Summary of work activities

Annamária Ferenczi
Intervention Epidemiology path (EPIET), 2019 cohort

Background

The ECDC Fellowship Programme is a two-year competency-based training with two paths: the field epidemiology path (EPIET) and the public health microbiology path (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 provide 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.

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.

This report summarises the work activities undertaken by Annamaria Ferenczi, cohort 2019 of the Intervention Epidemiology path (EPIET) at the Health Protection Surveillance Centre (HPSC) in Dublin, Ireland.

Pre-fellowship short biography

Annamaria Ferenczi has a BA in Social Sciences and an MSc in Health Policy Analysis with a specialisation in Health Economic Analysis from Eötvös Loránd University in Budapest, Hungary. Annamaria worked for five years at the National Public Health Institute, Budapest, Hungary. During this time, Annamaria was mostly placed at the Department of Public Health, Strategic Planning and Epidemiology, where she focused on planning and monitoring public health prevention programmes. Annamaria also worked on infectious disease related tasks, including the planning of national level hand hygiene education programmes and measuring the effectiveness and impact of vaccines used to prevent influenza (I-MOVE study).

Stockholm, November 2021

Methods

This report accompanies a portfolio that demonstrates the competencies acquired during the EPIET fellowship by working on various projects, activities, theoretical fellowship training modules, other modules or trainings and from international assignments or exchanges.

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 ECDC Fellowship Manual[1].

1. Epidemiological investigations

1.1 Outbreak investigations

Mumps outbreak among adolescents and young adults, Ireland, August 2018 to January 2020

Supervisors: Suzanne Cotter, Specialist in Public Health Medicine, HPSC, Dublin, Ireland

Since 2004, large mumps outbreaks have occurred every four to six years in Ireland (in 2004/05, 2008/09, 2014/15 and 2018/20). Between 18 August 2018 and 24 January 2020, 3 736 mumps cases were notified, including confirmed (n = 2,583), possible (n = 897) and probable (n = 256) cases. The median age of the cases was 20 years (interquartile range (IQR): 18–26). Where vaccination status was reported, 72% (n = 858) had received two doses of MMR vaccine, 16% (n = 187) had received one dose and 12% (n = 142) of cases were unvaccinated. A national outbreak control team (OCT) was convened in February 2019 to coordinate control and communication efforts throughout the country. As the outbreak predominantly affected third-level colleges and universities, students and employees have been targeted for a free MMR vaccination programme advertised through national and local media. Additionally, in 2019, all students (including those in secondary school) and education staff under 25 years of age who had not received two doses of MMR were recommended MMR vaccination. It was also recommended that all new entrants to third-level education younger than 25 years of age be vaccinated with two doses of MMR before the 2019/20 academic year. From January 2020, a media campaign advocated and raised awareness among individuals 11 to 30 years of age across Ireland to ensure they had received two doses of MMR. A rapid communication article was published in January 2020 to contribute to the discussion about reasons for large mumps outbreaks involving adolescents and young adults occurring in some European countries.

Annamaria was a co-investigator of the outbreak; starting from November 2019 she participated in the Outbreak Control Team meetings, extracted the relevant cases from the electronic surveillance system, performed the data analysis, wrote an article in HPSC's monthly bulletin *Epi-Insight* and she is first author of the rapid communication published in the peer reviewed journal *Eurosurveillance*.

Outbreaks of COVID-19 in meat processing plants, Ireland, 2020

Supervisors: Paul McKeown, Specialist in Public Health Medicine, HPSC, Dublin, Ireland

Early on in the COVID-19 pandemic, a series of outbreaks of COVID-19 were identified in meat processing plants (MPPs) in a number of countries. MPPs appeared to share potential outbreak risk factors including difficulty social distancing in the workplace, the nature of physical structures and production processes within the factories, low pay and issues relating to migrant workers' living and working conditions. By the end of April 2020, several clusters of COVID-19 had been identified in a number of MPPs in Ireland. An Outbreak Control Team (OCT) was established to provide coordination and guidance in investigating the outbreaks. The OCT was a rapidly assembled, interagency and interdisciplinary investigation team tasked with examining and describing the MPP outbreaks and developing a series of recommendations to prevent and manage outbreaks of COVID-19 in MPPs in Ireland. The production of a national standardised guidance was the immediate priority of the OCT. The OCT designed a protocol and questionnaire to enable investigation of any future outbreaks that might occur in MPPs in Ireland, to determine which

[1] European Centre for Disease Prevention and Control. European public health training programme. Stockholm: ECDC; 2020. Available from: https://www.ecdc.europa.eu/en/publications-data/ecdc-fellowship-programme-manual-cohort-2021

risk factors, in which locations, might be the most significant contributors to these outbreaks. A number of communication issues were identified, in particular the fact that there were so many workers for whom English was not their first language. Focussed, tailored communication support material was produced by the OCT. By 24 July 2020, all 23 outbreaks of COVID-19 in MPPs in Ireland had been successfully controlled and all the outbreaks declared over, except two.

Annamaria was a member of the Outbreak Control Team and was a principal investigator for the project, creating the MPP analytical study template; she also wrote the analytical study protocol and developed the questionnaire.

