FELLOWSHIP REPORT

# Summary of work activities

Lois O'Connor
Intervention Epidemiology path (EPIET)
Cohort 2016

# Background

The ECDC Fellowship Training Programme includes two distinct curricular pathways: Intervention Epidemiology Training (EPIET) and Public Health Microbiology Training (EUPHEM). After the two-year training EPIET and EUPHEM graduates are considered experts in applying epidemiological or microbiological methods to provide evidence to guide public health interventions for communicable disease prevention and control.

Both curriculum paths are part of the ECDC fellowship programme that provides competency based training and practical experience using the 'learning by doing' approach in acknowledged training sites across European Union (EU) and European Economic Area (EEA) Member States.

## Intervention Epidemiology path (EPIET)

Field epidemiology aims to apply epidemiologic methods in day to day public health field conditions in order to generate new knowledge and scientific evidence for public health decision making. The context is often complex and difficult to control, which challenges study design and interpretation of study results. However, often in Public Health we lack the opportunity to perform controlled trials and we are faced with the need to design observational studies as best as we can. Field epidemiologists use epidemiology as a tool to design, evaluate or improve interventions to protect the health of a population.

The European Programme for Intervention Epidemiology Training (EPIET) was created in 1995. Its purpose is to create a network of highly trained field epidemiologists in the European Union, thereby strengthening the public health epidemiology workforce at Member State and EU/EEA level. Current EPIET alumni are providing expertise in response activities and strengthening capacity for communicable disease surveillance and control inside and beyond the EU. In 2006 EPIET was integrated into the core activities of ECDC.

The objectives of the ECDC Fellowship - EPIET path are:

- To strengthen the surveillance of infectious diseases and other public health issues in Member States and at EU level;
- To develop response capacity for effective field investigation and control at national and community level to meet public health threats;



*This portfolio does not represent a diploma. Fellows receive a certificate listing the theoretical modules attended and the 23-month training. Additionally, if all training objectives have been met, they receive a diploma.*

Stockholm, September 2018

- To develop a European network of public health epidemiologists who use standard methods and share common objectives;
- To contribute to the development of the community network for the surveillance and control of communicable diseases.

## Pre-fellowship short biography

Lois O'Connor is a medical doctor who is dual specialist trained in general practice and public health medicine. She has completed a Diploma in Tropical Medicine and Hygiene and a Master's in Public Health. Lois worked extensively in Ireland and Australia as a general practitioner before developing an interest in public health. She has a particular interest in vaccine preventable and gastrointestinal diseases.

## Fellowship assignment: Intervention Epidemiology path (EPIET)

In September 2016, Lois started her EPIET fellowship at the Health Protection Surveillance Centre (HPSC), Dublin, Ireland, under the supervision of Dr Paul McKeown. This report summarises the work performed during this fellowship.

# Methods

This portfolio demonstrates the competencies acquired during the ECDC Fellowship, EPIET path, by working on various projects, activities and theoretical training modules.

Projects included epidemiological contributions to public health event detection and investigation (surveillance and outbreaks); applied epidemiology field research; teaching epidemiology; summarising and communicating scientific evidence and activities with a specific epidemiology 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

The objectives of these core competency domains were achieved partly through project or activity work and partly through participation in the training modules. Results are presented in accordance with the EPIET core competencies, as set out in the EPIET scientific guide[1].

[1] European Centre for Disease Prevention and Control. European public health training programme. Stockholm: ECDC; 2013. Available from: http://ecdc.europa.eu/en/publications/Publications/.pdf

# Fellowship projects

## 1. Surveillance

Supervisor(s): Dr Lelia Thornton, Specialist in Public Health Medicine (hepatitis), HPSC

Dr Niamh Murphy, Surveillance Scientist (hepatitis), HPSC

***Title:*** **Evaluation of the hepatitis B enhanced surveillance system in Ireland**

Enhanced surveillance for hepatitis B cases in Ireland was established in 2005. It geographically covers all eight health service executive regions and is part of the electronic national notifiable infectious disease surveillance system, CIDR. The aim of the study was to evaluate the surveillance system to identify if it fulfilled its objectives and to evaluate; completeness, timeliness, representativeness, acceptability and simplicity, identified by the surveillance team as important attributes.

