



FELLOWSHIP REPORT

Summary of work activities

Raïssa Tjon-Kon-Fat

Intervention Epidemiology path (EPIET)

Cohort 2018

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 the 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;

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This portfolio does not represent a diploma. Fellows receive a certificate acknowledging the 2-year training and listing the theoretical modules attended. Additionally, if all training objectives have been met, they receive a diploma.

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- 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.

Fellows develop core competencies in field epidemiology mainly through project or activity work, but also partly through participation in training modules. Outputs are presented in accordance with the EPIET competency domains, as set out in the ECDC Fellowship Programme Manual.

Pre-fellowship short biography

Raïssa Tjon-Kon-Fat grew up on Sint Maarten and went to the Netherlands to pursue her studies in 2004. She has a medical degree from the Erasmus University in Rotterdam, a Master's degree in clinical epidemiology from the Netherlands Institute for Health Sciences in Rotterdam and a PhD from the Academic Medical Centre in Amsterdam. For the last four years she has been working at the Public Health Service (GGD) of Rotterdam-Rijnmond and Zuid-Holland Zuid in the function as a medical doctor specialised in infectious disease control.

Fellowship assignment: Intervention Epidemiology path (EPIET)

On 10 September 2018, Raïssa Tjon-Kon-Fat started her EPIET fellowship at the Centre for Infectious Disease Control of the Rijkinstituut voor Volksgezondheid en Milieu (RIVM), Bilthoven, the Netherlands, under the supervision of Mirjam Knol and Ewout Fanoy. This report summarizes the work performed during the fellowship.

Fellowship portfolio

This portfolio presents a summary of all work activities (unless restricted due to confidentiality regulations) conducted by the fellow during the ECDC Fellowship, EPIET path. These activities include various projects, 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.

This portfolio also includes a reflection from the fellow on the field epidemiology competencies developed during the 2-year training, a reflection from the supervisor on the added value of engaging in the training of the fellow, as well as a reflection by the programme coordinator on the development of the fellow's competencies.

Fellowship projects

1. Surveillance

Title: The added value of a regional influenza surveillance bulletin, Rotterdam and Dordrecht, 2018-2019

Every year during the influenza season at the Public Health Service in Rotterdam and Dordrecht, we receive many questions on whether there is significantly more activity in our region compared with other regions. In order to create situational awareness at the Public Health Services, we sent out a regional influenza bulletin every 2 weeks to the doctors, nurses and management team of the infectious disease control departments of the regional public health service (PHS) of Rotterdam-Rijnmond and Zuid-Holland Zuid. In this bulletin, we presented numbers on cases of influenza-like illness (ILI), acute respiratory tract infections (ARI) and influenza positivity rates for national and regional data, where available. We also incorporated information from the regional surveillance system for outbreaks in care facilities (MUIZ). After the influenza season we evaluated through the use of an online questionnaire whether there was a benefit for the Public Health Service to produce this regional influenza bulletin. Overall, the regional influenza bulletin was seen as being a relevant source of information for the PHS. Yet a large portion (45%) did not read the bulletin and from those that read the bulletin many were unsure about the benefit for their work, possibly because it did not affect their public health actions during that season. This could be due to the mild past influenza season compared with the 2017-2018 season. Adjusting the frequency depending on the severity of the influenza season, sending this bulletin to more stakeholders and adding additional sources on capacity of the different care facilities, could make the production of this regional influenza bulletin more feasible and sustainable for the PHS. Moreover, we recommended consulting a communication expert to improve the layout of the bulletin to enhance readability.

Role and outputs: Principal investigator

Raïssa wrote the project proposal. She collected, analysed and grouped all the data from different sources to draft the bi-weekly bulletin. Moreover, she also set up an evaluation through the use of an online questionnaire.

Supervisor(s): Ewout Fanoy

Competencies developed:

Through this project Raïssa was able to fully complete the circle of planning, implementing and evaluating a project. With this evaluation she was also able to gain more experience in developing online questionnaires. Furthermore, she was able to combine data from different sources of information to draft a bi-weekly bulletin.

