



## EPIET REPORT

# Summary of work activities

Frederique Dorléans  
European Programme for Intervention  
Epidemiology Training (EPIET), 2011 cohort

## Background

### Pre-fellowship short biography

Frederique Dorléans was trained in Biological Sciences (BSc biology) and Public Health (BSc public health, ISPED, Bordeaux). She holds an MSc in Public Health (Paris) and an MSc in Health Services Management from the London School of Hygiene & Tropical Medicine. Her last position was at the French National Public Health Institute (Institut de veille sanitaire, Paris, France) where she worked as technical officer in the unit for vaccine-preventable diseases. Her areas of work included the surveillance of pneumococcal infections, liaising with a collaborative European network, and the coordination of a project on vaccine-preventable diseases in Europe (introduction of HPV and RV vaccinations in NIS, VENICE II). Earlier, she had spent several years with UNICEF and WHO as a public health specialist working mainly on poliomyelitis eradication and measles elimination (Niger, Togo, and Cameroon).

### EPIET assignment

On 19 September 2011, Frederique Dorléans was assigned to Statens Serum Institute, Copenhagen in Denmark, as an EPIET fellow.

## Fellowship projects

### Surveillance projects

#### **Evaluating the completeness of the invasive pneumococcal diseases surveillance system in Denmark, 2010–2011**

Background: In 2000–2005, invasive pneumococcal diseases (IPD) caused an average of 187 deaths annually in Denmark. In 2007, Denmark introduced the pneumococcal conjugated vaccine as part of the childhood immunisation programme. To assess the ability of the IPD surveillance system to capture cases, we estimated the completeness of its different components, including a national microbiological database (MIBA) launched in 2010.

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**Methods:** We defined IPD as a positive culture for *Streptococcus pneumoniae* from cerebrospinal fluid (meningitis) or blood (bacteraemia). From 1 January 2010 to 31 December 2011, we linked databases using the Danish national personal identifier to conduct a capture-recapture analysis in order to estimate (a) the total number of IPD cases (maximum likelihood estimator) and (b) the estimated completeness and 95% confidence interval (CI) for each data source. We compared MIBA with (1) the database of the national *Neisseria* and *Streptococcus* reference laboratory (NSR laboratory) and (2) the database of clinical notifications of IPD. It is mandatory in Denmark to report meningitis in all age groups and bacteraemia in children less than five years of age and send isolates for all cases to the NSR laboratory for serotyping.

**Results:** Capture-recapture analysis between MIBA and NSR laboratory databases estimated a total number of 2021 IPD (95% CI: 2015–2027) with respective completeness of 94% (95% CI: 88–100) and 93% (95% CI: 87–99). Capture-recapture between MIBA and clinical notifications database estimated a total of 237 IPD cases (95% CI: 233–240) with respective completeness of 89% (95% CI: 86–93) and 90% (95% CI: 86–93).

**Conclusions:** The newly operating MIBA, clinical notifications and the NSR laboratory databases show a high completeness in capturing IPD cases, therefore allowing effective monitoring of incidence trends, impact of vaccination and occurrence of serotype replacement.

**Contribution/role:** main investigator

**Status:** completed

**Output:** internal presentation; presentation at ESCAIDE 2013

## Outbreaks

### **A waterborne outbreak of norovirus in a small community in Denmark, December 2012**

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

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

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

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

**Contribution/role:** main co-investigator

**Status:** completed

**Output:** oral presentation at ESCAIDE 2013; manuscript accepted by PLOS-One; case study introduced at the EPIET introductory course, September 2013; internal presentations

### ***Salmonella* Typhimurium monophasic MLVA 0006 outbreak in July 2012 [2]**

**Part 1:** Outbreak occurring in 10 companies based in Copenhagen in weeks 23/24–2012; all companies had food delivered by the WDF catering company. Beef served on 8 June 2012 was identified to be associated with the infection.

**Part 2:** Outbreak occurring in a group of 500 participants to 24-hour run in Copenhagen in week 24–2012 who were served food by the WDF catering company.

**Contribution/role:** investigator

**Status:** completed

**Output:** internal presentations; presentation at central outbreak meeting (July 2012)

## Research

### A case-control study of risk factors for rotavirus infections in adults, Denmark, 2005–2009

Objectives: To identify risk factors for rotavirus infections among adults aged  $\geq 18$  years of age and to describe illness and genotyping characteristics.

Methods: From March 2005 to February 2009, we prospectively recruited cases (laboratory-confirmed rotavirus infection) that we compared with healthy controls matched on age, gender and municipality of residence. We collected information on illness characteristics and exposures using postal questionnaires. We calculated matched odds ratios (mOR) with conditional logistic regression.