Electronic information was extracted on all notified hepatitis B cases from 2012 to 2016 to evaluate data quality and timeliness (acute cases only). Published sero-prevalence studies and census data was used to estimate the expected number of cases in Ireland, and an on-line questionnaire was distributed to stakeholders to evaluate the simplicity and acceptability of the system.
The system differentiates between acute and chronic cases with 97% of cases assigned appropriate disease status. Data completeness for chosen variables was better for acute cases (71%-95%) compared with chronic (32%-62%). Only 33% of acute cases were notified to the system within four days of laboratory result date while 29% had incorrect dates reported. Approximately 50%-57% of the expected number of hepatitis B cases was reported to the system. The majority of questionnaire respondents found the system acceptable (n=46, 90%) and easy to use (n=35, 69%)**,** but suggested matching paper enhanced surveillance information exactly to electronic hepatitis B surveillance fields, having fewer fields to complete and removing duplicate fields.

The hepatitis B surveillance system, while comprehensive, does not fulfil all of its objectives. Recommendations include improved reporting timeliness for acute cases, better data collection for chronic cases, implementation of existing hepatitis B screening guidance to ensure that notified cases are representative of hepatitis B in Ireland and streamlining the system as suggested by stakeholders.

***Role:*** I was the principal investigator. I wrote the protocol, exported the data from the national surveillance system, developed a hepatitis B surveillance system user questionnaire, distributed it to system users nationally, performed data cleaning and data analysis of the national surveillance data and questionnaire responses and wrote the report (1). The work was presented as a poster at the Royal College of Physicians of Ireland, Faculty of Public Health Medicine Summer Scientific Meeting 2018 (2) and is accepted as a poster presentation at ESCAIDE 2018 (3).

Supervisor(s): Dr Patricia Garvey, Senior Surveillance Scientist (GZV), HPSC

Dr Paul McKeown, Specialist in Public Health Medicine (GZV), HPSC

***Title:*** **Epidemiology of Campylobacter in Ireland 2004-2016: What has changed?**

Campylobacter is the most common notifiable cause of bacterial gastroenteritis in Ireland. However, epidemiological information is limited. The aim of the study is to describe campylobacter epidemiology in Ireland, propose enhancements to current surveillance and identify targeted future studies.

Notified cases of campylobacteriosis (2004-2016) were described by age, sex, area of notification, patient type and outcome. Negative binomial regression was used to estimate incidence rate ratios (IRR) and adjusted IRR (aIRR) by sex, age-group, season and area of notification. Trends over time were described by sex, age-group, area of notification and season. Interrupted time series analysis was undertaken by age-group incorporating terms for trend and for period (2004-2010 and 2011-2016).

There were 27,034 cases of campylobacteriosis notified between 2004 and 2016. Crude annual incidence ranged from 36.2 to 44.4 per 100,000 population between 2004 and 2010 with higher incidences of 49.8 to 54.4 per 100,000 population between 2011 and 2016. This stepped increase in 2011 was seen in both sexes, spring and

summer seasons and all age-groups. Overall, the incidence was higher in males (aIRR 1.14, 95% confidence intervals (CI) 1.07-1.22), in those <5 years compared with the lowest incidence age-group (45-64 years) (aIRR 5.08, 95%CI 4.58-5.63) and in all other areas compared with the North-East area (aIRR range 1.24-3.18, p-values ≤0.002). For all age-groups, significant increases in trend-adjusted case numbers of 30-44% (p-values <0.006) were detected after 2011. In addition, an increasing trend in incidence, approaching significance (p=0.080) is seen in those aged 65 and older, but not in younger age groups.

An apparent stepped increase in campylobacteriosis in 2011 is noted in cases in all age-groups, with an overall increase in trend identified in those aged 65 years and older. While some of these changes may be due to the transition of regional laboratories from culture-based to molecular-based diagnostic methods, further investigation is required to fully explain the identified changes.

***Role:*** I was the principal investigator in the project. I wrote the protocol, exported the data from the national surveillance system, cleaned and analysed the data (with advice from Dr Alicia Barassa, EPIET co-ordinator), wrote the report (4) and corresponding draft manuscript. The project was presented as an oral presentation at the Royal College of Physicians of Ireland, Faculty of Public Health Medicine Summer Scientific Meeting 2018, where it won the Dr Zac Johnson medal for best presentation (5) and has been accepted as a poster presentation at ESCAIDE 2018 (6).

