EUPHEM

EUPHEM REPORT

# Summary of work activities

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European Public Health Microbiology Training Programme (EUPHEM), 2011 cohort

## Background

According to the European Centre for Disease Prevention and Control's (ECDC) advisory group on public health microbiology ('national microbiology focal points'), public health microbiology is a cross-cutting area that spans the fields of human, animal, food, water, and environmental microbiology, with a focus on human population health and disease. The primary work function is to use microbiology to improve the health of populations in collaboration with other public health disciplines, in particular epidemiology. Public health microbiology laboratories play a central role in the detection, monitoring, outbreak response, and provision of scientific evidence to prevent and control infectious diseases.

European preparedness for responding to new infectious disease threats requires a sustainable infrastructure capable of detecting, diagnosing, and controlling infectious disease problems, including the design of control strategies for the prevention and treatment of infections. A broad range of expertise, particularly in the fields of epidemiology and public health microbiology, is necessary to fulfil these requirements. Public health microbiology is required to provide access to experts with expertise and experience in all relevant communicable diseases at the regional, national and international level in order to mount rapid responses to emerging health threats, plan appropriate prevention strategies, assess existing prevention disciplines, develop or assist in the development of microbiological guidelines, evaluate/develop new diagnostic tools, arbitrate on risks from microbes or their products, and provide pertinent information to policy makers related to the above issues from a microbiology perspective.

According to articles 5 and 9 of ECDC's founding regulation (EC No 851/2004) 'the Centre shall, encourage cooperation between expert and reference laboratories, foster the development of sufficient capacity within the community for the diagnosis, detection, identification and characterisation of infectious agents which may threaten public health' and 'as appropriate, support and coordinate training programmes in order to assist Member States and the Commission to have sufficient numbers of trained specialists, in particular in epidemiological surveillance and field investigations, and to have a capability to define health measures to control disease outbreaks'.

Moreover, article 47 of the Lisbon Treaty states that 'Member States shall, within the framework of a joint programme, encourage the exchange of young workers.' Therefore, ECDC initiated the two-year EUPHEM training programme in 2008. EUPHEM is closely linked to the European Programme for Intervention Epidemiology Training (EPIET). Both EUPHEM and EPIET are considered 'specialist pathways' of the two-year ECDC fellowship programme for applied disease prevention and control.

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Stockholm, August 2013

This report summarises the work activities undertaken by Lieke van Alphen of the cohort 2011 of the European Public Health Microbiology Training Programme (EUPHEM) at the Statens Serum Institut (SSI), Copenhagen, Denmark.

All EUPHEM activities aim to address different aspects of public health microbiology and underline the various roles of public health laboratory scientists within public health systems.

# Material and methods

This report accompanies a portfolio of the outcome of different activities conducted during the EUPHEM fellowship. The activities comprised specific projects, activities and theoretical training modules.

Specific projects included epidemiological investigations (outbreaks and surveillance), applied public health research, applied public health microbiology and laboratory investigation, biorisk management, quality management, teaching and public health microbiology management, summarising and communicating scientific evidence, and activities with a specific microbiological focus.

The outcomes include publications, presentations, posters, reports and teaching materials prepared by the fellow. The portfolio presents a summary of all work activities conducted by the fellow, unless prohibited due to confidentiality regulations.

# Results

Objectives of these core competency domains were achieved partly by project/activity work and partly by participation in the modules. Results are presented according to the EUPHEM core competencies as can be found in the EUPHEM scientific guide[1].

## 1. Epidemiological investigations

### 1.1. Outbreak investigations

#### *A. Outbreak of food-borne illness among participants of the introductory course on Lazareto, 2011*

During the 17th EPIET/EUPHEM introductory course an outbreak was suspected among the participants. Therefore an outbreak investigation team was formed. Detailed information about symptoms and consumption of specific food items were obtained by questionnaires. The fellows drafted the questionnaires, collected, entered and cleaned the data and assisted in analysis and interpretation. The investigation demonstrated that the first peak of cases was most likely due to consumption of the cold Russian salad prepared by a chef that had been ill the day before food preparation occurred. The causative organism remained unknown due to limited access to full laboratory support.

