68-0.91).

**CONCLUSIONS**

The results suggest that SIRO as a voluntary surveillance system can support other SSI prevention efforts and lead to reduced SSIs.

18.2 Reference: 20080062

Track: Health care associated infections - Surveillance

## Prevalence of Methicillin-resistant *Staphylococcus aureus* (MRSA) in Hospitals in North Rhine-Westphalia

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### BACKGROUND

*Staphylococcus aureus* (*S. aureus*) is a major cause of Healthcare associated infections. In Germany, about 25% of all *S. aureus* isolated from blood cultures are Methicillin-resistant. In 2007, the Ministry for Labour, Health and Social Affairs of North Rhine-Westphalia initiated a federal state wide survey in hospitals to inspect the MRSA-management and implementation of the recommendations of the commission of hospital hygiene and infection control at the Robert Koch-Institute (RKI).

### METHODS

All hospitals were asked to supply the number of MRSA-cases per 1000 patient days, classified by infections and colonisations, the percentage of MRSA isolates on all *S. aureus* isolates and the number and size of outbreaks. Additionally, the hospitals were rated by local health departments for their implementation of RKI-recommendations.

### RESULTS

The overall response rate was 81%. 37% of 420 hospitals delivered analyzable data. The mean MRSA incidence density was 1.9 per 1.000 patient-days. In average, 27% of all *S. aureus* were MRSA and hospitals performed 62.3 nasal swabs per 1.000 admissions. The local health departments estimated that 57% of responding hospitals have implemented national hygiene recommendations adequately. The quality of the data was heterogeneous with missing data and sometimes poor plausibility.

### CONCLUSIONS

Nevertheless, the survey is an important step towards the improvement of MRSA-prevention and -control in NRW. The data give insight into MRSA-prevalence and -management of a whole federal state, which is unique in Germany. This study has led to increasing awareness of MRSA-problems in hospitals. It highlighted the need to ameliorate the quality of data and the necessity to improve the application of RKI guidelines. If MRSA-management measures are implemented successfully, they may represent strategies also for preventing the spread of other nosocomial pathogens.

**18.3 Reference: 20080018****Track: Health care associated infections - Surveillance****Routine surveillance of nosocomial infections and antibiotic consumption in Norwegian long-term care facilities – presentation of the study protocol**

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**BACKGROUND**

Nosocomial infections lead to additional burden for elderly patients, including hospital admissions and deaths. We have found that 5-7% of residents in long-term care facilities in Norway (LTCF) at any one time has a nosocomial infection. Following requests from many LTCF, we started developing a prospective surveillance system for nosocomial infections and antibiotic consumption. The aim is to provide data in order to implement measures to limit the spread of nosocomial infections and reduce inappropriate antimicrobial use.

**METHODS**

We designed the system in a collaboration project, using published examples and experience from a recent research project. A pilot study is currently being conducted.

**RESULTS**

The new system is designed as an annual open four-month cohort study: All LTCF are invited, and all their wards and residents are to be included. Individual, but not person-identifiable background data on all residents will be collected. The outcomes are episodes of infection in urinary tract, lower respiratory tract, surgical site or soft tissue according to the McGeer criteria. We will also record all use of systemic antimicrobials, including drug name, length of treatment and daily dose. Data will be reported to the NIPH through a web application. The results will be presented mainly as incidence rate of infection (no. of infection/patient-days) and antibiotic usage (DDD/ patient-days).

**CONCLUSIONS**

The system starts in 2009. This will give the LTCF and health administrators information that is essential for prevention of infections and improper use of antibiotics. This type of surveillance is also useful in documenting the quality of care.

**18.4 Reference: 20080055****Track: Health care associated infections - Surveillance**

## **The Prevalence of Invasive Device Use in Scotland**

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### **BACKGROUND**

Invasive device use is well recognised as a risk factor for healthcare associated infection. Ventilators, vascular devices and urinary catheters are all associated with an increased risk of infection particularly in patients with existing morbidities. The Scottish National Healthcare Associated Infection (HAI) Prevalence Survey was carried out between October 2005 and October 2006. The study found that 9.5% of patients in acute hospitals had a HAI at the time of survey. Invasive device use at the time of survey was also determined. The objective of this study was to describe the point prevalence of invasive devices in Scottish acute hospitals.

