Summary of work activities
Roan Pijnacker
Intervention Epidemiology path (EPIET)
Cohort 2015

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;
- 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 EPIET scientific guide[1].

Pre-fellowship short biography

Roan Pijnacker graduated as a radiation therapist in 2011. After finalizing his Masters in Health Sciences, with a specialisation in Infectious Diseases and Public Health, in 2013, he worked as an epidemiologist at the National Institute for Public Health and the Environment (RIVM).

Fellowship assignment: Intervention Epidemiology path (EPIET)

On 15th September 2015, Roan Pijnacker started his Member State (MS) EPIET fellowship at the National Institute for Public health and the Environment RIVM, Bilthoven, Netherlands, under the supervision of Susan Hahné. His EPIET frontline coordinators was Kostas Danis. 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.

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[1] European Centre for Disease Prevention and Control. European public health training programme. Stockholm: ECDC; 2013. Available from:
http://ecdc.europa.eu/en/epiet/Documents/Scientific%20guides/EPIET%20Scientific%20Guide_C2016.pdf

Fellowship projects

1. Surveillance

Title: *Shifting age distribution among children affected by rotavirus following a low rotavirus season in the Netherlands, 2010-2016*

INTRODUCTION
In the 2014 rotavirus (RV) epidemiological season, an unexplained decrease in RV incidence was reported in the Netherlands despite the absence of RV vaccination. A hyper-endemic year was expected in the following year(s), but the 2015 rotavirus season followed the usual pattern. We quantified the 2015 and 2016 RV seasons in the Netherlands in comparison with 2010-2013 and assessed possible shifts in age-specific incidence rates following a low-endemic year.

METHODS
We used weekly RV laboratory detections from virological surveillance (years 2010-2016) and all-cause gastroenteritis (GE) consultations in < 5-year-olds from NIVEL Primary Care Database (years 2010-2015). We calculated Incidence Rate Ratios (IRR) using negative binominal regression.

RESULTS
The number of RV detections and GE consultation rates in 2015 did not significantly differ from 2010-2013 (IRR: 0.86; 95%-CI 0.62-1.19 and IRR 0.87; 95%CI 0.70-1.07, respectively). However, a significant decrease in RV detections was observed in 2016 (IRR: 0.41; 95%-CI 0.29-0.56), similar to 2014. In 2015, age-stratified GE consultation rates were significantly higher in 2- and 3- year olds (IRR 1.66; 95%CI 1.34-2.07 and IRR 1.52; 95%CI 1.21-1.90, respectively) and lower in 0-year olds (IRR 0.44; 95%CI 0.35-0.56) compared with previous years.

CONCLUSIONS
Results indicate a possible shift to a biannual pattern in the Netherlands, with a change in affected age groups following low-endemic years.

Role and outputs: Main investigator, performed data analysis, drafted and submitted a manuscript to a peer-reviewed journal (1) and presented a poster at ESCAIDE 2016 (2).

Supervisor(s): Hester de Melker

Title: *Trends of shigellosis in the Netherlands, 1988-2015*

INTRODUCTION
Shigellosis is endemic in the Netherlands. The aim of this study was to describe changes in the epidemiology of shigellosis in the Netherlands.

METHODS
We used surveillance shigellosis reports stored in the national surveillance database at the National Institute for Public health and the Environment (RIVM). Cases were defined as persons with a culture positive for *Shigella* and who experienced diarrhoea, fever, vomiting or stomach ache or persons with these symptoms who had recent (<2 weeks) contact with a person with confirmed *Shigella*. We described trends by age, gender, land of infection, source of infection (including homosexual contact (MSM)) and clusters (i.e. one or more linked cases) of cases. Data regarding land of infection was available after 1992, data regarding MSM after 2005 and data on clusters since 2003.