Supervisor(s): Dr Joan O'Donnell, Specialist in Public Health Medicine (Respiratory), HPSC

***Title:*** **Development of a database and surveillance form for cases of Enterovirus EV-D68 associated with an outbreak of cluster**

Enterovirus D-68 (EV-D68) is a member of the Picornaviridae family and is one of more than 100 non-polio enteroviruses. It has been identified as the causal pathogen in respiratory tract infections (RTIs), meningitis, encephalitis and generalised septicaemia. In 2014, an outbreak in the USA and Canada was associated with severe respiratory tract infections and unexplained neurological illness, mainly in children with underlying respiratory disease. Since 2014, clusters of EV-D68 cases associated with neurological symptoms and signs have been reported in several European countries including Norway, Scotland and France.

In Ireland EV-D68 infection is not notifiable but a cluster or outbreak of EV-D68 is notifiable. Clusters are likely to initially be reported as clusters of 'acute respiratory illness', acute flaccid paralysis (AFP) or acute flaccid myelitis (AFM). Testing of respiratory samples should confirm whether or not the diagnosis is EV-D68. The aims of this project are to develop a surveillance system for clusters of EV-D68 to document; severity of illness, risk groups and illness outcomes and to develop an EV-D68 surveillance form that collects relevant information on all EV-D68 cases associated with a cluster.

A cluster of EV-D68 is defines as follows:

Confirmed cluster: Two or more laboratory confirmed cases of EV-D68 with an epidemiological link.

Possible cluster: One case of confirmed EV-D68 with two or more cases with symptoms suspicious of EV-D68 and an epidemiological link to the confirmed case

Clusters will be detected through clinical surveillance. Clinical surveillance should focus on identified risk groups including; children with underlying respiratory conditions and immunocompromised patients.Unusual clusters will be identified and notified to local departments of public health

A database for cases of EV-D68 associated with a cluster of EV-D68 was developed in Microsoft Excel. The database will be populated with data collected using a newly developed EV-D68 surveillance form. This form was developed following a review of internationally used EV-D68 surveillance forms from the United Kingdom and the USA. The database is stored at the national surveillance centre, Health Protection Surveillance Centre and is ready to use should the need arise.

***Role:*** I was the principal investigator. I initially wrote a protocol on the development of a surveillance system to identify sporadic cases of EV-D68. Subsequently this was ammended and I wrote the final study protocol on the development of a database and surveillance form for cases of EV-D68 associated with a cluster. I developed a

database in Microsoft Excel for use in an outbreak/cluster of EV-D68 and devloped a surveillance form (7) to collect information on associated cases.

## 2. Outbreak investigations

Supervisor(s): Dr Paul Kavanagh, Specialist in Public Health Medicine (regional area, OCT lead)

Dr Patricia Garvey, Senior Surveillance Scientist (GZV), HPSC

Dr Paul McKeown, Specialist in Public Health Medicine (GZV), HPSC

***Title:*** **Successful control of a large norovirus hotel outbreak following use of a forensic cleaning service, Ireland 2016**

On December 12th 2016, a large hotel alerted public health authorities that approximately 80 hotel patrons from the weekend of December 9th-11th had reported sudden onset, severe vomiting. Several staff reported similar illness. An outbreak control team (OCT) was established to identify infection sources, transmission routes and to control the outbreak.

A trawling questionnaire was distributed to ill staff to assist with hypothesis generation while the hotel collected information on self-reported illness among patrons. Stool specimens from symptomatic and asymptomatic staff, and samples of food and drinking water from the hotel's private well were submitted for microbiological testing.

By December 15th, 600 hotel patrons and 59 staff had reported illness. Extensive control measures were implemented by the hotel including; steam cleaning, bottled water use, disposal of food and exclusion of all symptomatic staff. In the three days following these actions, 174 additional patron cases were reported. Amongst staff, 67% (53/79) became ill on December 11th and 12th and 80% (55/69) of stool samples submitted were positive for norovirus. No pathogens were detected in food and water samples. On December 19th, the OCT advised the hotel to close for deep-cleaning and to interrupt transmission. During a two-week closure period, the hotel was cleaned by a forensic cleaning company. On reopening, no further cases of illness were reported by the hotel.

Epidemiological and environmental investigations did not identify a source of the outbreak. The continued occurrence of cases among hotel patrons suggested contamination of the environment was a significant factor in outbreak propagation. In future outbreaks, where environmental contamination is a major contributing factor, we recommend early employment of a forensic cleaning service.