Title: Setting up a surveillance system for maternal pertussis vaccination, contribution to this new surveillance system, 2019

Pertussis is a highly contagious infection that presents a high risk of severe disease for newborns. Due to the ongoing epidemic of pertussis and the risk of severe complications in new-borns a maternal pertussis vaccination (MPV) was introduced in December 2019. In this project they aimed to propose a surveillance system for evaluation and monitoring of the maternal pertussis vaccination programme and the change in vaccination schedule. They started working with the basic framework with which all surveillance systems within the National Immunisation Programme in the Netherlands are set up. Using this framework of five pillars, they evaluated what main indicators need to be addressed per pillar. Through an iterative process they defined these indicators and developed a proposal for a surveillance system for MPV. With a qualitative study they set out to assess whether the proposed surveillance system is feasible for stakeholders. There were several suggestions for improvement of the proposed surveillance system. They also drafted a final description of the surveillance plan for MPV in a separate document, where they incorporated all abovementioned suggestions (which includes suggestions for an evaluation of the surveillance system).

Role and outputs: Co-investigator together with Janeri Fröberg (epidemiologist)

Together with the epidemiologist in charge of pertussis surveillance, Raïssa drafted a study protocol, conducted a literature review and scheduled various brainstorm meetings within the National Immunisation department. Furthermore, they drafted a protocol for a qualitative study, developed an interview guide and conducted semi-structured interviews. They analysed the data from the qualitative study and drafted the final report.

Supervisor(s): Nicoline van der Maas and Hester de Melker

Competencies developed:

During this project Raïssa gained experience in the setting up of a surveillance system for vaccine preventable diseases. The basic framework of this system gave invaluable insights. Furthermore, she gained experience in setting up, conducting and analysing a qualitative study.

Title: Clinical severity of an emerging strain of invasive serogroup B meningococcal disease in the Netherlands, 2005-2018

Invasive infections with the bacteria *Neisseria meningitidis* can cause severe disease, such as bacterial meningitis, sepsis and septic shock. In addition, the mortality rate of invasive meningococcal disease (IMD) in Europe is relatively high, estimated between 6 and 8%. Of the serogroups of meningococci, the majority of the invasive infections are caused by serogroup B in the Netherlands. From November 2016 to May 2017, six cases of serogroup B invasive meningococcal disease (IMD-B) with finetype P1.22,14:F5-1 were reported in one region in the Netherlands (population: ~180,000). As four cases, including one fatality, were linked to one school, there was public concern about the severity of this strain, particularly as IMD-B vaccination is not routinely administered. To inform public health action, we assessed whether there was further transmission of this strain and whether this was associated with more severe disease. The national surveillance system for IMD includes clinical, epidemiological and microbiological data. We included all IMD-B cases reported between 2005 to 2018. We undertook descriptive epidemiology, comparing case attributes with this specific strain to other IMD-B cases. Of 1403 reported IMD-B cases, 25 (1.8%) had the cluster strain. The first case occurred in 2009 (0.85% of MenB cases), followed by two cases in 2014 (3.8%), three in 2016 (4.5%), 12 in 2017 (16%), and seven in 2018 (9.5%). Of 22 cases reported in 2016-2018, the median age was 18 years and 15 had meningitis (68%), compared to a median age of 16 years ($p=0.40$) and 62% ($p=0.58$) for other IMD-B cases. Ten cases (56%) were admitted to the intensive care unit (ICU) and one died (4.8%) compared with 36% ($p=0.10$) and 5.3% ($p=0.92$) for other IMD-B cases. There is ongoing transmission of this strain, causing a small fraction of IMD-B cases. ICU admission, an indicator of severe disease, was more common with this strain but the association was not statistically significant in the limited case series. Strain surveillance should continue but additional public health actions are not currently indicated.

Role and outputs: Principal Investigator

Raïssa wrote a protocol, analysed surveillance data and drafted a manuscript that will be submitted to a peer-reviewed journal in the upcoming months.

She also submitted abstracts to the European Meningococcal and Haemophilus Disease Society (EMGM) and to ESCAIDE. The abstract was accepted as a poster presentation for EMGM and she drafted the poster. Her supervisor held the poster presentation.

Supervisor(s): Mirjam Knol

Competencies developed:

Raïssa was able to perform descriptive analyses on national surveillance data, from which she drew conclusions and made recommendations for public health action. Furthermore, she became more familiar with the national surveillance systems in the Netherlands, as well as strain surveillance.