### **METHODS**

The prevalence of mechanical ventilators, peripheral vascular catheters, central vascular catheters and urinary catheters at the time of survey was determined by independent data collectors. The medical and nursing notes were used to detect the presence of a device and nursing staff were approached if further clarification was required.

### **RESULTS**

The prevalence of each invasive device by specialty of patient care at the time of survey is described.

### **CONCLUSIONS**

The high prevalence of invasive devices particularly urinary catheters and peripheral vascular catheters highlights the need for interventions to reduce utilisation and to promote the early removal of such devices. The identification of specialties with high invasive device use indicates the areas where targeting of interventions would be most beneficial.

## 18.5 Reference: 20080139

Track: Health care associated infections - Surveillance

## Preparing for national *Clostridium difficile* surveillance: A Swedish laboratory survey of testing and diagnostic methods

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### BACKGROUND

Preliminary analysis of Swedish hospital discharge data suggests that the incidence of *Clostridium difficile*-associated disease (CDAD) has increased between 1998-2006. There is currently no national CDAD surveillance. We conducted a laboratory survey to assess CDAD incidence and diagnostic methods, and provide recommendations on laboratory-based CDAD surveillance.

### METHODS

A questionnaire was sent to all 29 microbiological laboratories, distributed among 21 Swedish counties. Data was collected on number of cases, persons tested and diagnostic methods in 2007. Cases were persons with a positive laboratory test for *C. difficile* toxin in 2007, irrespective of the diagnostic method used. The incidence (cases/inhabitants), testing frequency (persons tested/inhabitants), positivity rate (cases/persons tested) and diagnostic methods were described per county.

### RESULTS

All 29 laboratories responded and all reported performing *C. difficile* toxin tests. A total of 24 (83%) laboratories used enzyme immunoassays for detection of both toxin A and B, and five (17%) laboratories used cytotoxicity assays for detection of solely toxin B. Thirteen laboratories (45%) reported to perform toxin tests on cultured strains, in addition to direct toxin-testing of the faecal sample. In 2007, a total number of 8276 CDAD cases were diagnosed corresponding to an incidence of 90/100,000 inhabitants. CDAD incidence varied between the different counties from 32-200/100,000 inhabitants. The testing frequency and positivity rate also varied between the counties from 418-778/100,000 inhabitants and from 7-26%, respectively.

### CONCLUSIONS

Large variations in incidence and positivity rate between counties were noted. The difference in diagnostic methods might partly explain this, although other factors could have played a role. When implementing CDAD surveillance, standardisation of diagnostic methods is recommended to allow more accurate comparison of the incidence over time and place.

18.6 Reference: 20080021

Track: Health care associated infections - Surveillance

## Evaluation of Surveillance of Healthcare-Associated Bloodstream Infections in a Neonatal Intensive Care Unit

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### BACKGROUND

An increased rate of bloodstream infections (BSIs) in the neonatal intensive care unit (NICU) of Helsinki University Central Hospital, Finland, was noted in 2004 as a result of prospective hospital-wide laboratory-based BSI surveillance, performed since 1999 as a part of the Finnish Hospital Infection Program. The aim of this study was to investigate the reasons for the increase.

### METHODS

All infants admitted to the NICU during 1999-2007 were included. Centers for Disease Control and Prevention definitions for laboratory-confirmed BSIs were used. Microbiology laboratory data were reviewed for determining the culturing activity. Monthly bed occupancy rates of the NICU as well as information on central line (CL) use and birth weights of the patients were obtained from the NICU. BSIs were classified as 'early-onset' if detected during the first 3 days of life and as 'late-onset' if detected thereafter.