Outbreak of COVID-19 in a supermarket in Dublin, Ireland, 2021

Supervisors: Naomi Petty-Saphon, Specialist in Public Health Medicine, HPSC, Dublin, Ireland

Workers in essential retail jobs have a high risk of exposure to COVID-19. During the first 12 months of the pandemic in Ireland, 480 COVID-19 cases were linked to outbreaks in retail workplaces. We investigated a COVID-19 outbreak among employees of a supermarket in Dublin to recommend control measures and inform future outbreak investigations.

Outbreak investigation was carried out at the supermarket. We analysed surveillance data and conducted a cohort study using an online anonymised questionnaire of all staff to explore potential risk factors. Descriptive analysis was conducted, relative risk and 95% confidence intervals were calculated.

Among 189 employees, 26 confirmed COVID-19 cases (14%) were identified between 4 January and 6 February 2021, including nine cases identified through single-day on-site testing of asymptomatic employees. Cases were aged 19 to 65 years and worked in different locations within the supermarket. A total of 77 (44%) employees participated in the cohort study, including 10 cases. 80% of respondents used the staff canteen and 20% used the hand sanitiser rather than recommended hand-washing before eating and/or smoking. Country of birth other than Ireland emerged as a risk factor (adjusted risk ratio (aRR): 4.70; p = 0.027) and living arrangements were identified as a significant risk factor associated with COVID-19, where those living in households with family members and other people had a higher risk of COVID-19 compared to people living with family members only (aRR: 7.67; p = 0.006). This was the largest COVID-19 outbreak reported in a retail workplace in Ireland.

Identifying workplace-related risk of infection during a time of high incidence in the community was difficult. Cases were identified from several work locations within the supermarket. Therefore, transmission might have occurred in the common areas (e.g. canteen). We recommend the reinforcement of control measures already in place prior to the outbreak and communication of key times to wash hands with water and soap. Those measures and testing of asymptomatic staff successfully controlled the outbreak within one month.

Annamaria was a co-investigator of the outbreak, participated in the Outbreak Control Team meetings and wrote the outbreak investigation protocol, including descriptive and analytical epidemiological components. She also developed a questionnaire, conducted a literature search, performed data validation and processing, analysed surveillance and outbreak data, wrote the outbreak report and submitted an abstract to ESCAIDE 2021, which was accepted for poster presentation.

International project opportunity: COVID-19 contact tracing data analysis with ECDC

Supervisors: Erika Duffell, Principal Expert Hepatitis; Emmanuel Robesyn, Principal Expert Emergency Preparedness and Response; and Stefania De Angelis, Scientific Officer Training and Capacity Building, ECDC, Stockholm, Sweden and Claire Buckley and Sarah Doyle, Specialists in Public Health Medicine, CMP, Dublin, Ireland

Secondary analyses of COVID-19 contact tracing data can provide meaningful information both on the performance of the contact tracing systems and on COVID-19 transmission. This project was part of an initiative by the European Centre for Disease Prevention and Control (ECDC) to enhance the use of COVID-19 contact tracing data facilitating the sharing of information and experiences among Member States. EPIET fellows Alberto Mateo Urdiales, Annamaria Ferenczi and Despina Pampaka participated in this project lead by ECDC supervisors. The aim was to perform an analysis of COVID-19 contact tracing data in three EPIET host countries: Italy, Ireland, and Spain.

The work conducted in Ireland was a descriptive, cross-sectional analysis of national contact tracing data extracted from the COVIDCare Tracker (CCT) system for the period 18 May to 1 October 2020. A list of ECDC recommended contact tracing indicators, including both epidemiological and operational indicators, were used for the analysis. The analyses included 13 448 COVID-19 cases and their 59 852 close contacts. During the study, the mean number of contacts per case was 4.5, but varied over time. The overall attack rate among close contacts who were tested was 11.1%. Attack rate among close contacts of cases under 18 years old were the lowest (7.7%) among all age groups. The average number of days from the primary case testing positive to their close contact placed in isolation was 1.8 days among cases with community transmission, while the same duration was on average 0.5 days among those with a known transmission chain. We concluded that some ECDC COVID-19 monitoring indicators were possible to calculate based on the extract from CCT and we were able describe the COVID-19 transmission dynamics in Ireland.

Annamaria conducted the analysis in Ireland. She wrote the Irish study protocol, participated in the data-sharing process, performed data cleaning and management, and conducted the data analysis. She submitted her work to the Irish Faculty of Public Health Medicine - Summer Scientific conference where it was presented as a poster. She participated in writing the technical report published on the ECDC website and co-authored the corresponding manuscript, which has been submitted to a peer-reviewed journal for consideration.

Training modules related to assignments/projects

EPIET/EUPHEM Introductory Course
During the EPIET/EUPHEM Introductory Course fellows gained a basic understanding of the principles of outbreak investigations, including the steps of the investigation of an outbreak, analytical study designs and the formulation of appropriate public health recommendations. These learning objectives were reached by lectures and case studies. Skills gained during the Introductory Course were applied to all outbreak investigations.

Outbreak Investigation Module
The Outbreak Investigation Module broadened the outbreak investigation knowledge and skills gained during the Introductory course. The module builds around a multi-day case study of an outbreak of gastroenteritis in a school in Copenhagen. This case study was a great way for fellows to apply all the steps of an outbreak investigation.