2. Outbreak investigations

Title: Gastrointestinal outbreak at a business event in the region of Rotterdam, the Netherlands, 2018

Gastrointestinal outbreaks tend to occur often after large events. In September 2018 an outbreak of norovirus occurred following a business event in the region of Rotterdam, the Netherlands. Of the 99 persons who attended this event, 79 participated in the subsequent investigation. In total 30 met the case definition (38%). The majority of cases had symptoms of diarrhoea and/or vomiting. Twelve persons submitted stool specimens: eight who were symptomatic and four who were not. Eight stool specimens were positive for norovirus GI. Four specimens from the environmental investigations were positive for norovirus GI: in the women's bathroom, one of the kitchen machines, a condiment holder and one of the workbenches. All positive human and environmental specimens were sent for further typing. Sequence analysis revealed that the capsid fragment (204 nt) matched 100% with the sequences identified in diagnostic samples that were typed as GI.P3-GI.3. These findings suggested that this was a point-source outbreak with norovirus as the infectious agent. It seems plausible that the food was contaminated through a source that originated from the kitchen, though we were unable to pinpoint the vehicle of the outbreak. The Netherlands Food and Consumer Product Safety Authority (NVWA) recommended a stringent cleaning protocol (including disinfection) for the kitchen of the restaurant and advised all food handlers on the measures that need to be taken if they have gastro-intestinal symptoms.

Role and outputs: Principal investigator

Raïssa drafted the protocol and the study report, analysed outbreak data and developed an online questionnaire. She also made a poster for a poster presentation during a national conference in the Netherlands.

Supervisor(s): Ewout Fanoy and Mirjam Knol

Competencies developed:

This was the first outbreak investigation that Raïssa performed during her fellowship. She gained experience with creating case definitions, describing the outbreak in terms of time, place and person, generating hypothesis and conducting an analytical study. The 10 steps of an outbreak investigation have provided her with a better framework to keep in mind when conducting an outbreak investigation.

Title: Scabies outbreak at a nursing home in the region of The Hague, the Netherlands, 2018

Scabies outbreaks are quite common among nursing homes in the Netherlands. An outbreak of scabies occurred among 85 persons who worked or lived at a nursing home in the region of The Hague in the Netherlands. Of the 78 interviewed persons, 30 persons met the possible case definition (i.e. reporting complaints of itchiness), four persons met the probable case definition (i.e. signs suggestive of scabies without laboratory confirmation) and six met the confirmed case definition (i.e. symptoms suggestive of scabies and laboratory confirmation). We performed laboratory confirmation with microscopy or PCR from either skin scrapings or specimens from bed linens. The overall attack rate was 51% when including all cases and 13% when only including probable and confirmed cases. The majority of the cases were residents. We were unable to identify risk factors for acquiring scabies among the residents. For the staff members direct physical contact with residents during work was significantly associated with a decreased risk of scabies, while pre-existing skin conditions or persons with symptoms suggestive of scabies in the family or immediate vicinity were significantly associated with an increased risk of scabies.

In the context of multiple consecutive outbreaks of scabies, we recommend an after action review in order to evaluate the control measures, the case finding procedures and the diagnostic processes that were implemented during this outbreak. We also recommend performing PCR when microscopy is negative in future outbreaks of scabies. We further advise that future studies are needed to evaluate the diagnostic performance of PCR when using environmental specimens (i.e. bed linens).

Role and outputs: Co-investigator together with Laurène Peckeu (EPIET fellow)

Raïssa Tjon-Kon-Fat and Laurène Peckeu, two fellows of the European Programme for Intervention Epidemiology Training, conducted the epidemiological aspects (writing of the study proposal and protocol, developing the questionnaires, performing the data entry, the data analysis and drafting a final report on the outbreak investigation). They also submitted an abstract to ESCAIDE, which was accepted as a poster presentation. Raïssa gave the poster presentation on behalf of Laurène Peckeu and the rest of the project group.

Supervisor(s): Ewout Fanoy

Competencies developed:

This was the second outbreak investigation that Raïssa performed during her fellowship. She was able to further develop her competencies. She was also able to gain more knowledge and expertise in the diagnostic tests for scabies and its role in scabies outbreak investigations. Moreover, for this project she reported and presented the results of the investigation during ESCAIDE.

