



EPIET REPORT

Summary of work activities

Nelly Fournet

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

Background

Pre-fellowship short biography

Nelly Fournet studied statistics and obtained a Master's degree in Biostatistics applied to Public Health and Social Sciences in 2003. Before enrolling in EPIET, she worked for three years (2004–2007) as a biostatistician in a clinical research unit of a hospital in Bordeaux, France), one year (2008) as a biostatistician in an HIV clinical research unit (Chiang Mai, Thailand) and three years (2009–2011) as a statistician/epidemiologist at the French Institute for Public Health (InVS, Paris, France) in the department of alert and coordination of regional offices (DCAR).

EPIET assignment

On 15 September 2011, Nelly Fournet was assigned as an EPIET-EU fellow to the Epidemiology and Surveillance Unit of the Centre for Infectious Diseases (Cib) of the National Institute for Public Health and the Environment (RIVM) in the Netherlands.

Fellowship projects

Surveillance project

Bi-weekly mumps surveillance reports

Routine surveillance report every two weeks: follow-up of hospitalisations, complications, complementary analysis and sending of the report to a contact list in RIVM and GGD (Municipal Health Service).

Status: completed

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Evaluation of a norovirus surveillance system in the Netherlands

In the Netherlands, there is no single national norovirus surveillance system. Instead, three databases are maintained with different types of information collected during norovirus outbreaks: Osiris (epidemiological data by outbreak), OGZ (case-based data) and LIS/LID (laboratory and genotype data).

First, these three databases were described by number of outbreaks/or cases per year, setting, and GGD. Completeness was shown by determining the number of missing data (%). Finally, in order to assess if these databases could provide an overview of norovirus cases in the Netherlands (based on sequences combined with epidemiological data from norovirus outbreaks), all three were temporarily connected. The following criteria were assessed for all three database systems: simplicity, flexibility, acceptability, sensitivity, positive predictive value, representativeness and timeliness. The period covered by all databases was 2008 to 2010.

After assessing all indicators it became clear that a permanent connection of all three databases was not possible and that the intended surveillance objectives could not be reached. Consequently, it proved to be very difficult to produce an overview of both the different genotypes that circulate in the Netherlands and the corresponding epidemiological data. Database records were not representative of the overall situation in the Netherlands because not all GGDs collect data. In addition, none of three databases used real-time processing, which rendered them useless for the detection of trends, food-tracing and rapid assessments of the epidemiologic situation.

We recommend that:

- the two main systems should be linked to Osiris, as they were used by most of the GGDs;
- the GGDs should be made aware of the usefulness of recording all norovirus outbreaks;
- data should be tagged with a unique identification number for each record; alternatively, it should be attempted find a combination of variables which would allow to link the databases;
- variables names and their coding should be homogenised; and
- that drop-down menus with presets should be provided (GGD, setting)

Status: completed

Evaluation of a mortality surveillance system in the Central African Republic

Status: completed

Outbreaks

Hepatitis A outbreak probably linked to the consumption of sun-dried tomatoesⁱ

In November 2011, a cluster of initially five cases of hepatitis A infection with closely related strains was identified in the Netherlands. England reported possibly related cases. Strains with identical sequences had been involved in previous outbreaks and appeared to be linked to semi-dried tomatoes. An investigation of the Dutch cluster suggested a link to ready-to-eat salads, including those containing semi-dried tomatoes. Despite a traceback, no source could be identified. Vigilance is needed, and rapid sharing of data may help source-tracing.

Status: Completed

Cryptosporidium outbreakⁱⁱ

In August 2012, an increase in *Cryptosporidium* infections was reported in the Netherlands, the United Kingdom and Germany. It represented a 1.8- to 4.9-fold increase compared with previous years. Most samples were *C. hominis* IbA10G2. A case-control study was performed in the Netherlands but did not identify an endemic source. A case-case study in the north of England found travel abroad to be the most common risk factor.