Multivariable Analysis Module
The Multivariable Analysis Module provided the background needed for an analytical approach to outbreak investigations. The module introduced the most commonly used statistical models for outbreak investigations and through group exercises, and fellows developed the necessary competencies to apply them later in their work. The knowledge gained during this module was very useful for the analytical investigation of an outbreak of COVID-19 in a supermarket in Dublin.

Educational outcome

Annamaria gained experience in planning and conducting outbreak investigations using the 10-step approach. She developed a variety of analytical and epidemiological skills needed for outbreak investigations, including active case finding, COVID-19 contact tracing, formulating case definitions, planning investigation protocols, different laboratory techniques used for outbreak investigations, outbreak data analysis and outbreak report writing. She gained insight into outbreak investigation field practicalities and gained experience working on multidisciplinary Outbreak Control Teams both at local and national levels. She developed her knowledge base regarding vaccines and immunology and acquired experience in the investigation of outbreaks of COVID-19. She enhanced her writing and communication skills.

1.2 Surveillance

Anogenital warts (AGW) surveillance system review and evaluation

Supervisors: Derval Igoe and Naomi Petty-Saphon, Specialists in Public Health Medicine, HPSC, Dublin, Ireland

Anogenital warts, a disease caused by human papillomavirus infection, are the second most common type of sexually transmitted infection globally. Anogenital warts diagnosis rates can potentially be used as an early evaluation system for HPV vaccination programmes. We reviewed and evaluated the anogenital warts surveillance system in Ireland to describe the data collection, identify data gaps and issues, and to recommend improvements. We carried out a literature review, described the surveillance system, constructed objectives for the surveillance system, evaluated data source and data field completeness, and evaluated usefulness by conducting an online, self-administered stakeholder survey.

The AGW surveillance system in Ireland is a national, comprehensive passive surveillance system; however the level of data source and data field completeness is low. Out of 22 STI clinics, 8 reported AGW rates in the required data format. A literature review was conducted to identify AGW surveillance strategies in other countries and regions. The stakeholder survey had a low participation rate, but all stakeholder groups were represented. The majority of responders disagreed with all statements regarding the usefulness of the current AGW surveillance system and provided free text views on the potential improvements of the surveillance system.

We proposed moving to a sentinel-based, electronic and web-based AGW surveillance system, where STI clinics and primary care providers are recruited on a voluntary basis. Additional data that should be collected includes self-reported vaccination status, sexual orientation among male patients and county of residence of the patient. We recommend planning the set of indicators for the evaluation of the impact of HPV vaccines at the same time the sentinel surveillance system is established. In order to further develop the needs and possibilities for a sentinel AGW surveillance system, we proposed the establishment of an AGW Surveillance Working Group where STI clinicians, primary health care providers, DPHs and HPSC staff could work together on a detailed plan.

Annamaria wrote the study protocol, conducted the literature review, wrote the surveillance objectives, evaluated data completeness, developed the stakeholder questionnaire, performed the data analysis, wrote the report and drafted the abstract submitted to ESCAIDE 2021.

Review and evaluation of the surveillance system for COVID-19 among HCWs

Supervisors: Lois O' Connor EPIET supervisor and Specialist in Public Health Medicine, HPSC, Dublin, Ireland

Healthcare workers (HCWs) are at high risk of contracting COVID-19. In Ireland data related to HCWs is routinely collected as part of the COVID-19 surveillance system. This study aimed to review and evaluate surveillance of

COVID-19 among HCWs in Ireland in order to describe the data and its collection, identify data gaps and issues, and to recommend improvements. We described the surveillance system and evaluated completeness and validity of the data. External completeness of the surveillance data was evaluated by comparing the number of COVID-19 cases among acute hospital HCWs from a different data source, using the 'capture-recapture' method.

We validated three data fields: age, employment status (e.g. unemployed or employed) and the source of most likely transmission concentrating on community transmission cases and those with no transmission source reported. Age and employment status was found to be valid, with few exceptions. Validation of most likely transmission source among COVID-19 cases revealed discrepancies between the definition of community transmission and its use in the surveillance data. We updated transmission source of 3% (6 632) of all COVID-19 cases reported during the first 12 month of the pandemic. For evaluating data completeness, ideally HCW employment data completion should be close to 100%, as the number of HCW COVID-19 cases is an important indicator. During the first 12 month of the pandemic, HCW employment was not complete for 7.6% (16 740/220 762) of COVID-19 cases following data validation. When compared to an occupational health incidence dataset, more COVID-19 cases were reported on the surveillance system compared to the incident management system.

Annamaria wrote the study protocol and conducted all the steps of the surveillance system evaluation. Annamaria collaborated with Occupational Health colleagues to undertake the capture-recapture component of the evaluation. She wrote the final report and circulated the results to the relevant stakeholders working on COVID-19 surveillance in HCWs.