RESULTS
Overall, 10,945 shigellosis cases were reported from 1998 to 2015. The highest incidence was observed in 1-4 year olds and 25-30 year olds (125 and 117 cases per 100,000 persons, respectively). Until 2005, 76% of cases were travel-related, mainly from Egypt (16%), India (11%) and Turkey (11%). During 2006-

2015, 72% of cases were travel-related, mainly from Morocco (14%), Egypt (14%) and India (9%). Travel-related cases from Egypt further decreased to 8% during 2011-2015. During 2005-2015, 27% of all cases were in MSM, 55% in autochthonous cases and 7% in travel-related cases. After 2010, 63% of autochthonous cases were in MSM. During 2003-2015, 32% of cases were part of a cluster, 75% of which were travel-related cases.. Of all clusters, 68% occurred within the family.

CONSLUSIONS
The epidemiology of shigellosis in the Netherlands has changed in the last 10 years, with the number of autochthonous cases having increased mainly among MSM. Although the majority of cases were still travel-related, the country where Dutch travellers contract shigellosis has changed. These results underscore the need of increased vigilance of shigellosis in MSM, and of gaining insight in the MSM network in the Netherlands to identify targets for intervention.

Role and outputs: Main investigator, performed data analysis, drafted and submitted a manuscript that was published in a peer-reviewed Dutch journal (3).

Supervisor(s): Wilfrid van Pelt and Ingrid Friesema

Competencies developed:
Time series analysis was an important skill to develop during my fellowship. I use it routinely in my role in monitoring Dutch national surveillance data for trends and outbreaks and will continue to do so in the future. Both projects helped to further develop my skills on the management of large datasets. Furthermore, I gained in-depth knowledge of the complex transmission dynamics of rotavirus in developed countries and of the epidemiology of shigellosis in the Netherlands.

2. Outbreak investigations

Title: Salmonella Enteritidis infections associated with non-retail eggs in the Netherlands, during a multi-country outbreak, 2015 – 2017

INTRODUCTION
In August 2016, an increase in Salmonella Enteritidis cases with Multi-Locus Variable number tandem repeat Analysis (MLVA) profile 2-9-7-3-2 was observed in several EU countries including the Netherlands. We investigated the outbreak in the Netherlands, to identify the vehicle of infection.

METHODS
Confirmed cases were infected individuals with S. Enteritidis sharing a common t5-level single nucleotide polymorphism (SNP) address based on whole genome sequencing (WGS); probable cases were those with MLVA profile 2-9-7-3-2/2-9-6-3-2. We compared cases reported since 01/08/2016 with controls selected randomly from population registries, frequency-matched on age, sex and municipality of residence. We collected information on food exposures using a structured questionnaire. We calculated odds ratios (OR) using logistic regression. Food trace-back investigations were performed based on identified food exposures of cases.

RESULTS
From May 2015 to April 2017, 74 confirmed cases and 128 probable cases were reported in the Netherlands. Cases were more likely to have eaten in restaurants than controls (48% (n=41) vs 75% (n=49); OR 3.4, 95%CI 1.6-7.3). Trace-back investigations of foods that cases consumed at restaurants identified a common supplier for 19 restaurants that imported non-retail eggs from a Polish packing station. Of these eggs, 66 (13%) egg shell samples and 2 (<0.1%) egg contents (pools of ten eggs) tested positive for Salmonella spp., and were linked to human cases using WGS. After eggs originating from the implicated packing station were removed from the market, no additional cases occurred.

CONSLUSIONS
Environmental and laboratory evidence suggested that non-retail eggs were the likely vehicles of transmission. This outbreak highlights the importance of a coordinated collaboration between public health institutes and food authorities, and the potential of routine WGS in Salmonella surveillance and outbreak response.

Role and outputs: Main investigator, developed questionnaire and data entry from, performed data analysis, wrote and submitted an abstract to ESCAIDE 2017 accepted as an oral presentation (4), wrote and submitted a manuscript to a peer-reviewed journal (5) and the RIVM Infectious Diseases Bulletin (6). Presented at the a national conference (Transmissiedag, in English: Transmission day), including 300 public health professionals from the RIVM and local health authorities (7).