3. Applied epidemiology research

Title: Sero-epidemiological study on Sint Maarten, 2020

Since the start of the COVID-19 pandemic there have been various published literature on sero-epidemiological studies that have been performed. On Sint Maarten, we had our first reported laboratory-confirmed case of COVID-19 on Sint Maarten on 17 March 2020. The number of new cases increased to 77 by mid-May; up to 1 July there were no new additional cases reported despite ongoing testing of all persons reporting respiratory symptoms to Collective Prevention Services (i.e. local Public Health Services). From the 1 July 2020 there has been another increase in the number of cases. As of 27 July 2020 a total of 115 persons tested positive for SARS-COV-2, 23 persons were admitted to the hospital and 15 persons with COVID-19 died. As a high percentage (13%) of the reported cases of COVID-19 died, we hypothesize that there was further spread of the virus on Sint Maarten. Due to stigma currently associated with COVID-19, possibly persons were afraid to report symptoms to their family doctor or to Collective Prevention Services (i.e. local Public Health Services department). This could have resulted in less symptomatic persons coming forward to be tested. Moreover, this could have affected certain subgroups of the population more, which could have led to further spread of the infection in those groups. Through this study we hope to get better insight into the extent of infection and cumulative incidence of infection on Sint Maarten in order to inform public health responses and policy decisions.

Role and outputs: Principal investigator

Raïssa drafted a study protocol. This protocol will be sent to the Medical Ethical Committee on Sint Maarten for further review.

Supervisor(s): Ewout Fanoy and Mirjam Knol

Competencies developed:

During this project Raïssa was able to gain more insight into how to conduct sero-epidemiological studies and writing a study protocol. She was able to specifically learn more about selecting a sampling strategy.

4. Communication

Publications in peer reviewed journals

Not applicable

Manuscripts submitted to peer reviewed journals (in review process)

1. Tjon-Kon-Fat R. and Peckeu L. et al. Short report: the potential of PCR on skin scrapings from bed linens for diagnosis of scabies during an outbreak. [Submitted]

Conference presentations

2. Tjon-Kon-Fat R. et al. Linking human and environmental specimens following a gastrointestinal outbreak in a restaurant. Poster presentation presented by Ewout Fanoy at Transmissiedag 2019; Amersfoort, the Netherlands.

3. Tjon-Kon-Fat R. et al. Increase of a specific strain of invasive serogroup B meningococcal disease in 2016-2018 in the Netherlands. Poster presentation presented by Mirjam Knol at EMGM 2019; Lisbon, the Netherlands.

4. Peckeu L, Tjon-Kon-Fat R. et al. An outbreak of scabies in a nursing home: the potential use of PCR on bed linens for diagnosis. Poster presentation presented by R.Tjon-Kon-Fat at ESCAIDE 2019; Stockholm, Sweden.

Other presentations

5. Tjon-Kon-Fat R. The study proposal and protocol of the GI-outbreak. Presentation presented at the internal EPIET/EUPHEM seminars, Bilthoven, the Netherlands.

6. Peckeu L and Tjon-Kon-Fat R. The study proposal, protocol and preliminary results of the scabies outbreak. Presentation presented at the internal EPIET/EUPHEM seminars, Bilthoven, the Netherlands.

7. Tjon-Kon-Fat R. The results of the GI-outbreak investigation. Presentation presented at an internal meeting for the doctors of the Public Health Service Rotterdam. Rotterdam, the Netherlands.

8. Fröberg, J. and Tjon-Kon-Fat R. The best-case scenario for a maternal pertussis vaccination (MPV) surveillance plan for the Netherlands. Presentation presented at an internal meeting of the department for the national immunisation programme of the RIVM, Bilthoven, the Netherlands.

9. Fröberg, J. and Tjon-Kon-Fat R. The proposed plan for a maternal pertussis vaccination surveillance programme. Presentation presented at the Internal Seminars of EPI-RIVM (refereer). Bilthoven, the Netherlands.

10. Tjon-Kon-Fat R. Molecular typing techniques - the usefulness from a Public Health perspective. Presentation presented at the Erasmus MC ACE meeting. Rotterdam, the Netherlands.

11. Tjon-Kon-Fat R. Proposed plan for a maternal pertussis vaccination surveillance programme. Presentation presented at the Erasmus MC ACE meeting. Rotterdam, the Netherlands..