COVID-19 pandemic in Ireland, 2020-2021

Supervisors: Joan O'Donnell and Lois O'Connor, Specialists in Public Health Medicine, HPSC, Dublin, Ireland

Annamaria was a member of the HPSC COVID-19 epidemiology team. She has been involved in a variety of work related to the pandemic response in Ireland, including:

- Epidemic intelligence – monitoring ECDC EWRS/WHO IHR alert systems, March 2020
- Knowledge management – member of the knowledge management team (work included literature reviews and providing background material for questions requested by decision makers), March 2020
- Surveillance forms/database - Reviewed COVID-19 close-contact surveillance forms and tested COVID-19 close-contact database, reviewed COVID-19 case surveillance form, March 2020
- Summarised COVID-19 laboratory results from the National Virus Reference Laboratory, March–April 2020
- Created COVID-19 choropleth maps of Ireland using QGIS for HPSC epidemiological reports and wrote the SOP for producing the maps for the HPSC COVID-19 epidemiology and surveillance team, March–April 2020
- Participated in training on the production of the daily COVID-19 epidemiology reports, regularly produced the daily reports and circulated them to stakeholders, March–April 2020
- Participated in HCW-related COVID-19 surveillance data validations, March–June 2020
- Provided additional analysis of COVID-19 HCW cases upon request by HPSC Director and COVID-19 epidemiology team leads, April–October 2020
- Member of the study group planning retrospective enhanced investigation of confirmed COVID-19 cases with unknown source of transmission in collaboration with the Central Statistics Office – participating in the questionnaire development for this project (this project was terminated, as the highest-level restrictions were implemented and social interactions were limited), October 2020
- ECDC/WHO COVID-19 – participating in weekly/fortnightly COVID-19 surveillance/epidemiology teleconferences organised by ECDC and/or WHO

Report of the profile of COVID-19 cases in healthcare workers in Ireland

Supervisors: Joan O'Donnell and Lois O'Connor, Specialists in Public Health Medicine, HPSC, Dublin, Ireland

In the early months of the COVID-19 pandemic it became clear that healthcare workers (HCWs) are crucial for maintaining healthcare services and that they are at increased risk of contracting COVID-19. To actively monitor COVID-19 infection among HCWs in Ireland, a regular epidemiology report was created by the HPSC COVID-19 epidemiology team. This report describes demographic, clinical and exposure data regarding COVID-19 among HCWs. The report was based on data extracted from the electronic national infectious disease surveillance system. The data analysis was conducted in Excel and Stata. The standard procedure for producing the report was updated several times. The report is shared with decision makers and is published on HPSC website for the public: https://www.hpsc.ie/a-z/respiratory/coronavirus/novelcoronavirus/surveillance/covid-19casesinhealthcareworkers/.

Annamaria planned the report structure, wrote the first SOP, provided training for a colleague on producing the report and produced and circulated the report to stakeholders on several occasions.

Training modules related to assignments/projects

EPIET/EUPHEM introductory course
EPIET/EUPHEM Introductory course covered key concepts related to the planning and components of surveillance systems, analysing and interpreting surveillance data and evaluation of surveillance system attributes. These fundamental concepts enabled fellows to start their first surveillance projects and they were essential during the setting up of COVID-19 surveillance systems.

Educational outcome

Annamaria developed competencies on the full cycle of infectious disease surveillance from setting up a system to formulating recommendations based on surveillance data. She gained hands-on experience in protocol development, project coordination, data management and analysis, surveillance and epidemiological report writing, and formulating public health recommendations. She conducted surveillance system evaluations and became familiar with the attributes of surveillance systems. She gained experience during the COVID-19 pandemic in a high intensity environment, creating detailed epidemiological reports/analysis with short deadlines. This was a unique opportunity to develop her communication skills and broaden her experience in setting up, maintaining, and improving surveillance systems.

2. Applied public health research

Rubella IgG antibody levels detected in antenatal screening: a retrospective rubella seroprevalence study, Ireland

Supervisors: Lois O' Connor, EPIET supervisor and Specialist in Public Health Medicine, HPSC, Dublin, Ireland; Cillian De Gascun, National Virus Reference Laboratory Director; and Paul Holder, Senior Clinical Scientist, National Virus Reference Laboratory, Dublin, Ireland

Rubella vaccination has been included in Ireland's vaccination schedule since 1971, leading to the elimination of endemic rubella and the absence of immunity from natural infection. We analysed antenatal rubella IgG test results (n = 134 977) to identify the proportion and trends of rubella susceptibility in pregnant women tested between 2015 and 2019 at the National Virus Reference Laboratory. Rubella-specific IgG-antibody levels were classified as immune, non-immune or detected at low level according to rubella-specific IgG concentrations of ≥10 IU/ml, <5 IU/ml and 5–9.99 IU/ml, respectively. Cohorts of women were defined based on their birth year, reflecting changes in the Irish vaccination schedule (cohort 1-3). Adjusted odds ratios (aORs) were calculated using logistic regression.

The overall proportions of immune, non-immune and detected at low level, rubella-specific IgG results were 89.8%; 5.9% and 4.4%, respectively. Rubella immunity gradually decreased with increasing maternal birth year. Only 73.7% of the youngest cohort were rubella immune. The odds of being rubella non-immune were 2.2 (95% confidence interval (CI):2.09-2.40) and 7.11 (95% CI:6.55-7.72) times higher in cohorts 2 and 3, respectively, compared to cohort 1.

This study identifies an increase over time in the proportion of pregnant women who are rubella susceptible in Ireland. This highlights the need to enhance rubella awareness and additional measures are required to ensure women are fully vaccinated before pregnancy. More in-depth analysis should identify at-risk groups.