***Role:*** I was the epidemiologist on the outbreak control team. I wrote a protocol for the epidemiological investigation. I developed an intial questionnaire for a sample of ill staff to generate a hypothesis for the outbreak. I subsequently developed a second questionnaire for all staff to describe the illness in staff at the hotel. I wrote an epidemiological report on the outbreak (8) and contributed considerably to the final outbreak report (9). I audited the response of the outbreak control team (10) using the ECDC 10 steps in an outbreak investigation as guidance. The project was presented as an oral presentation at the Royal College of Physicians of Ireland, Faculty of Public Health Medicine Summer Scientific Meeting 2017, where it won the Dr Zac Johnson medal for best presentation (11) and was presented as a poster presentation at the Five Nations Health Protection Conference 2018 (12).

## 3. Applied epidemiology research

Supervisor(s): Dr Derval Igoe, Specialist in Public Health Medicine (STIs), HPSC

Dr Kate O'Donnell, Surveillance Scientist (STIs), HPSC

Dr Margaret Fitzgerald, Senior Surveillance Scientist, HPSC

***Title:*** **Use of geo-social networking applications is independently associated with diagnosis of a sexually transmitted infection (STI) among men who have sex with men testing for STIs: findings from the MSM internet survey Ireland (MISI) 2015**

MISI 2015 was an anonymous, self-completed, cross-sectional internet survey assessing sexual behaviours and health needs among men who have sex with men (MSM) in Ireland. Factors associated with self-reported STI diagnosis among MSM who were sexually active and had an STI test in the previous year were explored.

The study sub-sample was compared with the total MISI population. Within the study sub-sample, socio-demographic features and sexual behaviours associated with self-reporting an STI diagnosis were identified. Multivariable logistic regression was used to estimate adjusted odds ratios (aORs).

There were 1,158 men in our study sub-sample. This sub-population were more likely to be employed, reside in Dublin, be highly educated, identify as gay, be open about their homosexuality, use geo-social networking applications (GSNa) to meet partners and take drugs compared with the total MISI population. In the previous year, 65% met a sexual partner via GSNa, 10% were HIV positive and 21% self-reported an STI diagnosis. On univariable analysis, factors associated with STI diagnosis were; older age, identifying as gay, HIV positive status, increasing number of sexual partners in the previous year, condomless anal intercourse (CAI) with ≥2 non-steady partners, using GSNa to meet a new sexual partner in the previous year or most recent sexual partner. On multivariable analysis, STI diagnosis was associated with: being aged 25-39 years (aOR 1.8, 95%CI 1.04-3.15), CAI with ≥2 non-steady partners (aOR 2.8, 95%CI 1.84-4.34), total number of sexual partners (aOR 1.02, 95%CI 1.00-1.03), and using GSNa to meet a new sexual partner (aOR 1.95, 95%CI 1.12-3.39).

STI diagnosis among MSM testing for STIs is associated with GSNa use, as well as sexual behaviours. GSNa are key settings for STI prevention interventions, which should prioritise men aged 25-39 years, those with high numbers of sexual partners and those with multiple CAI partners.

***Role:*** I was the principal investigator. I wrote the study protocol. I extracted the study population from the MISI data and analysed the data. I wrote the first draft of the manuscript and circulated it to my co-authors. I collated and included responses from my co-authors, wrote the final agreed manuscript and submitted it for publication (13). The project was presented as a poster presentation (14) and two-minute slide presentation (15) at the Faculty of Public Health Medicine in Ireland Winter Scientific Meeting December 2017. It was also presented as a poster at the Five Nations Health Protection Conference 2018 (16) as well as at the International Union against Sexually Transmitted Infections Conference June 2018 (17).

Supervisor(s): Dr Grazia Caleo, Epidemiologist MSF

***Title:*** **Epidemiologist with Médecins Sans Frontières (MSF), Kamrangrichar , Dhaka, Bangladesh,**

Since 2014, MSF-OCA has been providing medical and occupational health care to workers in small-scale factories in this area. I cleaned and analysed over 5,000 return visit consultations from the MSF clinics. The aim of the project was to describe the health status of factory workers attending the MSF clinics 2014-2016 and to suggest public health interventions to improve the health of the workers.

I co-authored the report on the health status of those attending the clinics, which highlighted common morbidities identified among factory workers. The analysis undertaken facilitated the design of possible public health interventions (e.g. nutritional/ mental health interventions and intervention inside the factories) for this neglected population.