### RESULTS

We identified 388 BSIs, of which 335 were late-onset BSIs (rate, 8.1/1000 patient-days). Of these, 175 (52%) were CL-associated (rate, 13.2/1000 CL-days). Of the late-onset BSIs, 279 (83%) were detected in very low birth-weight (VLBW, <1500g) infants, and 159 (57%) of these were CL-associated (rate, 13.3/1000 CL-days). We found no association between the annual rates of blood cultures or the monthly bed occupancy rates and BSIs. Coagulase-negative staphylococci were the main causative pathogens.

### CONCLUSIONS

It might be reasonable to target BSI surveillance in NICUs for VLBW infants only. The CL-associated BSI rate of VLBW infants was high compared to reports from national surveillance networks. Both reviewing CL maintenance guidelines and educating the personnel in CL care would be needed. However, the problem would not likely be controlled completely, as over 40% of the VLBW infants' BSIs were not CL-associated.

## 19.1 Reference: 20080089

Track: Food &amp; water borne diseases - Outbreaks

**Inadequate food handling led to outbreak of gastroenteritis outbreak during in three Kindergartens after a pre-Christmas excursion in Berlin, 2007**

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**BACKGROUND**

On 3.12.2007 two Berlin local health authorities were informed about gastroenteritis outbreaks amongst children and personnel in three kindergartens following an excursion. We conducted an investigation to describe cases, determine possible sources of infection and to recommend control measures.

**METHODS**

We conducted a retrospective cohort study in kindergartens A, B and C. Cases attended the excursion on 3.12.2007 and presented with vomiting, abdominal pain or diarrhoea within 30 hours post excursion. We interviewed kindergarten personnel on clinical symptoms, demographic data, and food consumption for themselves and the children. We calculated food-specific attack rates (AR), relative risks (RR), etiological fractions (EF) and conducted an environmental investigation of the catering facilities. Patient's stools vomit and food leftovers were tested for pathogens.

**RESULTS**

Among 155 participants, 47 met the case definition. The AR was 31% among children aged 2-6 years (n=137) and 22% among adults (n=18). The AR was 36%, 45%, and 3% in kindergartens A-B-C respectively. Symptoms included vomiting (85%), abdominal pain (64%) and diarrhoea (2%). Only rice pudding was associated with disease. The overall AR was 36.4% for eaters and 44%, 61%, 3% in kindergartens A-B-C respectively and 0% for non-eaters. (EF=100%, p<0.001). *Bacillus cereus* but not its emetic toxin was isolated from single a vomit sample. Stool and food leftovers were negative for pathogens. Environmental investigations revealed inadequate food preparation, cleaning facilities and cookware storage.

**CONCLUSIONS**

*Bacillus cereus* most likely caused this outbreak. Inadequate food handling probably caused spores, present in the rice pudding upon purchase or contaminating it thereafter, to germinate at ambient temperatures and to produce toxin. Caterers have to be aware of problems posed by spore forming bacteria and to strictly adhere to appropriate food time-temperature regimes.

19.2 Reference: 20080244

Track: Food &amp; water borne diseases - Outbreaks

## Two linked norovirus outbreaks resulting from the foodborne transmission of genogroup I-6 from an asymptomatic food handler

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### BACKGROUND

Norovirus is the commonest cause of infectious gastroenteritis in the UK affecting well over half a million people annually with an estimated cost of over £100 million to the National Health Service in epidemic seasons.

### METHODS

173 delegates attended two different events on consecutive days (Thursday and Friday) at the same venue with buffet-style catering provided by the same caterer. An outbreak investigation was instigated after staff who attended the first event did not report for work the following week due to vomiting, nausea and diarrhoea occurring within 48 hours of the event.

### RESULTS

Attack rates were 73% and 51% in the first and second event respectively. There were a further nine secondary cases. There were no food samples for testing and delegates could not recall what they ate due to the buffet-style catering. Five faecal specimens obtained within 8 days of the first event isolated norovirus genogroup I-6 from an asymptomatic food handler and event attendee. There were no reported cases of illness at two further events held at the venue on the same weekend catered for by different caterers.