Annamaria was the principal investigator; she wrote the study protocol, performed data cleaning and analysis, and wrote the study report. Annamaria submitted an abstract to ESCAIDE 2020, prepared the corresponding poster presentation and presented the poster at ESCAIDE 2020.

Prevalence of COVID-19 Antibodies in Irish Healthcare Workers (PRECISE Study) – data analysis

Supervisors: Niamh Allen, Consultant Physician in Infectious Diseases and Principal Investigator for PRECISE study and Lisa Domegan, Surveillance Scientist, HPSC, Dublin, Ireland

Hospital healthcare workers (HCW) are at increased risk of contracting COVID-19 infection. We aimed to determine the seroprevalence of SARS-CoV-2 antibodies in HCW in Ireland. Two tertiary referral hospitals in Irish cities with diverging community incidence and seroprevalence were identified; COVID-19 had been diagnosed in 10.2% and 1.8% of staff, respectively, by the time of the study (October 2020). All staff of both hospitals (N = 9 038) were invited to participate in an online questionnaire and blood sampling for SARS-CoV-2 antibody testing. Frequencies and percentages for positive SARS-CoV-2 antibodies were calculated and adjusted relative risks (aRRs) for participant characteristics were calculated using multivariable regression analysis.

5 788 HCW participated (64% response rate). Seroprevalence of antibodies to SARS-CoV-2 was 15% and 4.1% in Hospital 1 and 2, respectively. 39% of infections were previously undiagnosed. Risk for seropositivity was higher for healthcare assistants (aRR: 2.0; 95% CI:1.4–3.0), nurses (aRR: 1.6; 95% CI: 1.1–2.2), daily exposure to patients with COVID-19 (aRR: 1.6; 95% CI: 1.2-2.1), age 18 to 29 years (aRR: 1.4; 95% CI: 1.1-1.9), living with

other HCWs (aRR: 1.3; 95% CI: 1.1–1.5), Asian background (aRR: 1.3; 95% CI: 1.0-1.6) and male sex (aRR: 1.2; 95% CI: 1.0-1.4). The HCW seroprevalence was six times higher than community seroprevalence. Risk was higher for those with close patient contact. The proportion of undiagnosed infections call for robust infection control guidance, easy access to testing and consideration of screening in asymptomatic HCW. With emerging evidence of reduction in transmission from vaccinated individuals, this study strongly endorsed rapid vaccination of all HCW.

Annamaria wrote the analysis plan for the study and conducted the data analysis. She participated in the writing of the main manuscript and is one of the listed authors. She presented the study findings at an oral presentation at ESCMID 2021. She is first author of a second manuscript focusing on undiagnosed COVID-19 cases among HCWs, which has been submitted to a peer-reviewed journal.

Childhood immunisation in Ireland: a national survey of parents

Supervisors: Suzanne Cotter, Specialist in Public Health Medicine, HPSC, Dublin, Ireland and Chantal Migone, Specialist in Public Health Medicine, National Immunisation Office, Dublin Ireland

A national survey of parents' attitudes towards vaccination in Ireland was carried out from June to August 2021. Survey respondents were parents of babies aged zero to 48 months. The survey sample was based on random digit dialling and used Computer Assisted Telephone Interviewing. In total, 976 interviews were completed. The field work was carried out by a market research company. The survey aimed to examine parental beliefs about the safety of vaccines, the diseases prevented by vaccines, where they look for information about vaccines, and whether they had any issues in accessing vaccination services. The survey also collected information about their trust in different forms of information (e.g. from a general practitioner, online, etc.). The survey also collected parental attitude information related to COVID-19 vaccination in children. The survey collected information of parents' socio-economic status, education level, religion, ethnicity, and country of origin in order to identify specific groups of the population that are particularly unsure about vaccine safety and effectiveness. With the results of the survey, the national immunisation programme should be able to plan ways of increasing the uptake of childhood vaccines. Depending on the results, communication messages and strategies to increase vaccination uptake can be adjusted appropriately to specific groups of the population, for example, or to address specific concerns that parents have. This survey will also allow for tracking of attitudes towards vaccination over time, as it is intended that the survey will be repeated at intervals.

Annamaria finalised the study protocol including the survey methodology, conducted literature reviews, drafted the study questionnaire, liaised with the study team and the market research company conducting the field work and participated in the ethical approval process. She presented the study at the UK-FETP Project Review Module and conveyed the feedback and suggestions from the review regarding sampling methodology to the study team. She will contribute to the study analysis plan, study report and any study-related manuscript.

Home-based record use in Mozambique: results from a missed opportunities for vaccination assessment

Supervisors: Laura Nic Lochlainn, WHO

A missed opportunity for vaccination (MOV) refers to any contact with health services by an individual (child or person of any age) who is eligible for vaccination, which does not result in the person receiving one or more of the vaccine doses for which they are eligible. In 1988, the World Health Organization (WHO) published a methodology guide for assessing MOV, which has since been revised. Since 2015, 13 countries, mainly in the African Region, have completed MOV assessments using the WHO MOV strategy. As part of the MOV assessments, interviewers take photos of vaccination documentation (home-based records (HBRs) or health facility registers) for later data validation. A secondary analysis of photos of HBRs collected as part of a MOV assessment conducted in Mozambique in November 2017 was planned. Data on the state and type of the HBRs, deworming and D vitamin use were planned to be extracted from approximately 600 photos of HBRs. The results of this study would add to the knowledge base on HBRs and can potentially improve the design, use and quality of HBRs.