#### *B. PFGE analysis of MRSA isolates from two separate hospital outbreaks in Denmark, 2012*

In February–March 2012 an outbreak of MRSA spa type t304 occurred in a hospital in Denmark with a total of 21 cases. In April 2012 an outbreak of MRSA spa type t032 occurred in another hospital in Denmark with a total of 28 cases. The outbreaks were handled by the respective local public health authority but involvement of SSI was requested for further analysis of the isolates to determine whether an outbreak PFGE profile could be established. The fellow contributed to this outbreak investigation by implementation of PFGE for MRSA in the staphylococcal laboratory at SSI and subsequent PFGE analysis of the outbreak and control isolates. In both outbreaks, the PFGE patterns of all outbreak isolates were indistinguishable, but matched control MRSA isolates of identical spa type from the same year from other locations in Denmark. It is possible that these PFGE profiles are widespread among these spa types across Denmark in 2012. In this case PFGE was unable to establish a specific outbreak profile. To determine whether a PFGE profile is specific for an outbreak, more PFGE profiles of diverse MRSA isolates in Denmark should be made available for comparison.

[1] http://ecdc.europa.eu/en/publications/Publications/microbiology-public-health-training-programme.pdf

### *C.* Salmonella *Saintpaul outbreak, Copenhagen, Denmark, 2012*

Routine analysis of Danish *Salmonella* surveillance, performed by the fellow, showed an unexpected number of cases of *S.* Saintpaul: seven cases within one month, with four cases from Copenhagen. After alerting the epidemiology department, it was found that the Food Department at the Danish Technical University DTU also found *S.* Saintpaul isolates in batches of duck meat. Interviews demonstrated three cases from Copenhagen had a meal together and ate cold smoked duck from a butcher in Copenhagen. The PFGE profiles of these three patients and of the batches of duck from the food institute were identical.

### *D. Monophasic* Salmonella *Typhimurium MLVA 0006 'Puma-Run' Outbreak in Denmark, 2012*

A catering company that was implicated in an outbreak of monophasic *Salmonella* with eight cases in Copenhagen also catered another event on the same day: the Puma-24-run in Copenhagen in July 2012. The fellow's role in this outbreak investigation was to draft a questionnaire, together with the EPIET fellows, for participants from this run asking questions regarding food consumption and symptoms and to implement the questionnaire online.

### *E. Waterborne outbreak of gastrointestinal illness in Kalundborg, Denmark, 2012*

In December 2012, an outbreak of gastrointestinal illness occurred in an area with 374 households in Kalundborg town, Denmark. An outbreak investigation including epidemiological, microbiological and environmental investigations was conducted in order to describe the outbreak magnitude, identify the source and the pathogen causing illness. A newly developed method for extraction of viral nucleic acids from water samples was applied. Combined with a new molecular method for the sequencing of >1000 nt of the capsid region, this enabled a detailed and high resolution molecular comparison of sequences. Norovirus Genogroup (G) II was detected in 16 out of 17 stool samples; all those typed (13) were NoV GII.4 New Orleans 2009 variant. Norovirus GII was also detected in all five tested water samples from the affected area, two of which were successfully sequenced. Water samples from outside the affected area tested negative for indicator bacteria and were not tested for norovirus. Sequencing of the long capsid region demonstrated 100% identical NoV in all five sequenced stool samples and one water sample and one other water sample showed only 1 nt difference. A cohort study showed drinking tap water was associated with illness (RR=5.5). Environmental investigations suggested drinking water contamination from a sewage pipe to a drinking water pipeline due to fall in pressure during water supply system renovations.