***Role:*** I spent 5 weeks at the MSF project in Bangladesh. I analysed data on over 50,000 return visits to the MSF clinics. I co-authored the corresponding parts of the overall report (18) and contributed to an abstract submitted to the MSF Scientific Conference 2018.

Supervisor(s): Dr Paul McKeown, Specialist in Public Health Medicine (GZV), HPSC

Dr Patricia Garvey, Senior Surveillance Scientist (GZV), HPSC

***Title:*** **The prevalence of verocytotoxigenic *Escherichia coli* (VTEC) in children under the age of five in Ireland**

VTEC causes acute gastroenteritis which can range from self-limiting diarrhoea, haemorrhagic gastroenteritis to the life-threatening complication of haemolytic uraemic syndrome (HUS). Human infections occur through contact with infected ruminant (cattle, sheep) animal faeces at farms or petting zoos or by consuming faecal-contaminated food or drinking water. In Ireland, cases of VTEC are urgently notifiable to the Medical Officer of Health at regional Departments of Public Health, as are cases of haemolytic uraemic syndrome (SI 1981). Ireland has the highest notification rate for VTEC in the EU/EEA region. In 2015 the VTEC notification rate in Ireland was 12.92 per 100,000 compared with EU/EEA rate 1.52 per 100,000. In Ireland, children aged less than five have the highest age-specific incidence rate among notified cases of VTEC (81.4 per 100,000) and are most likely to develop HUS. In addition, children attending childcare facilities (CCFs) are recognised as being particularly at risk of VTEC infection.

The study aimed to estimate the prevalence of VTEC excretion in children less than five years of age in Ireland; in order to (1) provide the public with information on how common VTEC is (2) to inform national policy and guidance on VTEC and (3) to suggest possible remediation measures for subgroups where a high prevalence is detected.

This cross-sectional study aimed to recruit 4,250 children aged less than five years, attending child-care facilities nationally using multi-stage cluster sampling. It was planned to invite parents to consent for their child to provide a stool sample and to complete a short questionnaire on socio-demographics and possible VTEC risk factors. It was planned to request childcare facility managers to also complete a questionnaire on the childcare facility.

The study did not proceed.

***Role:*** I was the principal investigator in this study. I developed a project protocol and ethics submission which was submitted to the Royal College of Physicians of Ireland Ethics Committee. I developed all materials for the study including questionnaires, information letters and leaflets for childcare facility managers and parents, consent forms and specimen collection kits. I developed several project summaries for directors of public health regionally and met with other stakeholders to encourage participation in the project.

# 1. Communication

## Publications

1. Use of geo-social networking applications is independently associated with diagnosis of a sexually transmitted infection (STI) among men who have sex with men testing for STIs: findings from the MSM internet survey Ireland (MISI) 2015 - submitted for publication
2. One manuscript in preparation for submission
    a. Epidemiology of campylobacter in Ireland, 2004-2016.

## Reports

1. Evaluation of the hepatitis B enhanced surveillance system in Ireland. (1)
2. Epidemiology of Campylobacter in Ireland, 2004-2016. (4)
3. Norovirus outbreak at a large hotel in the HSE North-East area of Ireland, December 2016: Epidemiological Investigation Report. (8)
4. Report of an outbreak of norovirus at a large hotel – outbreak report (epidemiological investigation contribution) (9)
5. Audit of Outbreak Investigation of Norovirus at a large hotel, Ireland December 2016. (10)
6. Morbidities and occupational risks among factory workers in Kamrangirchar project, Dhaka, Bangladesh: Analysis of data from MSF-OCA occupational health clinics and a factory hazard assessment (18)
7. The prevalence of verocytotoxigenic *Escherichia coli* (VTEC) in children under the age of five in Ireland: Submission to Royal College of Physicians of Ireland Ethics Committee (19)

## Conference presentations

1. *A large norovirus outbreak in a hotel in Ireland, December 2016* - oral presentation, winner of the Zachary Johnson Medal for best oral presentation at the Royal College of Physicians in Ireland, Faculty of Public Health Medicine Summer Scientific Meeting, Dublin May 2017. (11)
2. *Factors associated with a diagnosis of a sexually transmitted infection in men who have sex with men: Findings from the MISI 2015* – poster and 2 minute magic presentation. Royal College of Physicians in Ireland, Faculty of Public Health Medicine Winter Scientific Meeting, Dublin, December 2017 (14,15)
3. *Factors associated with a diagnosis of a sexually transmitted infection in men who have sex with men: Findings from the MISI 2015 survey* – poster Five Nations Health Protection Conference, Belfast April 2018 (16)
4. *Successful control of a large norovirus hotel outbreak following use of a forensic cleaning service, Ireland 2016*– poster Five Nations Health Protection Conference, Belfast April 2018 (12)