Supervisor(s): Ingrid Friesema

Title: Outbreak of diarrhoea among participants of a triathlon and a duathlon on 12 July 2015 in Utrecht, the Netherlands

BACKGROUND
On 12 July 2015, a triathlon and duathlon competition with 900 participants took place in Utrecht, the Netherlands. We initiated an outbreak investigation after 56 participants reported health complaints such as nausea, vomiting and/or diarrhoea, to esimate the magnitude of the outbreak and identify the source.

METHODS
A retrospective cohort study was conducted among participants of the triathlon and duathlon. A case was defined as participants of the event on 12 July 2015 with acute gastrointestinal illness (AGI), including on of the following symptoms: vomiting, diarrhoea, nausea and/or stomach pain that started within 7 days of the end the event. An online questionnaire was sent to 700 participants to collect information on symptoms and swimming- and food-related exposures. Stool specimens from participants and water specimens from the swimming location were collected. We calculated adjusted risk ratios (RR) using binomial regression.

RESULTS
Overall, 239 participants completed the questionnaire (response: 34%); 73 (31%) of them met the case definition. Of the respondents, 159 (67%) were male and the median age was 38 years (range: 15-67). Consumption of energy drinks (RR 1.6, 95%CI 1.0-2.5) and ingesting 3 mouthfuls of canal water (RR 2.6, 95%CI 1.5-4.8, with no water swallowed as reference group) were associated with AGI among swimmers only. All four collected water specimens tested positive for norovirus genogroup I and rotavirus and 6 (100%) stool specimens tested positive for norovirus genogroup II.

CONCLUSIONS
Our findings indicate that swimming in open water was the most likely source of infection, with norovirus as the most likely causal agent. Swimmers should get information about the health risks for making an informed choice about participating. For future events, the organisers changed the swimming location from a canal to a recreational lake.

Role and outputs: Co-investigator, helped with data analysis and was co-author in the manuscript that was published in a peer reviewed journal (8).

Supervisor(s): Wilfrid van Pelt

Competences developed:
The S. Enteritidis outbreak was my first outbreak investigation as principal investigator. I learned how to liaise with local health authorities and laboratories and to administer questionnaires in patients. I also worked closely together with the Food and Safety Authority in the Netherlands, but also

internationally with ECDC and other public health institutes, since the outbreak affected multiple EU Member States. Because we conducted a case-control study, I gained experience with sampling controls from the population registries with similar sociodemographic characteristics as cases. I learned how to create a data entry mask in MS Access, maintain the line list, and gained experience with new commands in STATA to perform statistical analysis. The triathlon outbreak helped me in developing skills in (stratified) statistical analysis. It also gave insight in how to involve all players (i.e. event organizers, local health authorities, participants) in the outbreak investigation and how to disseminate the results of a study to stakeholders.

3. Applied epidemiology research

Title: Seroprevalance of antibodies against Coxiella burnetii among the general population in a livestock-dense area

BACKGROUND
In 2007-2010, a major Q fever epidemic occurred in the Netherlands. We aimed to (1) estimate the seroprevalence after the Q fever epidemic among people living in the affected areas, (2) to identify farm exposures associated with having antibodies against *C. burnetii*.

METHODS
During March 2014-February 2015, residents aged 18-70 years from two provinces, identified through general practitioners, completed a questionnaire concerning symptoms and personal characteristics and submitted a blood sample at one of 12 study centres. We used the mandatory provincial database of livestock licences to calculate distance to farms/farm animals for each participant. To compare ELISA-positive participants for *C. burnettii* antibodies with those negative, we calculated Prevalence Ratios (PR) using binominal regression.

RESULTS
Of the 2,296 participants (response: 34%), 6.1% (n=139, 95%CI 5.1-7.1%) had *C. burnetii* antibodies (range across municipalities: 1.7-14.1%). *C. burnetii* seroprevalence was higher in individuals living within 1000m from goat farms (PR 3.0; 95%CI 1.4-6.4) or within 1000m from >50 goats (PR 1.9; 95%CI 1.2-3.0). Seroprevalence increased with decreasing distance to the closest goat farm that was infected during the epidemic years (<500m, PR 9.5, 95%CI 2.8-32; 500-1000m, PR 4.5, 95%CI 2.6-7.7; 1000-1500m, PR 2.2, 95%CI 1.1-4.3, 1500-2000m, PR 1.2, 95%CI 0.6-2.5; >2000 reference group).