Reports

12. Tjon-Kon-Fat. Project: community outreach COVID-19 on Sint Maarten.[internal report]; 2020.

Other

13. Tjon-Kon-Fat R. Study protocol: Sero-epidemiology on Sint Maarten. 2020

14. Tjon-Kon-Fat R. Final report: Gastrointestinal outbreak at a business event. 2019

15. Tjon-Kon-Fat R and Peckeu L. Final report: scabies outbreak. 2019

16. Tjon-Kon-Fat R et al. Manuscript: Clinical severity of an emerging strain of invasive serogroup B meningococcal disease in the Netherlands. 2020 [manuscript in preparation for submission]

17. Tjon-Kon-Fat R and Fröberg J. Final report: Setting up a surveillance system for maternal pertussis vaccination, contribution to this new surveillance system. 2020

18. Tjon-Kon-Fat R. Final report: the added value of a regional influenza surveillance bulletin

5. Teaching activities

Webinar "Randomised controlled trials: a neglected study design in our fellowship?"

For the C2018 webinars Raissa developed a presentation on randomised controlled trials, which focused on giving an understanding of the basic principles of a RCT with respect to the difference with other study designs, the framework, randomisation, blinding, sample size, intention to treat principle, different study designs and how to incorporate these principles when assessing the risk of bias (appraisal of an RCT). She was allotted 1 hour for her presentation and for questions. Prior to the presentation she sent out an online survey among the fellows as a learning needs assessment, which led her to adjust her presentation slightly. After her presentation she sent out another online survey to receive feedback from the fellows on her presentation. Overall, they thought the webinar was clear, something new and gave the basic knowledge on RCTs. Some fellows would have preferred topics that were a bit more advanced.

Supervisor(s): not applicable

Educational outcome:

Through this teaching activity Raissa gained experience in providing presentations via webinars or other online trainings. This particular skill will be useful when developing future trainings, especially in COVID-19 times.

Europe's defences against infectious diseases - disease detectives

Together with EPIET fellows Sonia Boender, Laurène Peckeu, Tom Woudenberg and Robert Whittaker, she participated in a joint teaching activity at the Vrije University (VU) in Amsterdam. They developed and gave presentations on different topics related to infectious disease epidemiology, she presented the basic framework of infectious disease control in the Netherlands with the primary focus on the different levels of public health action from regional to national to international. Their presentations were followed by a question and answer session on careers in the field of infectious disease epidemiology where they first presented a short visual trajectory of their career path so far and then answered questions from the students. The target group were students specialising in PH & Infectious Diseases and 2nd/3rd year BSc students from Amsterdam University College (AUC), participating in the courses 'Introduction to Public Health' & 'Epidemiology'.

Supervisor(s): Not applicable

Educational outcome:

Through this collaboration with other fellows Raissa was able to work in a team to develop a training for students (i.e. soon to be health professionals). She furthermore was able to become more familiar with the laws on reporting of communicable diseases at the regional, national and international level, according to the International Health Regulations.

Teaching activity at NSPOH on epidemiological curves and facilitating a case study

As part of the module outbreak investigation at the Netherlands School of Public Health and Occupational Health Raissa was asked to help facilitate on the first day of this training. This module is part of the curriculum for all medical doctors who are doing a residency in infectious disease control. This training day took place on 7 October 2019 from 10.30- 16.30. She presented on epidemiological curves in the morning followed by facilitation of the EPIET case study on Giardiasis in the afternoon.

Supervisor(s): Not applicable

Educational outcome:

This was her first teaching activity at the NSPOH and the first time facilitating a case study. Raissa experienced the practical challenges of trying to guide a group through an outbreak investigation in a case study.

Teaching activity: facilitation of a case study at the University of Nijmegen

As part of the minor "Control of Infectious Diseases" at the medical faculty at the Radboud University Medical Centre in Nijmegen in the Netherlands Raissa was asked to help facilitate with the EPIET case study on trichinosis. During the case study she guided the 10-15 3rd year Medical and Biomedical Science students through this case study.

Supervisor(s): Alma Tostmann

Educational outcome:

This was the second time that Raïssa facilitated with a case study. She gained more experience in facilitation of a case study, learning the importance of supporting the group discussion and engaging the whole group through giving input and clarifying arguments at the right time.