5. *An evaluation of the Hepatitis B Enhanced Surveillance System in Ireland* - poster at the Royal College of Physicians in Ireland, Faculty of Public Health Medicine Summer Scientific Meeting, Dublin May 2018. (2)
6. *Epidemiology of Campylobacter Ireland 2004 – 2016: Has anything changed?* - oral presentation, winner of the Zachary Johnson Medal for best oral presentation at the Royal College of Physicians in Ireland, Faculty of Public Health Medicine Summer Scientific Meeting, Dublin May 2018. (5)
7. *Use of geo-social networking applications (GSNa) is independently associated with diagnosis of a sexually transmitted infection (STI) among men who have sex with men testing for STIS: Findings from the MSM internet survey Ireland (MISI) 2015* – poster and 3 minute presentation at the International Union Against Sexually Transmitted Infections (IUSTI) Conference 2018, Dublin June 2018. (17)
8. *An evaluation of the Hepatitis B Enhanced Surveillance System in Ireland* – accepted as a poster presentation at ESCAIDE 2018. (3)
9. *Epidemiology of Campylobacter, Ireland 2004 – 2016: What has changed?* – accepted as a poster presentation at ESCAIDE 2018. (6)

## Other presentations

1. *An outbreak of hepatitis A at a large urban childcare facility*. Outbreak Investigation Module, Berlin December 2016.
2. *Protocol development for a national VTEC prevalence study*.Training and Research Forum, HPSC, February 2017.

# 8. Teaching and pedagogy

### Title **Introduction to Epidemiology – 2 hour lecture October 2016**

I developed a 2 hour lecture for students on a Masters in Humanitarian Assistance programme at University College Dublin, Ireland. The objective was to provide an overview of epidemiology to students from a variety of academic backgrounds with no previous knowledge of epidemiology. The feedback I received, informally, suggested that overall students found the lecture interesting.

**Reflection** This was the first time that I developed material for a 2 hour lecture. Developing such material is very time-consuming and took more than 40 hours. Creating lecture content for students from a variety of backgrounds is difficult. I was not provided with the students backgrounds prior to the lecture. Keeping it simple is the key. On reflection I would simplify some of the lecture content and add some practical exercises to keep students engaged.

### Title **Salmonella Outbreak at a wedding in Dublin (cohort study)**

I facilitated the case study above in November 2016 at the School of Veterinary Medicine, University College Dublin. The students were undergraduate veterinary students. The case study was undertaken by the students in a 3 hour practical session.

**Reflection** It was challenging to keep the students engaged in the practical for the duration of the session. It is important to contextualise the case study for veterinary students so that they can see a veterinary role in the study.

### Title **The importance of data**

I developed and delivered a slide-set on the importance of data collection and its uses while at an MSF project in Kamrangirchar, Dhaka, Bangladesh. The teaching presentation was delivered to the multidisciplinary clinic staff.

**Reflection** This training session was delivered to all staff working at the MSF clinic including doctors, nurses and administration staff. It was difficult to engage some of the staff in the training as they didn't see data entry as their role (although all staff grades entered some kind of data). At the first session, I was advised that a translator would not be necessary as all staff spoke English. However, after the session it was clear that many staff had not understood some of the session.

### Title **Outbreak Exercise for Microbiology Specialist Registrars**

The objectives of this 2 part teaching session were to provide an overview of outbreak investigation and some basic epidemiological skills to medical microbiologists in training. Two 3 hour sessions were organised. At the first

session my EUPHEM colleague and I delivered a slide set presentation on basic epidemiology and the 10 steps in an outbreak investigation using several outbreak examples. The second session used a previously developed outbreak investigation exercise which we modified for the teaching session. The microbiology doctors in training were required to calculate attack rates and relative risks in a food-borne outbreak. We evaluated both teaching sessions and received very positive feedback.

**Reflection** The feedback we received was very positive. If the sessions were run again I would include a detailed example of one real outbreak and the difficulties that occur when managing an outbreak in real-time.