### *F. Module computer tools of outbreak investigations*

The aim of this module was to equip the fellows with basic tools to manage and analyse data from outbreak investigations in the field. During the module a case study of an outbreak of salmonellosis in a nursing home served to perform all steps involved in outbreak analysis, starting from creation of a data entry file and ending with stratified analysis using EpiData/Entry, Stata and Microsoft Excel.

Educational outcome: Application of microbiological and epidemiological knowledge in an outbreak investigation. Assessment of an outbreak situation and management and coordination of the investigation.

## 1.2. Surveillance

### *A. Evaluation of the measles surveillance system in Denmark, 2005–2012*

The aim of this study was to chart the routes of reporting and to assess how complete and timely the national reporting structure in this surveillance system is. The surveillance system was assessed by calculating measles surveillance system performance indicators (target ≥80%) listed by the World Health Organization and the United States Centers for Disease Control and Prevention. Furthermore, the reporting structure in the Danish measles surveillance system was mapped. Analysis showed that in Denmark, 130 (91.5%) out of 142 notified measles cases were laboratory-confirmed and 90.8% of cases were laboratory-confirmed within seven days of samples being sent to the lab. The source of infection was reported in 47.3% of cases. Cases were reported monthly by both the epidemiological department and the reference laboratory to ECDC and WHO, respectively. The reporting of cases in the measles surveillance system in Denmark is complete and timely laboratory results are available. Electronic or phone notifications of cases could improve public health response to within 48 hours after onset. The monthly international double-reporting is very time-consuming and a common epidemiology and laboratory data-entry platform could be developed, which would result in more efficient and user-friendly reporting for Member States.

### *B. Analysis of source of infection for all new dengue cases in Denmark, October 2012–February 2013*

An outbreak of dengue in the Autonomous Region of Madeira (Portugal) with an onset date of 3 October 2012 was detected after two dengue virus infections were confirmed in patients residing in Madeira. In November 2012 ECDC suggested that all laboratory-confirmed cases of dengue in EU Member States, who had visited the island of Madeira in the 21 days preceding the onset of symptoms, should be reported. In total 287 dengue tests were performed on 276 patients during the defined period, of which 44 patients tested positive for dengue virus infection. Travel information was collected either from patient records or by interviewing the patients. Detailed information on two patients that travelled to Madeira was reported to ECDC. Monitoring of the situation by ECDC in

collaboration with national and regional (Madeira) public health authorities resulted in recommendations for travellers to Madeira to take individual protective measures to avoid mosquito bites and to seek medical advice when experiencing symptoms during or within 21 days after travel to Madeira.

### *C.* Salmonella *surveillance, Denmark*

From July to September 2012 the fellow was solely responsible for running the real-time *Salmonella* surveillance in Denmark which involved:

- weekly analysis of the typing (serotyping and MLVA typing) results of all new *Salmonella* isolates to identify possible clusters or other interesting isolates
- instruction of laboratory personnel regarding extra (non-routine) tests that needed to be performed or rerun (for example additional PFGE on n suspected outbreak clusters)
- reporting of interesting isolates or clusters to the epidemiology department
- attending the weekly 'Danish Central Outbreak group meetings' at the National Food Institute, Technical University of Denmark (together with representatives of the Food, Veterinary and Human sections) to discuss clusters and outbreaks and compare with information from the Food and Veterinary Institutes (including trace-backs).
- answering enquiries from the Food or Veterinary Institutes or other European institutes with regard to MLVA, PFGE or antibiotic resistance profiles of human outbreak isolates.

Educational outcome: Evaluation of surveillance systems and the management and active use of such systems, analysis of surveillance data and the integration of microbiological and epidemiological knowledge to interpret what a cluster means. Interpretation of virological and bacterial routine and non-routine diagnostics and typing results. Interdisciplinary collaboration with people from different departments and institutes (management skills).