CONCLUSIONS
Results indicated a remarkable spatial variation in *C. burnetii* seroprevalence in a relatively small livestock-dense area, strengthening previous evidence that the Q fever epidemic was primarily the result of airborne *C. burnetii* transmission from Q fever affected goat farms. The higher *C. burnetii* seroprevalence among persons living close to goat farms suggests that physicians should remain vigilant for pneumonia possibly caused by Q-fever.

Role and outputs: Main investigator, performed data analysis, submitted a manuscript to a peer-reviewed journal (9).

Supervisor(s): Wim van der Hoek

Title: Different risk factors for infection with Giardia lamblia assemblages A and B in children attending a day-care centre in the Netherlands

BACKGROUND
Giardia lamblia is a major cause of diarrhoea in children, especially those attending day-care centres (DCCs). Only Giardia assemblages A and B infect humans. Given the lack of assemblage-specific epidemiological data, we aimed to identify risk factors for assemblage A and B infection in DCC-attendees.

METHODS
During 2010-2013, 5015 faecal samples from ≤4-year-old children attending 40 DCCs participating to laboratory surveillance in the Netherlands were tested for Giardia using RT-PCR. Giardia -positive samples were typed for identification of assemblages A and B. We compared child- and DCC-level characteristics of Giardia-positive children with those of Giardia-negative children using mixed-effects logistic regression and calculated odds ratios (OR).

RESULTS
Overall, 226 (4.5%) samples tested positive for Giardia and assemblages were determined for 138 of them: 62 (45%) were assemblage A and 76 (55%) were B. The only risk factor for assemblage A infection was attending DCCs with indoor sandpits and cats during spring/summer (OR 13.5; 95%CI 1.8-101.3). For assemblage B, risk factors were attending DCCs with dedicated diaper-changing (OR 3.6; 95%CI 1.7-7.6) and laundry (OR 2.3; 95%CI 1.1-4.9) areas. Preventing sick children from attending day-care and having cloth-towels at the DCC decreased the risk of assemblage B infection (OR 0.0; 95%CI 0.0-0.5 and OR 0.3; 95%CI 0.1-0.6, respectively).

CONCLUSIONS
Risk factors for assemblage A and B infection in DCC-attending children were different, with assemblage B being mainly related to anthroponotic transmission, and assemblage A being related to zoonotic transmission. Given these differences, interventions to reduce the burden of childhood giardiasis cannot ignore those assemblage-specific preferred reservoirs and transmission routes.

Role and outputs: Main investigator, performed data analysis, published a manuscript in a peer-reviewed journal as a first author (10).

Supervisor(s): Wilfrid van Pelt

Title: Invasive meningococcal disease: association with influenza-like illness in the Netherlands, 2006-2016

INTRODUCTION
Viral respiratory tract infections, including influenza, may predispose to bacterial disease such as meningococcal disease, suggesting that immunization against influenza might result in reductions of Invasive meningococcal disease (IMD). We will conduct a study to examine the association between IMD and influenza-like-illness (ILI) in the Netherlands during 2006-2016, after the implementation of nationwide Meningococcal Serogroup C vaccination, in order to inform better vaccination strategies to reduce the burden of IMD.

METHODS
We will compare time trends of the two diseases. Weekly data on ILI cases will be obtained from the NIVEL Primary Care Database, and the total number of people enrolled in the sentinel practice network, and data on IMD cases from the Netherlands Reference Laboratory for Bacterial Meningitis during 2006-2016. Cross-correlation functions will be used to identify the delay with the strongest relationship, both adjusting and not adjusting for seasonality, to identify differences between these two approaches. Adjusting for seasonality will be done by fitting a seasonal autoregressive integrative moving average (SARIMA) model to the independent time series (ILI incidence).

Role and outputs: Main investigator, wrote the study protocol (11) and started performing data analysis.