Status: Completed

Research

Undervaccinated groups in Europe: Who are they and how to communicate with them in outbreak situations?ⁱⁱⁱ

Executive summary of the report

Increased scientific knowledge and technical advances have enabled health authorities to respond more effectively to major outbreaks. However, the ability of governments and health authorities to effectively communicate the need for large-scale preventive measures such as vaccination campaigns – particularly during outbreaks – and to increase the acceptance of vaccination among the general population and undervaccinated risk groups has not developed to the same extent. Consequently, unvaccinated pockets remain in many European countries, with a disproportionately high number of outbreaks of vaccine preventable diseases (VPDs).

This project aimed to develop evidence-based behavioural and communication strategies for undervaccinated groups that can be used effectively by health professionals and agencies throughout Europe in case of major epidemic outbreaks of a VPD.

The first part of this report seeks to identify undervaccinated groups and to describe their determinants regarding vaccination in three European countries (Portugal, Romania and the Netherlands). Through literature reviews, grey literature and ongoing research, we identified six undervaccinated groups: anthroposophists, orthodox protestants, members and supporters of The Dutch Association for Conscientious Vaccination (NVKP), the Roma community, the followers of macrobiotics, and the so-called 'critical citizens'. The main determinants regarding vaccination were the perceived non-severity of traditional 'childhood' diseases, fear of vaccine side-effects, doubts about the effectiveness of the vaccine, religious objections, natural lifestyle, low access to healthcare centres and a lack of trust in public health authorities. All identified undervaccinated groups hold a variety of beliefs about, and objections to, vaccination, and not all members of a group share the same convictions (within-group heterogeneity). On the contrary, some members of different groups shared similar beliefs (between-group homogeneity). Therefore, we decided to develop communication strategies on the determinants most easily influenced (or amenable to change) rather than build a separate communication strategy for each UVG.

We then developed a 'determinants and performance objectives matrix' which combined performance objectives with each selected determinant; programme objectives were defined in order to achieve these performance objectives. The inherent hypothesis of this approach is that a determinant-based approach may be more effective and efficient than a segmented approach based on specific sub-groups of the population such as orthodox protestants, anthroposophist and members of the Roma community.

The potential efficiency of the programme may be significant, given that such an approach could also be used with the general population. This approach should not be confused with a total disregard for the specific needs of specific segments of the population who, actively or passively, resist immunisation. Rather, the use of a determinants-based approach should supplement a more specifically segmented and targeted approach based on specific sub-group characteristics.

Abstract of the manuscript

Background: Despite a large number of national immunisation programmes in Europe, some groups remain unvaccinated, which leads to outbreaks of vaccine-preventable diseases (VPD). Gaining insight into beliefs and attitudes of these undervaccinated groups (UVGs) might give opportunities to communicate with them based on mutual trust and thus increase vaccine uptake.

We performed two literature reviews: the first aimed to identify UVGs in Europe and the second to describe their main determinants with respect to vaccination.

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

Results: We selected 44 articles (of a total of 651) in the first literature search and nine articles (of a total of 447) in the second. Five UVGs were identified: anthroposophists; orthodox protestants; orthodox Jewish, Roma, and Irish Travellers communities. The main determinants regarding vaccination were the perceived non-severity of traditional 'childhood' diseases, fear of vaccine side-effects, doubts about the effectiveness of the vaccine, religious objections, natural lifestyle, low access to healthcare and a lack of trust in public health authorities.

Conclusions: The identified UVGs hold a variety of beliefs about, and objections to, vaccination. Similar beliefs are shared by several other groups. In order to reach these UVGs and help them to make a well-informed decision about vaccination, access to healthcare has to be improved, and communication programmes need to be developed that take into account determinants shared across different groups, but still taking into account the specificity of each group. This might eventually lead to an increase in vaccination coverage and a subsequent drop of VPD outbreaks in the future.

Status: completed (report finished, manuscript in preparation, abstract accepted for ESCAIDE 2013)

HIV/STI among female and male sex workers

Abstract ESCAIDE 2012 (oral presentation)^{yvv}

Title: Young commercial sex workers are at higher risk of sexually transmitted infections, the Netherlands, 2006–2011

Background: Commercial sex workers (CSWs) are particularly exposed to sexually transmitted infections (STIs). To direct prevention measures, we estimated the prevalence of the three most common bacterial STIs and examined factors associated with infection among CSWs.