### CONCLUSIONS

Genogroup I-6 is rarely associated with outbreaks in the UK. This is therefore a unique case of a norovirus genogroup I-6 outbreak resulting from the food-borne transmission of an unusual genotype from an asymptomatic food handler. It highlights the complexities of investigating and establishing causality in suspected norovirus outbreaks in the absence of a reliable food history and samples for testing, and where there is a significant time lapse and paucity of samples for testing. It also reinforces the importance of prompt reporting of symptoms of gastroenteritis in the prevention and control of infection.

## 19.3 Reference: 20080065

Track: Food &amp; water borne diseases - Outbreaks

**A food-borne outbreak of gastroenteritis among guest at two baptism parties, Norway, 2008***Karina Junussova (1, 2), S. Hemmersbach (3), B. T. Heier (2)*

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**BACKGROUND**

An outbreak of gastroenteritis among 55 guests at two baptisms on 3rd February was notified to the Norwegian Institute of Public Health on 7th February. Norovirus or bacterial toxin was suspected. Both parties served food from the same catering firm plus homemade dishes. An outbreak investigation aimed at containing the outbreak and identifying its source.

**METHODS**

We conducted a retrospective cohort study using phone interviews to collect data on food consumption and clinical symptoms among guests. A case was a person who consumed food at the baptism party and developed diarrhoea, vomiting, nausea, stomach ache or fever between evening 3rd and 5th February. Relative risks (RR) were calculated for both parties combined and for each party separately. Environmental and microbiological investigations included interviewing personnel, inspecting premises and analysing food samples.

**RESULTS**

Among 52 respondents we identified 30 cases (attack rate 58%). Eating scrambled eggs with smoked salmon from the caterer was identified as a risk factor for two parties combined (RR 1.83 [95%CI:0.98-3.40]) and for party 1 separately (RR 2.23 [95%CI:0.99-5.06]). For party 2, eating homemade scrambled eggs was a risk factor (RR 3.46 [95%CI:0.98-12.18]). Neither bacterial toxins nor norovirus were detected in food samples. One faecal sample was negative for bacterial pathogens. Norovirus was not tested, however all clinical criteria for noroviral outbreaks were met (Kaplan criteria include proportion of cases with vomiting, incubation period and duration of illness, no bacterial pathogen on stool culture). A cook reported having gastroenteritis on 2nd February.

**CONCLUSIONS**

Norovirus was the most likely pathogen causing the outbreak, and scrambled eggs with salmon from the caterer were the most likely vehicle of transmission. An ill cook may have been the infectious source.

19.4 Reference: 20080232

Track: Food &amp; water borne diseases - Outbreaks

## Gastroenteritis Outbreak in an elderly nursing home caused by Rotavirus and Norovirus jointly. Palma (Spain), February 2008.

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### BACKGROUND

The study describes an outbreak of acute gastroenteritis that took place in an elderly nursing home in Palma de Mallorca between the 4th and 23rd February 2008. The study objectives were to know the etiology and its mechanism of transmission.

### METHODS

A retrospective cohort study was conducted with a fixed cohort including employees and residents. Data was gathered from medical records and through a survey using a standardised questionnaire. We calculated attack rates (AR), 95% confidence intervals (95%CI) and relative risks (RR) using univariate analyses and Cox regression.

### RESULTS

Out of 146 people the nursing home, 96 had residents and 50 were staff Members. The main symptom was diarrhoea and the index case was a health-care worker. The total AR was 48.6% (95%CI, 38.5-61.3), for residents AR was 55.2% (95% CI, 42.1-72.2), and 36% (95% CI, 22.6-57.1) for the staff. The fact being resident of the first floor in a double room, incontinent and non-self-carrier to handle activities of daily living, poses a greater risk. There are no significant differences between the different menus that are taken at the centre. Tap water consumption was statistically associated with disease after adjusting for age, sex and food items (RR=4.03, 95%CI 1.42-11.38). Norovirus and Rotavirus were isolated in collected stool samples.