## 9. EPIET/EUPHEM modules attended

1. EPIET Introductory Course, Spetses - Greece 24th September to 14th October 2016
2. EPIET outbreak investigation module, Berlin 5th-9th December 2016
3. EPIET module on Multivariable Analyses, Zagreb 13th-17th March 2017
4. EPIET RAS module, Athens 8th-13th May 2017
5. EPIET Project Review Module, Lisbon 28th August -1st September 2017
6. EPIET module on Time Series Analyses, Bristol 20th-24th November 2017
7. EPIET Vaccinology Module, Cardiff 11th-15th June 2018
8. EPIET Project Review Module, Lisbon 27th-31st August 2018

## 10. Other training

1) In-house HPSC Stata training on Introduction to Stata, Descriptive analysis in Stata and Time series analysis tool in Stata. 18th, 25th October and 2nd November 2016.
2) Stata training EpiConcept at HPSC "Stata for surveillance". November 7th-11th 2016.
3) Visit to the TB reference laboratory November 18th 2016
4) Zoonosis Training Day, Dundalk organised by the North-East Zoonosis Committee, November 23rd 2016.
5) Microsoft Office webinars organised by Health Service Executive, January-February 2017
6) Mini Project Review module, Bristol March 9th-10th 2017.
7) Attended lecture on Lyme Disease, HSE East, May 30th 2017
8) Attended WHO Human Resources in Health Conference as rapporteur, Dublin, November 13th-16th 2017.
9) Lab 4 Epi course, Public Health England, Colindale January 16th-17th 2018
10) Training at Health Pricing Office on Hospital InPatient Enquiry (HIPE) and ICD-10 coding, February 22nd 2018.
11) Mini Project Review module, Nottingham March 5th-6th 2018
12) Media Training for Public Health Specialist Registrars March 15th 2018
13) Visit to National Virus Reference Laboratory, Dublin, April 18th 2018
14) Participated in National Immunisation Advisory Committee meetings as medical secretary, January 2017-July 2018

# Discussion

## Supervisor's conclusions

*Dr Paul McKeown*: I acted as Dr O'Connor's lead Supervisor in HPSC. I found Lois to function as a driven and highly effective epidemiologist. That said, she has an unerring ability not to go places where the evidence she has divined does not lead. Her communications skills are highly developed, and she has a well-developed ability to strip research questions down to their simplest and most important components. Dr O'Connor moved rapidly through skills and competence acquisition and took on every offered opportunity with equal relish. I have no doubt that Dr O'Connor will have a very successful career in Public health Medicine and epidemiology.

## Coordinator's conclusions

During the two-year fellowship Lois has proven to be a complete epidemiologist with an enormous capacity to learn as to develop successful studies in very different topics as shows the variety of public health projects she

developed with a broad range of pathogens like hepatitis B, campylobacter, enterovirus or VTEC; and using different methodologies form evaluating surveillance systems to the study of particular behaviours for STIs, or occupational risks.

Lois has also been exposed to difficult to control outbreaks like the large norovirus hotel outbreak she investigated, and has proven to be able to work in an international context as her mission in Bangladesh shows.

Lois is an extremely competent professional working independently but at the same time seeking assistance when necessary. She has a very positive attitude and knowing her personal and professional skills, I believe that Lois would fit in any kind of position public heath related.

# Personal conclusions of fellow

During the two years of the fellowship, I gained advanced epidemiological and statistical skills, through attending EPIET training modules and applying what I learned there to projects at HPSC. My epidemiological and statistical knowledge and confidence improved considerably during the fellowship and I am confident that I will use these skills in my future career in public health.
A highlight of the fellowship was the opportunity to go on an international mission to Bangladesh. This was a unique experience to utilise my public health and epidemiological skills outside Ireland. I am very grateful to my site supervisor and EPIET co-ordinator who were supportive of my decision to go on an international mission. In addition, my training site facilitated any learning opportunity that arose and supported my attendance at several conferences and courses, which contributed to my learning experience.

The EPIET fellowship programme has provided me with opportunities to attend high-standard training modules, to participate in a variety of epidemiological projects and to build a network of public health colleagues across Europe. The model of a combination of classroom learning and fieldwork ensures that I have the scientific knowledge and practical skills to work across epidemiology and public health.

# Acknowledgements of fellow

I would like to thank my main supervisor Dr Paul McKeown and two second-line supervisors Dr Margaret Fitzgerald and Dr Patricia Garvey for their supervision and support during my fellowship. In addition, I would like to thank my EPIET co-ordinator Dr Alicia Barrasa for her support, encouragement and advice.