## 2. Applied public health microbiology research

### *A. Analysis of exposures and characteristics of cases of non-livestock-associated CC398 MRSA in Denmark*

The increase in non-livestock-associated (non-LA) CC398 meticillin-resistant *Staphylococcus aureus* (MRSA) in Denmark in recent years has led to the hypothesis that these isolates might be more easily transferred from person to person than originally assumed. In this study a questionnaire was developed to investigate possible sources of infection with MRSA CC398, and analysed to determine whether non-LA MRSA isolates show different characteristics from LA isolates. The questionnaires identified possible exposures, such as direct exposure to livestock, being a household member of other CC398 MRSA cases and close physical contact to humans with livestock exposure. The majority of the cases lived in close proximity to areas with intensive pig farming. Molecular typing by PFGE, spa typing or typing of other genetic elements, like the *scn* gene and antimicrobial resistance markers did not show a difference in characteristics between LA and non-LA isolates. However, an increase in person-to-person transmission dependent on other genetic elements is possible. Therefore, non-LA cases should be closely monitored and extension of this study with the non-LA cases from 2012 is currently in progress.

### *B. Leptospirosis, Denmark, 1980–2011*

The aim of this project was to perform a descriptive study on the incidence of leptospirosis in Denmark, 1980–2012. In this period a total of 583 cases of leptospirosis were identified in Denmark. The most frequent detected serotypes were Patoc, Icterohemorragiae and Sejrø. Notifications with detailed information on profession and possible exposures showed that fish farmers, farmers and sewage workers were overrepresented among cases compared with Danish demography. Other common exposures included water sports and cleaning of flooded areas after heavy rainfall. Fish farmers were most commonly infected with serotype Icterohemorragiae, farmers with serotype Sejrø, while sewage workers did not show a trend towards a specific serotype. Further analysis on the incidence of leptospirosis per region and a possible correlation between leptospirosis cases, weather conditions like heavy rainfalls and the rat population in a certain year are currently in progress.

Educational outcome: Development, planning and execution of research projects, including writing a detailed study protocol and discussing the feasibility of projects, writing a scientific publication on the results.

## 3. Applied public health microbiology and laboratory investigations

### *A. Analysis of a* Yersinia enterocolitica *outbreak signal, Denmark, January–May 2012*

In May 2012, routine surveillance demonstrated an increase in the number of *Yersinia enterocolitica* cases in Denmark in the first four months of the year. Analysis was necessary to assess whether an outbreak was occurring or whether the observed increase in cases could be otherwise explained. Analysis showed a 50–100% increase in

the number of cases per month compared with previous years, mainly consisting of the non-pathogenic biotype 1A. Biotyping data from previous years is unavailable, so the normal proportion of biotype 1A among *Yersinia* cases is unknown. No unexpected virulence genes were found in the isolates. PFGE showed a wide variety of profiles among the tested isolates. It was concluded that the *Y. enterocolitica* cases from January to May 2012 did not appear to come from a single-source outbreak and an outbreak investigation was deemed unnecessary.

### *B.* FlaA *sequencing and antimicrobial resistance profiling in an outbreak investigation of* Campylobacter*, Denmark, 2011*

Surveillance data showed that *Campylobacter* cases in Denmark increased above the expected seasonal peak during July and August in 2011. The project aimed to analyse whether an outbreak of *Campylobacter* was responsible for this increase. *FlaA* short variable region sequencing and antimicrobial resistance profiling showed that among the 187 obtained human isolates, six large *flaA*-nucleotide type clusters could be observed. Travel data showed 37% of cases could be attributed to foreign travel. When *flaA*-typing data, antimicrobial resistance profiles and travel information of the patients were combined, no large single cluster of isolates was observed. Therefore it was concluded that the increase in *Campylobacter* cases in Denmark in 2011 could not be attributed to a single-source outbreak.