### CONCLUSIONS

It is highly likely that the origin of the outbreak had two synergistic sources, firstly through an infected worker of the nursing home, and secondly through the tap water. The transmission by direct contact, from person to person has been proved. It is likely that the high levels of dependence on residents might have been a factor facilitating the spread of the outbreak.

19.5 Reference: 20080163

Track: Food &amp; water borne diseases - Outbreaks

## A multi-state investigation of a Salmonella outbreak among tourists in Lloret de Mar, Spain, August 2007

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### BACKGROUND

On 21 August 2007, a hospital in Barcelona reported 12 cases of gastroenteritis after a common lunch at a hotel in Lloret de Mar on 14 August. Salmonella spp. was isolated from 6/6 stool samples collected. Between 14-18 August, 56 hotel-guests (6 countries) sought medical assistance for similar symptoms. We conducted a multi-state investigation to determine the extent and source of the outbreak.

### METHODS

We conducted a retrospective cohort study among individuals who ate at the hotel buffet on 14 August. Cases were cohort members presenting diarrhoea or vomiting within 96 hours. We collected information from hotel administrative files. Through Enter-net and EWRS we distributed to 5 countries involved a questionnaire on symptoms and consumption of 25 food items. We estimated relative risks (RR) and 95% confidence intervals (CI) using Cox regression. We interviewed food handlers. Food safety authorities performed laboratory and environmental investigations.

### RESULTS

Out of 271 individuals in the cohort, 52 (corresponding to the three most affected countries) completed questionnaires. The attack rate was 54% (28 cases). Only spaghetti consumers (15/19) were at higher risk of disease after controlling for confounding (RR 3.2, 95%CI 1.3 – 7.8). The 6 isolates from cases and 4 positive isolates from 4/6 foodhandlers were identified as *S. Enteritidis* with identical PFGE patterns. No food samples were available for testing. We detected inappropriate food handling and storage. A salmonella-positive, symptomatic foodhandler mixed spaghetti with bare hands.

### CONCLUSIONS

The cooperation of the most affected countries was excellent. The incomplete tourists' contact information resulted in a low response. Results suggest that spaghetti were the contamination source. We recommended appropriate food handling and storage methods. Multi-state outbreak investigations could benefit from limiting studies to most affected countries.

19.6 Reference: 20080149

Track: Food &amp; water borne diseases - Outbreaks

## Outbreak of Norovirus gastroenteritis in a group of adults in North-Eastern Italy

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### BACKGROUND

Noroviruses represent the most important agents of gastroenteritis outbreaks worldwide being a relevant problem to public health. We report an outbreak of acute gastroenteritis in a group of adults who attended a restaurant of Umago (Croatia) on 25 March, 2007.

### METHODS

A cohort study using a standardised questionnaire for each participant was carried out. Case was defined as a person who, after meal, had at least one of the following symptom: diarrhoea (two or more loose stools in a day), vomiting, nausea, abdominal pain or temperature  $\geq 38^{\circ}\text{C}$ . Stool samples were available from 30 persons. Samples were analysed for the presence of enteropathogenic bacteria, parasites and viruses; Norovirus was investigated by EIA and RT-PCR. Amplification products were submitted to direct sequencing. The association between food consumption and illness was estimated by the relative risk (RR) and its CI<sub>95%</sub> using Epi Info Version 3.4.2.

### RESULTS

Twenty five people (78%) from 32 participants had been ill. Incubation period ranged from 8 to 76 hours (median= 43 hours). The most common symptoms were diarrhoea (41%), vomiting (38%), abdominal pain (31%), nausea (25%), and fever (13%). Epidemiological evaluation suggested a link with a meal of "fasolari" shellfish eaten uncooked (RR= 6,7 95% CI:1,09-41,3). Molecular analysis resulted positive in 6 of 16 symptomatic but in none of 7 asymptomatic subjects. By sequencing all viruses belonged to the genogroup GII.4.