Annamaria wrote a protocol for the study and commenced the data extraction. Due to the COVID-19 pandemic, data extraction was delayed. Therefore the project will be completed by the team in WHO.

Training modules related to assignments/projects

EPIET/EUPHEM Introductory Course
The EPIET/EUPHEM Introductory Course provided the basic understanding of research methods and data analytics applied in infectious disease epidemiology. The skills and knowledge gained during the first three weeks were essential through the two years of the fellowship.

Outbreak Investigation Module
The Outbreak Investigation Module helped fellows to gain in-depth understanding on study design and questionnaire development.

Multivariable Analysis Module
The Multivariable Analysis Module introduced a variety of regression models and their applications. This module was an important milestone in developing the statistical skills and knowledge of the attending fellows. The experience gained during this model was actively used for analysing seroprevalence data from the PRECISE study.

Vaccinology module
The Vaccinology module has a collection of vaccine-related learning objectives, including types of vaccines, planning and evaluation of vaccine programmes, a summary of research-related vaccination attitudes and vaccine coverage. This is a very useful module for all vaccine-related work.

Educational outcome

I gained competencies in protocol development, project coordination and management, data analysis, result presentation, and report and manuscript writing. I have a better understanding of laboratory methods and their interpretation. I gained experience in conducting seroprevalence studies and analysing seroprevalence data. Designing the data analysis for different research studies allowed me to become more confident about selecting and applying the appropriate statistical methods. Participating in the protocol writing for a national level survey added to my survey design skills and provided me with an opportunity to observe the field work carried out by a contact research company.

3. Teaching and pedagogy

Case study: an outbreak of trichinosis in France

Annamaria facilitated the case study 'An outbreak of trichinosis in France' on three occasions (face-to-face teaching on 20 and 21 November 2019 and online teaching on 3 December 2020) at the School of Veterinary Medicine, University College Dublin. The students were undergraduate veterinary students. The first face-to-face teaching was in a small group, the second time in a larger group. Annamaria developed an evaluation form for the online teaching occasion. The case study received positive feedback from students. Annamaria completed a teaching reflection after each teaching session.

QGIS training for COVID-19 reporting

Annamaria developed a one-hour practical QGIS training for creating maps for COVID-19 epidemiological reports. Annamaria provided this training two times for members of the HPSC COVID-19 epidemiology team during March 2020. The objective of the training was to demonstrate the functionalities used for creating choropleth maps of COVID-19. The maps were used in daily COVID-19 epidemiology reports circulated to decision makers and published on the website.

Training modules related to assignments/projects

EPIET/EUPHEM Introductory Course
The EPIET/EUPHEM Introductory Course covered the principles for designing and evaluating training activities. Additionally, by participating in case studies as fellows participants gained a good understanding of the role of a good facilitator in adult education.

Educational outcome

Teaching the same outbreak investigation case study on three occasions, twice face-to-face and once online, provided Annamaria with the opportunity to compare different teaching delivery methods. Facilitating the case studies with a senior epidemiologist with extensive experience in food-borne outbreaks contributed to her knowledge in this area. Evaluating the online teaching sessions was a very useful learning experience which helped her identify areas for improvement.

4. Communication

Publications related to the EPIET fellowship

1. **Ferenczi A.**, Gee S., Cotter S., Kelleher K., & On Behalf Of The Mumps Outbreak Control Team (2020). Ongoing mumps outbreak among adolescents and young adults, Ireland, August 2018 to January 2020. Euro Surveill. 25(4):2000047. https://doi.org/10.2807/1560-7917.ES.2020.25.4.2000047
2. Allen N., Ni Riain U., Conlon N., **Ferenczi A.**, Carrion Martin A. I., Domegan L., Walsh C., Doherty L., O'Farrelly, C., Higgins E., Kerr C., McGrath J., PRECISE Study Steering Group, Fleming C., & Bergin C. Prevalence of Antibodies to SARS-CoV-2 in Irish Hospital Healthcare Workers. Epidemiology and infection, 1–33. Advance online publication. 2021. https://doi.org/10.1017/S0950268821000984

3. **Ferenczi A.** Domegan L, Carrion Martin A. I., Fleming C., Bergin C., Allen N. Risk factors for undiagnosed SARS-COV-2 infection among healthcare workers in two hospitals in Ireland. Submitted to Occupational Medicine on 25 August 2021. (in preparation)
4. De Angelis, S., Pampaka, D., **Ferenczi, A**. Towards a European standard for the collection and analysis of contact tracing data: key lessons learned from a project in Ireland, Italy, and Spain. (in preparation)
5. Contact tracing data analysis EPIET/EUPHEM Fellowship project. ECDC Technical Report. (in preparation)
6. Parental attitudes towards childhood vaccination in Ireland: results from a national survey. (planned)
7. **Ferenczi A.** Ongoing mumps outbreak in Ireland, 2018-2020 Epi-Insight Vol 21 (2). February 2020. https://ndsc.newsweaver.ie/4otaa688p3/124e7jf8za410gkzp9yxn5?a=6&p=56462825&t=31302936
8. **Ferenczi A**. Epidemiological report of COVID-19 cases in Ireland, 2 March 2020 – 15 August 2020. Epi-Insight Vol 21 (4). September 2020. https://ndsc.newsweaver.ie/4otaa688p3/b9rre3xqj4c10gkzp9yxn5?lang=en&a=1&p=57752522&t=31302934