### *C. Laboratory rotations: identification and characterisation of pathogens in bacteriology and virology*

During each of the different projects, the fellow was introduced to the procedures and methods for the identification and characterisation or typing of different pathogens. The activities included observation and execution of methods such as: isolation/identification techniques for bacteria by biochemical reactions and chromogenic media, serotyping, biotyping, phage typing, spa typing, MLST, MLVA, PFGE, antibiotic-resistance profiling. In the virology and TB departments the fellow was introduced to molecular diagnostic methods and sequence typing, serological detection, MAT, ELISA, and many more diverse and specific techniques. Furthermore, the fellow participated in the discussion of diagnostics results of patients; this increased the understanding of difficulties with the interpretation of results and the importance of giving advice to the treating physician.

Educational outcome: Application of concepts of virology, bacteriology, parasitology/mycology and immunology to the public health disciplines and translation to advice, identification of the use and limitations of diagnostic and typing methods and their interpretation in patient diagnosis, outbreak investigations, surveillance and epidemiological studies.

## 4. Biorisk management

### *A. Laboratory assessment/internal audit*

An assessment of the national reference laboratory for TB and mycobacteria at SSI was performed for the indicators 'process management and control' and 'documentation' using the IQLS checklist provided during the 'biorisk and quality management' module. The assessment showed that process management and control and documentation are both very well established. The few indicators that did not score 100% do not need to be changed, but are inherent to the procedures in which the laboratory operates, as it is not a first-line clinical microbiology diagnostic laboratory, but a reference laboratory. Minor recommendations have been made and include: registration of the name of the person in charge of validation and/or updating of laboratory procedures in the electronic datasystem QDoc and the availability of a bench-level copy of all procedures.

### *B. Instruction on biosafety, biosecurity and quality control procedures*

The fellow received instruction on biosafety and biosecurity at the national reference laboratory for TB and mycobacteria at SSI. In addition a full instruction on the quality procedures by the quality coordinator of the laboratory was provided. The instructions also involved spending time in the BSLIII laboratory together with the laboratory technicians and learning about TB diagnostic procedures and safety regulations surrounding working in a level 3 laboratory.

### *C. Biorisk and quality management module, Institute Pasteur, Paris, France*

The objective of the module was to provide training on three related topics:

- Quality management in biomedical laboratories according to ISO 15189 norm (1½ day)
- Training for international shipping of infectious substances (1 day)
- Biorisk management in biomedical laboratories (2 days)

In each session the content was first presented as an exercise and then discussed in depth with the whole group. The facilitator summarised the content in a plenary lecture.

Educational outcome: Application of national, European and WHO rules and regulations regarding biosafety and biosecurity, appropriate decontamination strategies and the use of personal protection in a BSLIII laboratory, Management of quality and biosecurity in the national reference laboratory for TB and mycobacteria. International shipping of infectious substances accreditation from WHO.

# 5. Quality management

## *A. Implementation of an external quality assurance scheme for* Neisseria gonorrhoeae *and* Haemophilus influenzae *antimicrobial susceptibility testing across Denmark*

The objective of this project was to assess the ability of each of the clinical microbiology laboratories in Denmark to correctly identify the antimicrobial susceptibility of selected *N. gonorrhoeae* and *H. influenzae* isolates. A panel of eight *N. gonorrhoeae* and eight *H .influenzae* isolates was sent out to all 13 clinical microbiology laboratories in Denmark. The laboratories were asked to perform the following tests: For *N. gonorrhoea*: beta-lactamase test and susceptibility to ciprofloxacin, ceftriaxon, azithromycin, gentamicin and penicillin tested by E-test or MICE. For *H influenzae*: beta-lactamase test and susceptibility to cefotaxim, ceftriaxon, cefachlor and penicillin tested by disc diffusion assay. All 13 laboratories participated and 11 of them reported that they follow EUCAST guidelines. Overall the results show the 13 Danish clinical microbiology laboratories are very capable of correctly identifying the antimicrobial susceptibility of selected *N. gonorrhoeae* and *H. influenzae* isolates. A recommendation for the optimisation of antimicrobial susceptibility testing is to strictly apply the EUCAST protocol for the interpretation of the susceptibility.

Educational outcome: Application of external quality standards, assessment of different standards and procedures between laboratories and their outcomes.