Thank you to all the HPSC staff especially those who facilitated and supervised my EPIET projects: Dr Lelia Thornton, Dr Niamh Murphy, Dr Joan O'Donnell, Dr Derval Igoe, Dr Kate O'Donnell. Many thanks also to Dr Paul Kavanagh, Department of Public Health, HSE North-East for giving me the opportunity to contribute to the management of a local outbreak. Thank you to MSF and Dr Grazia Caleo for support and guidance during my MSF international mission.

A big thank you to past and present EPIET fellows at HPSC (Dr Jolita Mereckiene, Dr Patricia Garvey, Dr Margaret Fitzgerald, Dr Katerina Chaintarli, Dr Annalisa Quattrocchi) for all their advice during my fellowship.

# References

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8. L. O'Connor, P. Garvey, P. McKeown, P. Kavanagh. Norovirus outbreak at a large hotel in the HSE North-East area of Ireland, December 2016. Epidemiological Investigation Report, February 2017.

9. P. Kavanagh, L. O'Connor. Report of an outbreak of norovirus infection at the [redacted] December 2016. Report on behalf of the Outbreak Control Team.
10. L. O'Connor, P. Kavanagh. Audit of Outbreak Investigation of Norovirus at a large hotel, Ireland, December 2016.
11. L. O'Connor on behalf of the Outbreak Control Team. A large norovirus outbreak in a hotel in Ireland, December 2016. Oral presentation. Faculty of Public Health Medicine in Ireland Summer Scientific Meeting May 2017.
12. L. O'Connor, P. Garvey, E. Brabazon, C. O'Dwyer, C. Tierney, A. Barrasa, P. McKeown, P. Kavanagh. Successful control of a large norovirus hotel outbreak following use of a forensic cleaning service, Ireland 2016. Poster presentation. Five Nations Health Protection Conference April 2018.
13. L. O'Connor, K. O'Donnell, P. Barrett, F. Hickson, D. McCartney, M. Quinlan, A. Barrasa, M. Fitzgerald, D. Igoe. Use of geo-social networking applications is independently associated with diagnosis of a sexually transmitted infection (STI) among men who have sex with men testing for STIs: findings from the MSM internet survey Ireland (MISI) 2015. Manuscript submitted to BMJ STI.
14. L. O'Connor, K. O'Donnell, P. Barrett, F. Hickson, D. McCartney, M. Quinlan, A. Barrasa, M. Fitzgerald, D. Igoe. Factors associated with acquisition of a sexually transmitted infection in men who have sex with men (MSM) in Ireland: Findings from the men who have sex with men internet survey (MISI) 2015. Poster presentation. Faculty of Public Health Medicine in Ireland Winter Scientific Meeting December 2016.
15. L. O'Connor, K. O'Donnell, P. Barrett, F. Hickson, D. McCartney, M. Quinlan, A. Barrasa, M. Fitzgerald, D. Igoe. Factors associated with acquisition of a sexually transmitted infection in men who have sex with men (MSM) in Ireland: Findings from the men who have sex with men internet survey (MISI) 2015. Two-minute slide presentation. Faculty of Public Health Medicine in Ireland Winter Scientific Meeting December 2016.
16. L. O'Connor, K. O'Donnell, P. Barrett, F. Hickson, D. McCartney, M. Quinlan, A. Barrasa, M. Fitzgerald, D. Igoe. Factors associated with acquisition of a sexually transmitted infection in men who have sex with men (MSM) in Ireland: Findings from the men who have sex with men internet survey (MISI) 2015. Poster presentation. Five Nations Health Protection Conference, Belfast 2018.
17. L. O'Connor, K. O'Donnell, P. Barrett, F. Hickson, D. McCartney, M. Quinlan, A. Barrasa, M. Fitzgerald, D. Igoe. Use of geo-social networking applications (GSNa) is independently associated with diagnosis of a sexually transmitted infection (STI) among men who have sex with men testing for STIS: Findings from the MSM internet survey Ireland (MISI) 2015. Poster presentation. International Union against Sexually Transmitted Infections Annual Conference, Dublin June 2018.
18. [redacted] L. O'Connor [redacted]
19. L. O'Connor on behalf of the VTEC prevalence study steering group. 7. The prevalence of verocytotoxigenic Escherichia. Coli (VTEC) in children under the age of five in Ireland: Submission to Royal College of Physicians of Ireland Ethics Committee