Methods: A CSW was defined as a person exchanging sex for money or other valuable goods in the past six months prior to the consultation. Using 2006–2011 national surveillance data on STI clinic visits, we estimated the prevalence of STIs (positive laboratory test for chlamydia, gonorrhoea and/or syphilis). We used univariable and multivariable logistic regression to identify factors associated with these STIs, stratified by gender and age group.

Results: Between 2006 and 2011, the prevalence of STIs was 9% among 23 789 female sex workers (FSWs) and 17% among 2 295 male sex workers (MSWs). Young CSWs (15–24 years) had a higher prevalence (25% for MSWs, 16% for FSWs) than CSWs aged ≥ 25 years (14% for MSWs, 7% for FSWs, $p < 0.0001$). Prevalence of STIs was higher among MSWs having sex with men than among heterosexual MSWs (OR=2.0, 95% CI: 1.2–3.5 for 15–24 years of age, OR=2.2, 95% CI: 1.3–3.6 for 25–34 years of age and OR=2.8, 95% CI: 1.5–5.3 for ≥ 35 years of age). MSWs known to be HIV positive had a higher prevalence (OR=4.6, 95% CI: 2.7–7.9 for 25–34 years of age and OR=2.8, 95% CI: 1.5–5.5 for ≥ 35 years of age) than those who were previously tested negative for HIV.

Conclusions: Young male and female CSWs, MSWs having sex with men, and known HIV-positive MSWs had a higher prevalence of STIs. Prevention activities need to target young sex workers to increase early diagnosis, prevention and treatment. MSWs having sex with men and known HIV-positive MSWs may require more targeted interventions.

Abstract ESCAIDE 2013 (poster)⁹

Title: Factors associated with newly diagnosed cases of HIV infection among commercial sex workers, the Netherlands, 2006–2012

Background: Commercial sex workers (CSWs) are particularly exposed to sexually transmitted infections, including HIV. To direct prevention and intervention measures, we calculated the proportion of consultations with newly diagnosed HIV and examined factors associated among male (MSWs) and female sex workers (FSWs).

Methods: A CSW was defined as a person exchanging sex for money or other valuable goods in the six months prior to the consultation. Using 2006–2012 national surveillance data on STI-clinic visits, we calculated the proportion of consultations with newly diagnosed cases of HIV infection among CSWs. We used univariable and multivariable logistic regression to identify factors associated with this outcome, stratified by sex.

Results: Between 2006 and 2012, the proportion of newly diagnosed cases of HIV infections was 0.1% (40) among 28 398 FSWs and 2.5% (66) among 2 688 MSW consultations. The proportion of HIV infections was higher among MSW having sex with men than among heterosexual MSW (OR=26.9, 95% CI: 3.7–197.7) and among MSW who had a co-infection with bacterial STI (OR=5.4, 95% CI: 3.2–9.1). FSWs from sub-Saharan Africa had a higher proportion of HIV infections than Dutch FSW (OR=20.6, 95% CI: 8.0–53.0). Among FSWs, intravenous drug use was associated with HIV infection (OR=7.3, 95% CI: 1.6–32.0). The proportion of newly diagnosed HIV infections was higher among both FSWs and MSWs who were never tested prior to the consultation for HIV compared with those who were previously tested negative.

Conclusions: MSWs and FSWs had different factors associated with newly diagnosed cases of HIV infections. Prevention and intervention activities on HIV need to target MSWs having sex with men, sub-Saharan FSW and CSW who were never tested for HIV in order to increase early diagnosis, prevention and treatment and to avoid further transmission through their clients or partners.