### CONCLUSIONS

On the basis of clinical presentation, epidemiological analysis and virological data this probably is a Norovirus food-borne outbreak due to raw shellfish consumption. In order to evaluate the pattern of circulating genogroups and variants, Norovirus aetiology should be assessed by systematic virological and molecular investigation of epidemic and non-epidemic cases of gastroenteritis.

19.7 Reference: 20080366

Track: Food &amp; water borne diseases - Outbreaks

## A foodborne Norovirus outbreak likely related to the infected infant of a food handler, Austria, 2007

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### BACKGROUND

A cluster of gastroenteritis due to norovirus occurred within two days after a Christmas party in a restaurant on December 14, 2007. Consumption of food at the party was the potential common link among all patients. We investigated the outbreak to identify the source of the outbreak and the vehicle(s) of transmission.

### METHODS

We defined a case as a person [1] who attended the party or prepared food for the party dinner [2] who fell ill with symptoms of diarrhea or vomiting after December 14. We conducted a retrospective cohort study among participants and kitchen staff of the restaurant. We calculated food-specific risk ratio (RR) and used a log-linear model for multivariable analysis. Stool samples of nine cases were tested for norovirus and diarrhoea causing bacteria by the Austrian reference laboratory for norovirus.

### RESULTS

A total of 21/63 cohort members fulfilled the definition of a case. Eight cases were female. 95% of cases fell ill within 48 hours following food exposure. Three cases tested positive for Norovirus. Consumption of "schinkenrolle" (ham roll) was associated with risk of gastroenteritis (adjusted RR: 3.9, CI95%: 1.6-9.8). Neither food nor environmental samples were available for microbiological investigations. A kitchen assistant's infant fell sick with norovirus gastroenteritis two days prior to the party.

### CONCLUSIONS

As "schinkenrolle" is usually consumed raw, it was most likely contaminated with norovirus during preparation by the kitchen assistant. Not only food handlers but also their household contacts should be considered as a potential source of foodborne outbreaks. Food handlers should be informed of the risk of transmission of gastrointestinal illness from infected relatives and raise awareness about the hand hygiene.

19.8 Reference: 20080010

Track: Food &amp; water borne diseases - Outbreaks

## Outbreak of salmonellosis at institution for mentally impaired people

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### BACKGROUND

On 26 August 2007, more than 100 cases of acute gastroenteritis among residents and staff in institution for mentally impaired (IMI) in Maribor, Slovenia, occurred and on the same day the outbreak was reported to the regional Institute of Public Health. Outbreak investigation was conducted to determine the extent of the outbreak, to identify source and mode of transmission and to implement control measures.

### METHODS

A case was defined as a resident or worker in IMI with vomiting or diarrhoea developed after 26 August 2007. Microbiological examinations, environmental investigation and descriptive information gathering started on 26 August. A retrospective cohort study was performed.

### RESULTS

Of 580 residents and staff 420 met case definition (attack rate 72,4%). 39 patients were hospitalized, 4 patients died. There was no significant difference in attack rates between 18 different units of IMI. Consumption of bean salad on 25 August was associated with disease occurrence (RR=3,4;CI=1,5-8,1). No other food item or patient characteristic was associated with disease. In stool samples *Salmonella* Enteritidis was confirmed. Out of 23 environmental samples one sample (bean salad) was also positive for *Salmonella* Enteritidis. PFGE genotyping showed 96% identity between *Salmonellae* isolated from stool samples and bean salad. Beans were cooked a day before serving and stored in refrigerator in three pots. In one of them raw meat had been prepared before. The salad was finalized 2 hours before lunch.

### CONCLUSIONS

Epidemiological and laboratory investigation suggested that consumption of bean salad contaminated with *Salmonella* Enteritidis was the source of this large outbreak. Exact inoculation of agent in salad was not determined, but cross contamination was suspected. Recommendations were given regarding the hygienic preparation and appropriate storage of food.

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