Supervisor(s): Mirjam Knol, Hester de Melker, Hester Korthals Altes

Title: Grant proposal: Investigating Leptospirosis Emergence in People and Pets: Transmission and Occurrence (iLEPPTO)

INTRODUCTION

In the Netherlands, 60 autochthonous human leptospirosis cases were notified in 2014 and 44 in 2015, representing a 4-fold increase compared with 2010-2013. A concurrent increase was observed in canine leptospirosis in veterinary practices. Most autochthonous cases are notified in the Western and Central parts of the Netherlands, suggesting the need for more targeted prevention and control measures in high-risk areas. However, development of these measures are hampered because transmission pathways of leptospirosis are not well understood. There is no data at all on Leptospira in the environment and little data on Leptospira in rodents.

PROPOSAL

We propose a research project with the following objectives: 1) to identify risk factors for Leptospira exposure in humans in the Netherlands, 2) to assess the value and feasibility of a national surveillance system in veterinary practices to monitor leptospirosis in dogs as a proxy for environmental exposure to Leptospira in humans, 3) to develop a predictive statistical model that can explain and predict the occurrence of autochthonous human leptospirosis, and 4) to raise awareness for leptospirosis among general practitioners, occupational health services, and high-risk occupational and recreational groups.

EXPECTED OUTCOMES

Project results will help develop targeted preventive and control measures and assist Public Health Services (PHS) in evidence-based risk assessments. In addition, it will increase awareness for leptospirosis among general practitioners, occupational health services, and high risk groups for leptospirosis, in order to prevent human Leptospira infection and ensure timely and appropriate treatment of the disease. This is especially important due i) to increasing popularity of outdoor activities associated with leptospirosis outbreaks, such as triathlons and mud races and ii) the increased Leptospira and rodent survival as a result of climate change.

Role and outputs: Prepared the grant proposal (12). The project passed the first round of selection but was not honoured in the second (and last) round.

Supervisor(s): Wilfrid van Pelt

Title: Retrospective mortality and nutrition survey (anthropometry) in the MSF catchment area in Mayendit county, Unity State, South Sudan, July 2017

INTRODUCTION

In February 2017, Mayendit county in Southern Unity State was declared in famine with a global acute malnutrition (GAM) prevalence of >30%. In May 2017, after the implementation of an emergency nutrition response, including food drops food from airplanes, the county was declared to be no longer in famine, but was still facing food security emergency. From 4-16 July 2017, we conducted a survey in this county, to estimate mortality and GAM prevalence to serve as baseline estimates for future health and intervention monitoring surveys.

METHODS

We used a two-stage cluster sampling to select households in Thaker, Rubkuay and Gier payam districts . In the first stage, we randomly selected clusters (villages) with probability proportional to the village population size. In the second stage, the spin-the-method was used to select the first household and subsequently, the next closest households were selected. We interviewed

households using a household questionnaire on persons who had arrived, had left, were born or had died during the last 6 months, cause of death and measured the mid-upper arm circumference (MUAC) of children aged 6-59 months.

RESULTS

Overall, 632 households were interviewed in 26 villages, including 4,422 people, of whom, 948 (21%) were <5 year olds. The median age was 19 years (range 0-92). The Crude Mortality Rate (CMR) was 0.92/10,000 persons/day (95%CI 0.64-1.3) overall and 0.32/10,000 persons/day (95%CI 0.14-0.73) among under 5-year-olds. 37/69 (54%) recorded deaths were attributed to violence. GAM prevalence was 9.7% (95%CI 6.0-13.3) and the Severe Acute Malnutrition 1.5% (95%CI 0.5-2.6).

CONCLUSIONS

Results indicate that mortality and malnutrition rates in Mayendit county are below emergency thresholds and confirm that famine has ended. However, the area still faces food insecurity and requires close monitoring of mortality and malnutrition, especially since food provision frequency in the county decreased from every 30 to every 45 days in July 2017.