Results: Illness exceeded 10 days in 31% of the 68 cases; 22% were hospitalised. Compared with their 246 controls, cases were more likely to report close contact with a person with gastrointestinal symptoms, including children  $< 3$  years of age (mOR=40; 95% CI=8.5–190) and adults  $> 18$  years of age (mOR=12; 95% CI=3.5–43). Underlying health conditions were associated with infection risk (mOR=5.5; 95% CI=1.5–20).

Conclusions: Contact with young children or an adult with gastrointestinal symptoms is a risk factor for rotavirus infection among adults in Denmark. Rotavirus vaccination assessments should consider that rotavirus vaccination in children may indirectly reduce the burden of disease in adults.

Contribution/role: main co-investigator

Status: completed

Output: poster presentation at ESCAIDE 2012; manuscript under submission; internal presentations

## Scientific communication

- Two manuscripts as first author/co-author (in progress)
- First author or co-author of two weekly epidemiology bulletins (SSI website)
- Two posters presented at ESCAIDE 2012 (Edinburgh) and ESCAIDE 2013 (Stockholm)
- Oral presentation at ESCAIDE 2013 (Stockholm)

## Teaching experience

### Case study writing

Conception and writing of a case-study: inspired from the outbreak investigation in Kalundborg, in Denmark (December 2012) and introduced at the EPIET introductory course (2013).

Contribution/role: main co-investigator and author

Status: completed

Output: case study presented at the EPIET introductory course (2013); teaching materials for participants in future training courses

### Course organisation and coordination for MSc students: outbreak investigation and surveillance methods (March 2013)

Organisation/coordination of a course for students seeking an MSc in International Health; overview presentations on epidemiology at SSI and outbreak identification and investigation in Denmark.

Contribution/role: organiser, coordinator and presenter of two sessions

Status: completed

Output: organisation; coordination and presentation

### Course organisation and coordination: Organisation of introductory course for international undergraduate students

Introductory course for international undergraduate students on surveillance, outbreak investigation and activities carried out at SSI (February 2012 and February 2013).

Contribution/role: co-organiser, coordinator and presenter of two sessions

Status: completed

Output: organisation; coordination and presentation

## Supervisor's conclusions

During her two-year fellowship at the Department of Infectious Disease Epidemiology at Statens Serum Institut, Frédérique Dorléans was an integral part of the department and involved in a large variety of epidemiological and public health activities. Frédérique – a positive, constructive and enthusiastic colleague – dutifully, energetically and quickly completed all tasks assigned to her. Frédérique adapted well to living in Denmark and although the Danish language remained a challenge, she felt clearly at ease in the country and it was a pleasure to witness her professional and personal development.

Several of the projects Frederique conducted during her fellowship had a clear public health value. Her contribution to a project on risk factors for rotavirus infection in adults is particularly notable. These infections are often overlooked and were found to be transmitted through person-to-person contact. Her investigation used an analytical study to investigate the various public health implications. (The cause of the outbreak she investigated was later identified as a waterborne norovirus outbreak). Frédérique also took part in transforming her research into a case study for teaching purposes.

## Next steps

To work as a public health specialist and trainer with a focus on infectious diseases epidemiology in local, regional, national and international contexts.

## Publications and presentations

1. Van Alphen L, Dorléans F, Schultz AC, Fonager J, Ethelberg S, Dalgaard C, et al. The application of new molecular methods in the investigation of a waterborne outbreak of norovirus in Denmark, 2012. Submitted to PlosOne (manuscript accepted).
2. Dorléans F, Ethelberg S, van Alphen L, Fonager J, Adelhardt M, Mølbak K, et al. A waterborne outbreak of norovirus in a small community in Denmark, December 2012. Oral presentation at the European Scientific Conference on Applied Infectious Disease Epidemiology (ESCAIDE), 5–7 November 2013, Stockholm.
3. Dorléans F, Mølbak F, Voldstedlund M, Dalby T, Nielsen J, Hiul Suppli C, et al. Evaluating the completeness of the invasive pneumococcal diseases surveillance system in Denmark, 2010–2011. Poster presentation at the European Scientific Conference on Applied Infectious Disease Epidemiology (ESCAIDE), 5–7 November 2013, Stockholm.
4. Dorléans F, Falkenhorst G, Böttiger B, Howitz M, Midgley S, Nielsen J, et al. A case-control study of risk factors for rotavirus infections in adults, Denmark, 2005–2009. European Scientific Conference on Applied Infectious Disease Epidemiology (ESCAIDE), 24–26 October 2012, Edinburgh; manuscript under submission
5. Dorléans F, Andersen PH. Eradicating poliomyelitis: the final countdown. Weekly epidemiological bulletin, Statens Serum Institute website (week 34/2012 and week 35/2012, Danish and English versions).
6. Dorléans F, Grove TK. Epidemiological situation of Coronavirus. Weekly epidemiological bulletin, Statens Serum Institute website (week 10/2013 and week 11/2013, Danish and English versions).