Reports

1. Analytical Study for Outbreaks of COVID-19 in Meat Processing Plants. Analytical Study Protocol. June 2020.
2. Outbreak of COVID-19 in a Supermarket in Dublin, Ireland, 2021, Final Outbreak Report. April 2021.
3. Prevalence of Antibodies to SARS-CoV-2 in Irish Healthcare Workers - PRECISE Study. In: HPSC, ed. Final Study Report. January 2021. https://www.hpsc.ie/a529z/respiratory/coronavirus/novelcoronavirus/research/precise/.
4. Ano-genital warts (AGW) surveillance system review and evaluation. Surveillance Study Report. July 2021.
5. Review and evaluation of the surveillance system for COVID-19 among HCWs. Surveillance Study Report. September 2021.
6. Report of the profile of COVID-19 cases in healthcare workers in Ireland. Regular Surveillance Report. https://www.hpsc.ie/a-z/respiratory/coronavirus/novelcoronavirus/surveillance/covid-19casesinhealthcareworkers/
7. Rubella IgG antibody levels detected in antenatal screening: a retrospective rubella seroprevalence study, Ireland. Final Study Report. September 2020.
8. Childhood Immunisation in Ireland: A National Survey of parents. Study protocol and questionnaire. April 2021.
9. Trichinosis case study for veterinary students. Teaching reflective note. November 2020 and November 2021.

Conference presentations

1. **Ferenczi A**. Rubella IgG antibody levels detected in antenatal screening: a retrospective rubella seroprevalence study, Ireland. ESCAIDE 2020 (online). Poster presentation.
2. **Ferenczi A**. Proposed European contact tracing indicators: does Irish data measure up? Irish Faculty of Public Health Medicine - Summer Scientific conference 2021 (online). Poster presentation.
3. **Ferenczi A**. Prevalence of COVID-19 Antibodies in Irish Healthcare Workers (PRECISE Study). ESCMID 2021 (online). Oral presentation (10 minutes).
4. **Ferenczi A**. Outbreak of COVID-19 in a Supermarket in Dublin, Ireland, 2021. ESCAIDE 2021 (online). Accepted as poster presentation.

Other presentations

1. UK FETP Project review module. Birmingham, March 2020. Parental attitudes towards childhood immunisation: a national survey. Oral presentation.
2. Contact Management Program, Weekly Knowledge Management Meeting. 10 March 2021. Analysis of COVID-19 contact tracing data - ECDC coordinated international project. Oral presenation and discussion (30 min).

5. Other activities

1. Royal Academy of Medicine in Ireland, Epidemiology and Public Health Medicine Section Scientific Meeting, 7 November 2019, Dublin, Ireland.
2. Royal College of Physicians of Ireland, Faculty of Public Health Medicine, Winter Scientific Meeting, 4 December 2019, Dublin, Ireland.
3. Royal College of Physicians of Ireland, Faculty of Public Health Medicine, Summer Scientific Meeting, 4 December 2021, Dublin, Ireland.
4. European Congress of Clinical Microbiology & Infectious Diseases (ECCMID), 9-12 July 2021.

6. EPIET/EUPHEM modules attended

1. EPIET Introductory Course, Spetses – Greece, 23 September-11 October 2019
2. EPIET Outbreak Investigation module, Nicosia - Cyprus, 9-13 December 2019
3. EPIET Management, Leadership and Communication in Public Health module, online, 10-14 February 2020
4. EPIET module on Multivariable Analyses, online, 20-24 April 2020
5. EPIET Rapid Assessment & Survey Methods (RAS) module, online, 27 April 2020, 5- 6 May 2020
6. EPIET Project Review Module, Online, 24-27 August 2020
7. EPIET module on Time Series Analyses, Online, 25-29 January 2021
8. EPIET Vaccinology Module, Online, 14-18 June 2021

7. Other training

1. In-house HPSC training on Computerised Infectious Disease Reporting (CIDR), 21 October 2019, Dublin, Ireland
2. In-house self-paced HPSC training on STATA for Public Health, October 2019, Dublin, Ireland
3. Mandatory online GDPR training for all workers of the Health Service in Ireland, 18 October 2019
4. Introduction into R for Outbreak Analytics, Stockholm, Sweden, a RECON Learn and EAN course. 25-26 November 2019
5. UK-FETP Project Review Module, Birmingham, 2-4 March 2020
6. Qualitative Methods Workshop, Birmingham, 5-6 March 2020
7. In-House HPSC training on SAP Business Object Report Design, 13 hours training, online, June 2020
8. COVID-19 Contact Management Program (CMP) Induction Training, CMP Super User Training, online, 24 September 2020
9. ECDC Micro-Training: Contact tracing in the context of COVID-19 response, 25 September 2020
10. Johns Hopkins University: COVID-19 contact tracing - online course via Coursera, 6 October 2020
11. Johns Hopkins University: Measuring and Maximizing Impact of COVID-19 Contact Tracing – online course via Coursera, 13 October 2020
12. HPSC training in-house in EXCEL for Public Health reporting, 31 March 2021 and 15 April 2021

Discussion

Coordinator's conclusions

One of the main goals of the EPIET programme is for fellows to develop core competencies in field epidemiology mainly through project or activity work, but also partly through participation in training modules and applying epidemiological methods to provide evidence to guide public health interventions for communicable disease prevention and control. This report summarises all activities and projects conducted by Annamaria during her two-year EPIET fellowship (cohort 2019) as an EU-track fellow at the Health Protection Surveillance Centre (HPSC) in Dublin, Ireland.