Status: completed (one oral presentation at ESCAIDE 2012, one poster at the STI/AIDS congress in Vienna, Austria, July 2013, one poster at ESCAIDE 2013, 1 manuscript in preparation)

Scientific communication

- Two posters presented in conferences at ESCAIDE 2013 (n=1) and at STI/AIDS congress, Vienna, Austria, 15 July 2013 (n=1)
- Three oral presentations at ESCAIDE in 2012 (n=1) and 2013 (n=2)
- Two rapid communications in Eurosurveillance

Teaching experience

- 1 November 2011: 2 lectures on (i) outbreak investigation and (ii) epidemiological curves. Also facilitated a case study: outbreak of giardiasis in Norway (NSPOH, Amsterdam)
- 22 November 2011: facilitated case study on hepatitis A, oysters and alcohol (NSPOH, Amsterdam)
- 14 November 2011: facilitated a case study: an outbreak of trichinellosis in France (Nijmegen University)
- 12 March 2013: facilitated a case study: an outbreak of trichinellosis in France; held a lecture on questionnaire design (NSPOH, Amsterdam)

Status: completed

International missions

Mortality retrospective survey in Central African Republic, Carnot City, July 2012^{vii}

The main objective was to estimate the crude mortality rate and the specific mortality rate among children <5 years of age in Carnot City between January and July 2012. The secondary objectives were to estimate the main causes of deaths and to evaluate the mortality surveillance system implemented in September 2011 in some of the neighbourhoods (sentinel surveillance). The team applied the SMART methodology and used two-stage cluster sampling. Together with a senior epidemiologist from Epicentre, Nelly was involved in the implementation of the field study and in the training of the 17 interviewers. She also supervised the interviewers and the two data operators in the field for the duration of two weeks. Finally, she participated in the analysis and the writing of the report at Epicentre in Paris.

Abstract

Title: High levels of crude mortality rate in Carnot City, Central African Republic, January–July 2012

Background: Epicentre estimated that from January to July 2011 the crude mortality rate (CMR) and the specific mortality rate among children <5 years old (U5MR) in Carnot City, Central African Republic, was three times higher than the SPHERE emergency thresholds (1 and 2 deaths/day/10 000 inhabitants). In January 2012, Médecins Sans Frontières (MSF) initiated healthcare activities. In July 2012, we conducted a retrospective mortality survey to evaluate the impact of this programme.

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

Results: We included 32 clusters in 23 neighbourhoods for a sample of 8 857 persons in 1 526 households (0.92 male/female). Twenty-one per cent were children <5 years of age and 46% <15 years of age. Household heads reported 322 deaths, including 116 deaths (36%) among children <5 years of age (CMR: 1.8 deaths/day/10 000 inhabitants, 95% confidence interval (CI): 1.4–2.3); U5MR: 3.0/day/10 000, 95%CI: 2.0–4.4). U5MR was 3.1 (95% CI: 2.2–4.4) before the rainy season (January–April) and 2.9 (95% CI: 1.9–4.5) in May–July. The main reported causes of deaths were HIV among adults >15 years of age (n=55, 30%) and malaria among children <5 years of age (n=40, 35%).

Conclusion: In Carnot City, CMR and U5MR dropped by half, compared with 2011; U5MRs were similar before and during the rainy season, suggesting a positive impact of the MSF programme. However, these indicators still exceed emergency thresholds, pointing out the need to improve access to healthcare centres, with a focus on HIV and malaria prevention and management.

Status: Completed (oral presentation at ESCAIDE 2013)

Supervisor's conclusions

During the two year fellowship at RIVM, Nelly Fournet worked on a wide variety of projects, ranging from a mortality survey in the Central African Republic to attitudes towards vaccination in Western Europe. The main strength of her fellowship is that it allowed her to engage in all projects with a high and very infectious dose of enthusiasm. From a technical point of view, her fellowship was characterised by a wide variety of topics and places of study (the Netherlands, Europe and Africa). By doing so, she delivered high-quality epidemiological work, making an important contribution to public health.

Next steps

On 1 October 2013, Nelly started to work at Epicentre in Paris, preparing six-month mission in the Democratic Republic of Congo; the mission will conduct a study on cholera vaccination coverage and vaccine effectiveness.

References

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