Role and outputs: Principal investigator. Prepared the study protocol (13) and wrote the study report (14).
Supervisor(s): Kostas Danis and Ruby Siddiqui

Competencies developed:

These research projects provided a great opportunity to improve my skills in managing large datasets and performing multivariable analysis while allowing for clustering in the data. I was also provided with the opportunity to work on respiratory bacteria, extending the range of infectious disease in which I have gained experience. It was the first time for me to work on and coordinate the writing of a grant proposal, as well as chairing meetings. This experience is very valuable for my future career and this was one of my main personal goals when I started EPIET. It was also my first time to work on a study protocol on diseases/syndromes (meningococcal disease and influenza-like-illness) which were outside my usual scope of gastro-intestinal diseases.

The nutrition and mortality survey in South Sudan was my first study that I conducted in a resource-pour setting and it was my favourite project during my two-year EPIET fellowship. I was involved in all the steps/stages of the survey and learned about sampling methods, training strategies in a context with (almost) no resources and a low educational level. I worked as an international staff and learned to be flexible due to a fragile security situation.

4. Communication

Publications in peer reviewed journals

One manuscript has been published as first author (10) and one as co-author (8).

Manuscripts submitted to peer reviewed journals (in review process)

Two manuscripts submitted (1, 9) and one in preparation (5).

Conference presentations

One poster presentation at ESCAIDE 2016 (2), one oral presentation at a national conference (7) and one oral presentation at ESCAIDE 2017 (4).

Other presentations

Two oral presentations at the Netherlands School of Public & Occupational Health, one oral presentation at the Center for Infectious Disease Control (RIVM) and one oral presentation at a national symposium on Leptospirosis and Wheil's Disease from swimming water (15).

Reports

One nutrition and mortality survey report (14).

Other

Risk assessment on the emergence of Seoul virus in the Netherlands (16), one case report (17) and one surveillance report (3).

5. Teaching activities

1. Case study: HIV surveillance in Spain
Facilitated the case study 'HIV surveillance in Spain' on November 11th 2015 for 12 students who attended the module 'Infectious Diseases Epidemiology' during their masters Biomedical Sciences.

2. Case study: Giardiasis in Bergen, Norway
Facilitated the case study 'Giardiasis in Bergen, Norway' on February 2nd 2016 at the Netherlands School of Public & Occupational Health for a group of approximately 10 doctors in training.

3. Lecture: Use of epidemic curves in epidemiological research
Developed and delivered a 1-hour lecture on February 2nd 2016 on epidemic curves, at the Netherlands School of Public & Occupational Health for a group of approximately 10 doctors in training.

4. Case study: Giardiasis in Bergen, Norway
Facilitated the case study 'Giardiasis in Bergen, Norway' on May 24th 2016 during the course "Infectious Disease Epidemiology" the Utrecht University among mainly PhD students.

5. Case study: Hepatitis A, Oysters and Alcohol
Facilitated the case study 'Hepatitis A, Oysters and Alcohol' on March 14th 2017 at the Netherlands School of Public & Occupational Health for a group of approximately 15 medical doctors in training.

6. Lecture: Bias in epidemiological studies
Developed and delivered a 1-hour lecture on bias in epidemiological studies on March 14th 2017 at the Netherlands School of Public & Occupational Health for a group of approximately 15 medical doctors in training.

Educational outcome:
Developing these teaching assignments and delivering them has helped to fully understand the epidemiological concepts and methods. I learned to teach "students" of different educational levels and backgrounds; master and PHD students, and medical doctors. I also learned to adjust my lectures according to their needs. These teaching assignments made me realize how fun teaching is, and I hope to continue this in the future.

6. International assignments

Title: Retrospective mortality and nutrition survey (anthropometry) in the MSF catchment area in Mayendit county, Unity State, South Sudan, July 2017

See research projects.