# 6. Teaching and pedagogy

1. Facilitation of the 5-day course 'Basic microbiology for infection control nurses at the Nordic School for Public Health' in Goteborg, Sweden, together with Anne Kjerulf from SSI. For this course the fellow identified the training needs of the nurses and prepared two lectures and four case studies which were delivered over the course of two days.
2. Teaching of trainee clinical microbiologists, on rotation at SSI. Preparation of a lecture about the EUPHEM programme and one of the projects. The aim was to increase their understanding of public health microbiology in the EU and to give an example of projects performed by fellows, resulting in an in-depth discussion of diagnostic practices among clinical microbiology laboratories.
3. Co-supervision of two MSc students at SSI performing a study researching the pathogenicity of *Yersinia enterocolitica* biotype 1A.
4. Preparation of a case study on the investigation of the outbreak of norovirus in Kalundborg, Denmark, 2012 for the 19th EPIET/EUPHEM introductory course.

Educational outcome: identification of educational needs of target group, development of case studies and lectures based on educational needs, teaching people with diverse backgrounds (nurses, MSc students, clinical microbiologists) about the importance of public health microbiology and the collaboration between microbiology and epidemiology.

# 7. Public health microbiology management

## *A. Management during outbreak investigations and projects*

In all projects the fellow needed to communicate with experts from various disciplines to effectively progress and finish the projects. She learned to plan, coordinate and lead projects. Specifically: during the *Salmonella* surveillance and the TB laboratory assessment she learned about the running of a reference laboratory and how to instruct and direct the personnel; during the outbreak investigations she frequently intermediated between the epidemiologists and the microbiology laboratory and communicated with other partners involved in the investigations; the measles project provided the opportunity to discuss current WHO and other international policies and procedures and the way they are implemented on a national level; in the external quality assurance project, prioritisation and the importance of good planning, shipping of organisms and interaction with the reporting regional clinical laboratories were learned.

## *B. Initial management in public health microbiology module, ECDC, Stockholm, Sweden*

The module on initial management in public health microbiology provided educational outcomes such as: to understand the role and responsibilities of a people manager within a public health environment; to understand different management styles in order to get the best out of people and teams; to understand team roles and team evolution to inform team success; to describe and identify how to motivate teams to improve performance; to understand how to provide structured feedback to improve performance and to minimise disruption when conflict occurs.

Educational outcome: Organisation and management of a public health microbiology laboratory, including planning workflows, communication with and instruction of laboratory staff. Written and oral communication (such as meetings, discussions, presentations, reports and publications) with people from diverse and multidisciplinary backgrounds.

# 8. Communication

## A. Publications

1. Torpdahl M, van Alphen LB and Sørensen G. Characterisation of *Campylobacter* isolates from humans and chicken meat. Annual report on Zoonoses, DTU Food, National Food Institute (2011)
2. Kinross P†, van Alphen LB†, Martinez Urtaza J, et al. Multidisciplinary investigation of a multi-country outbreak of *Salmonella* Stanley infections associated with turkey meat in the EU, 2011–2012 (in preparation)
3. van Alphen LB†, Dorleans F†, Schultz AC, et al. The application of new molecular methods in the investigation of a waterborne outbreak of norovirus in Denmark, 2012 (in preparation)
4. van Alphen LB, Fonager J, Krause Knudsen L, Mulders M and Kølsen Fischer T. Measles Surveillance System in Denmark 2005–2012 – room for improvement? (in preparation)
5. van Alphen LB, Krogfelt K, Lemcke A, et al. Leptospirosis in Denmark 1980-2012 (in preparation)
6. Larsen J, Petersen A, van Alphen LB, et al. Emergence and epidemiology of livestock-associated methicillin-resistant *Staphylococcus aureus* CC398 in humans, Denmark, 2004–2011 (in preparation)