Online training on infectious disease epidemiology for the islands within the Dutch Kingdom

Together with her supervisor, Raïssa was in the process of developing a series of webinars for personnel working in the field of infectious disease control at the Public Health Institutes in the Dutch Caribbean. They aimed to introduce these participants to general principles of surveillance, outbreak investigation and applied epidemiology of infectious diseases in order to implement these tools in their routine work at their own Public Health institutes in the Dutch Caribbean. For a learning needs assessment they had discussions via online meetings; they also sent an online survey to gauge what topics persons would like to learn more about. They planned to start the webinars in April 2020. Due to the COVID-19 pandemic this project has been postponed.

Supervisor(s): Barbara Schimmer

Development and delivery of webinars is still pending

Educational outcome:

Although the project is not completed yet, she learned how to plan and use available resources which are necessary to conduct this training. Raïssa aims to complete this series of webinars after her fellowship, as she believes a training program in infectious disease epidemiology in the Dutch Caribbean is very important.

Teaching of medical interns (5th-6th year of medical school)

As part of the internships for medical students at the Erasmus Medical Centre, the public health doctors of the Public Health Service (GGD) of Rotterdam Raïssa provided a presentation of 3 hours on principles of infectious disease control, regulations in the Netherlands and international and case studies on pertussis and rabies. She has given this presentation numerous times to various groups over the course of the last two years.

Supervisor(s): Not applicable

Educational outcome:

During this teaching activity she was able to make medical students more familiar with basic concepts of infectious disease epidemiology. Furthermore, she gained experience in being able to adjust her message when giving her presentation depending on the level of knowledge and engagement of the group.

Pilot training at the GGD

Raïssa was in the process of developing training for the GGD to introduce the doctors and nurses of the infectious disease control team to general principles of surveillance, outbreak investigation and applied epidemiology in order for them to implement these tools in their routine work at the GGD. If this pilot was a success it would be rolled out in more GGD across the Netherlands. This was planned to start the training in spring/summer 2019, but due to the COVID-19 pandemic this has been postponed.

Supervisor(s): Ewout Fanoy

Development and delivery of this pilot is still pending

Educational outcome:

For this training Raïssa was looking for a way to bring across the knowledge that she has learned during her EPIET fellowship to her colleagues at the GGD. She hopes to be able to still complete this training after her fellowship.

6. Other activities

1. Residency infectious disease control (in Dutch: "arts infectieziektebestrijding"):

During her fellowship Raïssa finished her second year of residency in infectious disease control. As part of her residency programme, she participated in trainings and modules on the following topics:

- Health promotion (November 2018)
- Chemical, biological, radioactive and nuclear (CBRN) incidents and emergencies (November 2018)
- Public Health professionals in the media (November 2018)
- Zoonosis (November 2018)
- KAMG conference (December 2018)
- NSPOH Vaccinology module (January - February 2019)
- Practical media training (May 2019)
- 4-week part-time internship at a regional laboratory including a lab project (June - July 2019)

2. Deployment to Sint Maarten to support in the response to the COVID-19 pandemic:

In April 2020 Raïssa was asked by the National Coordination Centre for Communicable Diseases of the RIVM if she would be willing to go to Sint Maarten to support the response to the COVID-19 pandemic. From April 2020 to August 2020 she was deployed to Sint Maarten. During the course of this deployment her main responsibilities were:

- Coordinating the team responsible for the COVID-19 response at Collective Prevention Services
- Providing technical guidance with respect to infection control and surveillance for COVID-19
- Reporting of national daily numbers of COVID-19
- Developing and maintaining surveillance databases
- Developing and conducting information sessions on COVID-19
- Advising the Prime Minister and Minister of Public Health, Social Development and Labour on the social measures to be taken
- Strengthening the collaboration between relevant stakeholders within government, healthcare sector and Collective Prevention Services
- Acting as liaison with national stakeholders, counterparts from Saint Martin, counterparts from the rest of the islands of the Dutch Kingdom and PAHO
- Addressing all public queries related to COVID-19

3. Other training and meetings

Raïssa attended the weekly scientific seminars organised by the RIVM epidemiology department as well as the weekly early warning meeting, which has provided insight in how signals are generated and how this can effectively be communicated nationally.

Furthermore, she participated in an introduction to R course via EAN in November 2019.