7. Other activities

1. Mini-symposium Wildlife and zoonoses. 25th January 2016
2. Bayesian statistics course, 25th and 26 May 2016
3. Mini-symposium Water quality, 9th March 2017
4. R Introductory course, 15th March 2017
5. R Advanced course, 17th March 2017

8. EPIET/EUPHEM modules attended

1. Introductory Course, Spetses, Greece 15th October to 5th November 2015
2. EPIET Outbreak module, Berlin 7th to 11th December 2015
3. EPIET Module on Multivariable Analyses, Vienna 14th d to 19th March 2016
4. EPIET RAS Module, Athens, 20th to 25th June 2016
5. EPIET Project Review Module, Lisbon, 22th-26th August 2016
6. EPIET Module on Time Series Analyses, Bucharest, 7th -12th November 2016
7. EPIET Vaccinology Module, Stockholm, 12th-16th June 2017
8. EPIET Project Review Module, Lisbon, 28 August to 2 September 2017

Supervisor's conclusions

Roan Pijnacker has had a very prolific EPIET Member State track fellowship, in which he achieved all his EPIET objectives. He managed to take on projects outside of his primary department (gastro-intestinal illness and zoonoses), which is a great achievement to broaden his scope. An important piece of work was the multi-country outbreak of Salmonella Enteritidis, in which he represented the Netherlands in an international investigation which was conclusive in that Polish eggs were the source. He has written manuscripts on a range of other pathogens, including Shigella, rotavirus, Q-fever, Giardia lamblia and meningococcal disease. In the last part of his fellowship, Roan took on a challenging MSF mission to assess nutritional status in South Sudan. Roan is characterized by a very open attitude and great enthusiasm to learning and to starting and finishing projects. He is a very pleasant colleague to work with. During his EPIET fellowship he obtained a permanent position at RIVM, which is well deserved.

Coordinator's conclusions

Roan Pijnacker was trained in a site with high level expertise in infectious disease epidemiology that could offer high quality supervision and projects. During his Member State track EPIET fellowship, Roan was involved in a wide range of public health relevant projects (including a multi-country Salmonella Enteritidis outbreak, many research and surveillance projects), and achieved a large amount of outputs (including several publications in peer-reviewed journals). He also went to an international assignment in South Sudan with MSF, where he conducted a nutritional and mortality survey that informed public health interventions targeting a highly vulnerable population. He was able to work independently and effectively, but also in a team, and delivered high quality work. He was highly motivated and always focused on achieving the goals of the projects he was involved in. He demonstrated a positive attitude towards scientific review and he was always ready to accept constructive criticism. I believe that Roan is committed to field epidemiology and has considerable professional skills for any epidemiological and public health related work, both at national and international level.

Coordinator: Kostas Danis

Personal conclusions of fellow

I highly recommend the EPIET programme. The skills that I already had are now further developed, but even more valuable; I have learned many new skills which I would not otherwise have learned during my routine work as an epidemiologist. Also, I got to work on infectious diseases such as meningococcal disease and Q fever that are usually outside my scope of work. I feel that this fellowship will be of great value in my future career, especially because I am now a more versatile epidemiologist.

Furthermore, during the programme I developed a valuable network of public health professionals. The best experience for me was the international mission in South Sudan with MSF. It was hard work and challenging, but it was the project where I learned most professionally and personally. I feel very privileged that I could be part of this programme.

Acknowledgements

I am very grateful to my frontline coordinator Kostas Danis. He was very dedicated to his fellows and always available for help. His timely and constructive way of giving feedback were much appreciated. I learned a lot from him. Moreover, I found him very pleasant on personal level, making it a joy to have him as coordinator. I would also like to thank Susan Hahné, my supervisor. She is in my opinion one of the reasons why the RIVM is such a pleasant site to work in as EPIET fellow. I always felt welcome in her office and felt fully supported throughout the fellowship. She made sure that I was able to get the projects that I wanted and had very good advice. Like Kostas, she is a friendly and warm person, which I greatly appreciate. I would also like to thank Wilfrid van Pelt and Eelco Franz, who have been very flexible during the fellowship and gave me the opportunity to develop new skills. I would also like to thank the rest of the EPIET coordinators and project supervisors and colleagues at the RIVM for their help and support.

References

1.   Verberk J, Pijnacker R, Bruijning-Verhagen P, Franz E, Vennema H, Hooiveld M, et al. Shifting age distribution among children affected by rotavirus following a low rotavirus season in the Netherlands. Submitted to Eurosurveillance. 2017.

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