† *Contributed equally*

## B. Reports

1. Preliminary report of molecular epidemiology outbreak investigation *Salmonella* Stanley – Multi country EU outbreak microbiological investigation 2011–2012, ECDC
2. Lab Assessment of the National Reference Laboratory for TB and mycobacteria
3. Analysis of a *Yersinia enterocolitica* outbreak signal January–May 2012, Denmark
4. Outbreak report of respiratory and gastrointestinal illness in EPIET–EUPHEM introductory course on Lazareto 2011
5. MRSA outbreak, Hillerød Hospital, February–March 2012, Denmark
6. MRSA outbreak, Vejle Hospital, April 2012, Denmark

## C. Teaching materials

1. Lectures (2) on Gram Negative Rods and Streptococci for a Course in Basal Microbiology for Infection Control Nurses at the Nordic School for Public Health in Goteborg, Sweden
2. Case studies (4) based on outbreak investigations I participated in for Course in Basal Microbiology for Infection Control Nurses at the Nordic School for Public Health in Goteborg, Sweden
3. Case study on the investigation of the outbreak of norovirus in Kalundborg, Denmark, 2012 for the 19th EPIET/EUPHEM Introductory course (in preparation)

## D. Conference presentations

1. van Alphen LB, Torpdahl M, Larsson JT, et al. Flagellin A Sequencing and Antimicrobial Resistance Profiling in an Outbreak Investigation of Campylobacter in Denmark, 2011. Oral presentation at the European Scientific Conference on Applied Infectious Disease Epidemiology (ESCAIDE 2012) congress, Edinburgh, Scotland, 24–26 October 2012.
2. van Alphen LB, Larsen J, Petersen A, et al. Analysis of exposures and characteristics of cases of non-livestock-associated CC398 MRSA in Denmark. Poster presentation at the Scientific Spring Meeting KNVM & NVMM, Papendal, Netherlands, 16–17 April 2013
3. van Alphen LB, Torpdahl M, Larsson JT, et al. Use of *flaA* sequencing and antimicrobial resistance profiling in outbreak investigation of *Campylobacter* in Denmark, 2011. Poster presentation at the Applied Bioinformatics and Public Health Microbiology conference in Cambridge, UK 15–17 May 2013

## E. Submitted abstracts (ESCAIDE 2013)

1. van Alphen LB, Fonager J, Krause Knudsen L, Mulders M and Kølsen Fischer T. Measles Surveillance System in Denmark 2005–2012 – room for improvement?
2. van Alphen LB, Schultz AC, Fonager J, et al. Applying new molecular methods in the investigation of norovirus in a waterborne outbreak of gastroenteritis in Denmark, 2012

## F. Selection of other presentations

1. van Alphen LB. Evaluation of the measles surveillance system in Denmark EPIET–EUPHEM Forum meeting, Department of Infectious diseases immunology, SSI. 6 March 2013
2. van Alphen LB. European Public Health Microbiology (EUPHEM) Fellowship: overview of fellowship and summary of Virology projects at the journal club of the Department of Virology, SSI. 7 February 2013

3. van Alphen LB. Microbiological analysis of Kalundborg outbreak of norovirus. Virological surveillance and Research group, SSI. 1 February 2013
4. van Alphen LB. Analysis of a *Yersinia enterocolitica* outbreak signal January–May 2012, Denmark. Department of Infectious diseases immunology, SSI. 6 March 2013
5. van Alphen LB. Analysis of a *Yersinia enterocolitica* outbreak signal January–May 2012, Denmark. DTU Food. 28 June 2013
6. van Alphen LB, Flagellin A. Sequencing and Antimicrobial Resistance Profiling in an Outbreak Investigation of *Campylobacter* in Denmark, 2011 at the Danish Central Outbreak group meeting, DTU Food. 12 December 2011