Annamaria was already experienced in epidemiological research and surveillance when she started the EPIET fellowship. Nevertheless, she managed to find a variety of projects at her training site to further improve her competencies in all areas covered by the programme. This development was especially notable in the area of outbreak investigations. Besides contributing to the response to the pandemic with different national COVID-19 related projects and activities, she was involved in an international project with ECDC, analysing the Irish COVID-19 contact tracing data. Her role in the investigation of a mumps outbreak developed her outbreak investigation skills further. Other projects, including a review and evaluation of the ano-genital warts (AGW) surveillance system and a retrospective rubella seroprevalence study, further helped her improve/acquire skills with regard to confidentiality, formulating public health recommendations, laboratory issues, and written communication. Annamaria managed to complete the fellowship very successfully, despite the difficulties posed by the pandemic. It was a great pleasure to work with her as her frontline coordinator.

Supervisor's conclusions

Annamaria's fellowship experience was severely impacted by the COVID-19 pandemic, as public health institutions globally struggled to respond to unprecedented demands. Despite the challenges of the pandemic, Annamaria has managed to complete a variety of projects across surveillance, research and outbreak management domains and consequently has a comprehensive, diverse fellowship portfolio.

Annamaria adapted quickly to HPSC's transition to emergency mode at the start of the pandemic and became a valued member of the COVID-19 epidemiology team. On this team she worked on routine COVID-19 surveillance tasks including daily epidemiological reports and also developed and produced a weekly epidemiological report on COVID-19 surveillance of healthcare workers. In addition to routine COVID-19 surveillance, Annamaria worked on several COVID-19 projects across outbreak management, research and surveillance in collaboration with public health and laboratory partners.

Aside from COVID-19, Annamaria projects included vaccine-preventable diseases, vaccine hesitancy and sexually transmitted infections, ensuring exposure to a broad range of topics. She presented her work to both national and international audiences at conferences and in peer-reviewed journals.

Annamaria was a valued team-member in HPSC during challenging times. She collaborated with colleagues across a variety of disciplines and was always willing to explore new opportunities. Her work was of very high standard and informed national and international public health. She will be an asset to any organisation that she joins.

Personal conclusions of fellow

The EPIET fellowship has been an enriching professional experience. I worked on a broad range of topics; gained advanced understanding of infectious diseases, epidemiology and statistics; enhanced my oral and writing communication; and developed my project management and organisational skills.

HPSC is a great training site where I was offered interesting projects and I could apply the knowledge I gained during the training modules.

The COVID-19 pandemic broke out midway through my fellowship, overwriting some of my expectations for the professional and social aspects of the fellowship. However, it also created a unique opportunity to witness and participate in the response to a global public health threat. Through this experience I gained better understanding of the daily work involved with running surveillance systems, both in emergency and everyday mode, including setting up the data collection, interpretation of notifications, reporting and communication to the public. Completing the EPIET fellowship was a significant step in my professional development and I am looking forward to using the knowledge and skills I gained.

Acknowledgements of fellow

I would like first and foremost thank my main supervisor Dr Lois O'Connor and co-supervisor Dr Margaret Fitzgerald for their time, excellent supervision and mentoring during my fellowship. I am particularly grateful for their dedication and commitment during the very busy and often difficult times of the COVID-19 pandemic. I would also like to thank my EPIET coordinators and, in particular, Tanja Charles for their guidance and support.

I would also like to acknowledge HPSC Director, Dr John Cuddihy for his support throughout my fellowship. Thank you to all HPSC staff for their kind support and especially those who facilitated and supervised my EPIET projects: Dr Suzanne Cotter, Dr Sarah Gee, Gillian Cullen, Dr Patricia Garvey, Dr Derval Igoe, Dr Paul McKeown, Dr Jolita Mereckiene, Dr Lisa Domegan, Dr Joan O'Donnell, and Dr Naomi Petty-Saphon.

Many thanks to the members of the COVID-19 Contact Management Program and especially Dr Sarah Doyle and Dr Claire Buckley for their advice and the time they devoted to my contact tracing data analysis project. I am grateful for the opportunity to participate in the PRECISE COVID-19 seroprevalence study and I would like to acknowledge the PRECISE study steering group.

I would also like to thank Dr Chantal Migone and her colleagues at the National Immunisation Office for including me in the team working on the National Survey of Parental Vaccine Attitudes. This project helped me develop my knowledge of survey methods and I also gained a better understanding of factors influencing parental vaccine attitudes, which I know will be very useful in my future professional life.

Many thanks are due to all past and present EPIET fellows in Ireland for their advice and support during my fellowship (Dr Jolita Mereckiene, Dr Patricia Garvey, Dr Margaret Fitzgerald, Dr Lois O'Connor, Dr Lisa Domegan and Melissa Brady).