7. EPIET/EUPHEM modules attended

1. Introductory course, 24 September - 12 October 2018, Spetses, Greece
2. Outbreak Investigation, 3 - 7 December 2018, Berlin, Germany
3. Multivariable Analysis, 25 - 29 March 2019, Madrid, Spain
4. Rapid Assessment and Survey Methods, 13 - 18 May 2019, Zagreb, Croatia
5. Project Review 2019, 26 - 30 August 2019, Prague, Czech Republic
6. Time Series Analysis, 4 - 8 November 2019, Bilthoven, the Netherlands
7. Vaccinology, 22 - 24 June 2020, Online training

Supervisor's conclusions

With already quite some experience in research (obtained during her PhD project), Raïssa wanted to focus on outbreak investigation and surveillance during her EPIET fellowship. This is clearly reflected in the projects she performed. Raïssa did three different surveillance projects; one where she analysed routine surveillance data of meningococcal B disease, one where she set up a surveillance plan for evaluation of maternal pertussis vaccination, and one where she developed and evaluated a regional influenza surveillance bulletin. These were three totally different surveillance projects where she acquired different skills. The regional influenza surveillance bulletin was generally well accepted and may be continued in this coming influenza season. The report written about the surveillance system for maternal pertussis vaccination will be used for evaluating the implementation of vaccination. Raïssa conducted two outbreak investigations. One was a 'classical' food outbreak, where Raïssa followed the ten steps of an outbreak investigation and tried to identify the source of the outbreak. In the scabies outbreak Raïssa learned specifically about the lab component in an outbreak. Lastly, she wrote a research protocol for a SARS-CoV-2 seroprevalence study on Sint Maarten. A very timely and relevant topic where she had to think about the sampling population and sampling strategy. She also did a variety of teaching activities including presenting at her EPIET cohort webinar, and developing online training for the Dutch Caribbean islands. In the last months of her fellowship she went to Sint Maarten. There she played a major role in advising the key policy makers about COVID-19 surveillance and response.

Raïssa had to combine her regular work at the Municipal Health Center with her EPIET fellowship at RIVM which was sometimes challenging. On top of that, the COVID-19 pandemic and the associated mission to Sint Maarten came along during her fellowship, complicating things even more. Still, Raïssa succeeded in performing many different projects on different topics acquiring a lot of skills, which will be very useful in her future career. Furthermore, Raïssa is a pleasant person to work with, she is very open-minded, has a broad interest and brings in a lot of enthusiasm. I am confident that she will continue to work in public health, in the Netherlands or abroad, where she will be able to apply the skills she acquired or improved on during her fellowship.

Coordinator's conclusions

Raïssa has gained a wide range of experience during her EPIET fellowship, cementing her epidemiology skills and seeking to apply these in a strong public health context. A particular piece of work which demonstrated how she has successfully combined epidemiological rigour around surveillance with the more strategic elements of public health implementation is in her work on a surveillance plan for maternal pertussis vaccination. The latter part of her fellowship has been dominated by her response to COVID-19, first in the Netherlands and subsequently on St Maarten where she provided support on all aspects of incident response and surveillance of this novel virus. In developing a robust protocol for a seroprevalence study on St Maarten she has also helped to contribute to the evidence about this disease. Raïssa has demonstrated both skill and enthusiasm in teaching others at various levels and I am confident will continue to use these skills to effectively build epidemiology capacity wherever she works.

Personal conclusions of fellow

Before I started the fellowship I had worked in the field of infectious disease control for over two years and I wanted the opportunity to broaden my knowledge and skills in field epidemiology, specifically outbreak investigations and surveillance. Now at the end of this fellowship I can say that I have gained more than just more knowledge and skills, I have also gained a better understanding of the complexities of infectious disease epidemiology. Through the modules and projects I was able to learn more about the theoretical framework behind an outbreak investigation (i.e. the ten steps) and surveillance systems (i.e. the various pillars of surveillance, the outputs with its timelines). This has given me the necessary foundation to be able to apply the skills and knowledge that I have learned during this fellowship in any setting. Already during my deployment during the last few months, I was able to apply my training in outbreak investigation and I was grateful that I had this basis on which to build during my work on Sint Maarten.

This fellowship not only helped me grow my skills in infectious disease epidemiology, but also helped me to become a more all-round Public Health professional. I gained experience in performing evaluations, providing various teaching activities, presenting to various audiences, providing information to the lay public and engaging with key stakeholders. These are all relevant proficiencies to have in the broad field of Public Health and I am grateful to the fellowship for allowing me this opportunity to harness these skills further.

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