# 9. International mission

An international mission request was received from ECDC for microbiological support in the investigation of the international outbreak of *Salmonella* Stanley in Europe. After an alert on 29 June 2012 an investigation was coordinated at the EU-level between EU institutions and agencies and affected countries, to describe the scale of the outbreak, assess possible food sources and inform public health authorities. The objective of the EUPHEM fellow's role in the project was to support the outbreak investigation by compiling all data on outbreak isolates sent by the Member States to ECDC. Analysis of the PFGE profiles of *S.* Stanley human isolates from a historical database of isolates from 1994 onwards (formerly known as PulseNet Europe), and from the outbreak period, revealed that the outbreak isolates had a novel PFGE profile that emerged in Europe in 2011 and spread rapidly throughout parts of the EU in 2011–2012. Comparative analysis of *S.* Stanley isolates from human, animal, food, feed and environmental samples from 16 Member States showed indistinguishable PFGE profiles in 357 out of 464 analysed isolates. Non-human isolates were linked to the turkey food production chain.

# 10. EPIET/EUPHEM modules attended

- EPIET/EUPHEM introductory course, Menorca, Spain (15 days)
- Computer tool in outbreak investigation (5 days)
- Biorisk and quality management (5 days)
- Initial management in public health microbiology (5 days)
- Project review module 2012 (5 days) and 2013 (5 days)
- Vaccinology (5 days)
- Rapid assessment of complex emergency situations (5 days)
- ECDC stay 2012 (3 days) and 2013 (3 days)

# 11. Other courses

Laboratory course on PFGE analysis of CC398 MRSA isolates. Instructor: Thijs Bosch, RIVM, the Netherlands (5 days).

# Discussion

## A. Coordinator's conclusions

One of the main goals of the EUPHEM programme is to expose the fellows to different public health experiences and activities, thus enabling them to work across various disciplines in the field of public health. This report summarises the different activities and projects conducted by Lieke van Alphen, EUPHEM fellow (cohort 2011), the first fellow placed at the Statens Serum Institut, Copenhagen, Denmark. The activities were in line with the 'learning by doing' approach of the EUPHEM programme and followed the core competency domains described for mid-career and above. All projects and other activities had a clear educational outcome contributing to the development of a wide range of experiences and expertise. The activities provided the fellow with a variety of knowledge, skills, abilities and attitude required in the field of public health microbiology and strengthened her ability to work in a multidisciplinary team. The fellow has succeeded in performing all her tasks to a very high standard and with a professional attitude.

## B. Supervisor's conclusions

During the two-year fellowship at Statens Serum Institut Lieke van Alphen has been involved in a large variety of public health activities as described in the core competencies of the EUPHEM programme. The fellow has developed both personally and professionally during the fellowship and has solved the given tasks in a highly competent way, with a high degree of independence, but at the same time seeking assistance appropriately. A positive attitude to challenges and open mind towards colleagues makes the fellow a very competent team player.

## C. Personal conclusions of fellow

In public health microbiology the application of microbiological principles and practice are used for the prevention and control of infectious diseases on a population level. This requires microbiologists who can effectively communicate and collaborate with people from different disciplines, especially from epidemiology and medical microbiology. The structure of the training during this fellowship with specific modules and a 'learning-by-doing' approach with continuous feedback provides a good foundation to perform these tasks. The two years of the EUPHEM fellowship gave me the opportunity to diversify my microbiological knowledge and to be exposed to the different aspects of public health microbiology. I have been part of outbreak investigations and multidisciplinary research teams, thereby broadening my own view of microbiology and the impact it can and should have in public health. It has given me the chance to build a network consisting of fellows, alumni of both the EPIET and EUPHEM programmes and experts from national public health institutes and international organisations like ECDC and WHO. This network is a great basis for future national and international interdisciplinary collaborations, which are so important in disease prevention.

I hope that as the EUPHEM programme grows and develops, public health microbiology will become an important discipline within public health. I expect the added value of public health microbiologists and especially their ability to bridge across disciplines will be recognised and employed more in the future.

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And last but not least, a big thank you to all my EUPHEM co-fellows past and present; it has been a pleasure working on our fellowships together!