



FELLOWSHIP REPORT

Summary of work activities

Salla Toikkanen

Intervention Epidemiology path (EPIET)

Cohort 2014

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 EPIET scientific guide¹.

Pre-fellowship short biography

Salla Eliisa Toikkanen graduated as a Master of Science from the University of Jyväskylä, Finland in 2010. She has a major in Statistics and minors in Mathematics and Psychology. Prior to EPIET, Salla Eliisa Toikkanen worked as a biostatistician at the National Institute for Health and Welfare (THL) in the Department of Infectious Disease Surveillance and Control at the Epidemiologic Surveillance and Response Unit from September 2010 to September 2014 in Helsinki, Finland. Her main tasks at THL were statistical analysis, consulting and teaching. She also worked as a team member in the food- and waterborne outbreak investigation team.

Fellowship assignment: Intervention Epidemiology path (EPIET)

On 15th September 2014, Salla Eliisa Toikkanen started her EPIET fellowship at the Department of Infectious Disease Epidemiology at the Governmental Institute of Public Health of Lower Saxony (NLGA), Hanover, Germany, under the supervision of Dr. Elke Mertens. 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

Seroprevalence of antibodies against Measles, Rubella and Varicella among Asylum Seekers Arriving in Lower Saxony, Germany, November 2014–October 2015

The number of asylum seekers arriving in Germany has increased rapidly since 2014 and cases of vaccine-preventable diseases at German reception centres were reported. To guide immunisation strategies in case of shortage of vaccines or resources, an assessment on immunisation against measles, rubella and varicella among arriving asylum seekers in Lower Saxony was performed. Asylum seekers 12 years and older arriving in Lower Saxony were serologically screened for antibodies against measles, rubella and varicella between November 2014 and October 2015. We calculated the seroprevalence from the screening data by infection, country of origin and age group and compared them with literature-based herd immunity thresholds in order to identify immunisation gaps among subgroups of asylum seekers. In total, 23,647 specimens were included in our study. Although the vast majority of asylum seekers tested positive for antibodies against measles, rubella and varicella, the

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

seroprevalences were not sufficient to ensure herd immunity. The seroprevalences varied substantially between countries of origin and increased with age. Immunisation of asylum seekers against measles, rubella and varicella is needed and the detailed information on seroprevalences among subgroups of asylum seekers can be used for targeted immunisations at reception centres.

Role and outputs: *Principal investigator*

Salla Toikkanen analysed surveillance data and wrote and submitted a manuscript to a peer reviewed journal (1). She also presented the project in several occasions, including a poster presentation in an international conference (2), an oral presentation in a national conference (3), presentation at EPIET/EUPHEM Project review module 2015, presentation at a weekly teleconference with German FETP fellows and a presentation at a training session for asylum seekers health at the Landesgesundheitsamt Baden-Württemberg, Stuttgart, Germany.

Supervisors: *Dr. Armin Baillot, Dr. Elke Mertens*

Competencies developed:

Through this project, I gained an insight into the immunisation policy development in Lower Saxony and Germany and familiarized myself with the existing programme and recommendations as well as basic principles in immunisation against measles, rubella and varicella.

2. Outbreak investigations

An outbreak of HUS caused by sorbitol-fermenting enterohaemorrhagic Escherichia coli O157:H⁻ in Northern Germany, 2015

On 13th July 2015, district of Cuxhaven in Northern Germany reported two cases of Hemolytic Uremic Syndrome (HUS) caused by sorbitol-fermenting enterohaemorrhagic Escherichia coli O157:H⁻ (SF EHEC O157:H⁻). The cases were children <2 years with symptom onset on 6th July, after a weekend with common neighborhood events. We initiated an investigation to identify the extent of the outbreak and its source in order to prevent further infections.

We performed a retrospective cohort study and defined a case as a participant in the common events 3-5th July with SF EHEC O157:H⁻ confirmation from the first stool specimen. We collected information on symptoms, water- and food exposures and outdoor activities and calculated risk ratios (RR) with 95% confidence intervals (95%CI). Food, water and environmental specimens were microbiologically tested and isolates were subtyped with pulse-field gel electrophoresis (PFGE).

Eighteen persons were included in the study. Six children met the case definition: three HUS patients and three asymptomatic children. Playing in a sandbox (RR=13, 95%CI 2.0-85) and eating bananas (RR=8.0, 95%CI 1.3-50) were associated with being a case. SF EHEC O157:H⁻ with indistinguishable PFGE pattern was identified from all six human specimens. Water and food samples tested negative for E.coli. One specimen from the sandbox was positive for SF EHEC O157:H⁻.

Our findings suggested sand being the source of this outbreak. Environmental source for SF EHEC O157:H⁻ infections was proposed previously, but this is the first time it was detected in both human and environmental specimens in an outbreak. The PFGE-pattern was novel to the German National Reference Centre. To further confirm sand as a plausible vehicle of infections, it should be considered as an exposure and tested when cases of SF EHEC O157:H⁻ are observed.

Role and outputs: *Co-investigator*

Salla Toikkanen co-operated in the questionnaire design, participated the interviews, analysed the outbreak data and a manuscript is at an advanced stage of preparation for a peer-reviewed journal (4). She also co-authored a poster for an international conference (5), presented the project two one national conferences [one oral (6), one poster (7)] and presented the project at a weekly teleconference with German FETP fellows.

Supervisors: *Dr. Anne Mazick, Dr. Martina Scharlach*

Leptospirosis outbreak among seasonal workers on two strawberry farms in Lower Saxony in summer 2014

In July 2014, the Governmental Institute of Public Health of Lower Saxony was informed about two clusters of Leptospirosis cases among seasonal farm workers in two distinct strawberry farms in neighbouring counties in

Lower Saxony. The epidemiological outbreak investigation was initiated and conducted by the Polish National Public Health Institute since a great majority of the seasonal farm workers were Polish. We assisted the outbreak investigation by coordinating the collection of case-based information from German medical doctors and hospitals. An abstract of the epidemiological investigations was submitted with the Polish colleagues to the ESCAIDE 2015 conference.

For the season 2015, a risk assessment was conducted in collaboration with the affected farmers, regional health authorities and the Lower Saxony State Office for Consumer Protection and Food Safety (LAVES). This resulted in a revised prevention plan, a campaign to raise the awareness among the farmers and farm workers and medical doctors in the region and an active surveillance for cases in 2015 in the region.

Role and outputs: Co-investigator

Salla Toikkanen participated in the communication between corresponding parties in Germany and Poland throughout the course of the investigation and risk assessment. She also performed additional analysis on weather data to assess the environmental circumstances before the outbreak. For the information campaign in 2015, she participated in the development of the informational material and the active surveillance of leptospirosis cases during the season 2015. She presented the results of the outbreak investigation, prevention methods and active surveillance for further cases in 2015 in two national conferences (8,9) and in one local training session and co-authored a poster presentation in an international conference (10) as well as an oral presentation in national conference (11).

Supervisor: Dr. Johannes Dreesman

Increased number of notified Hepatitis E cases in spring 2015 in Lower Saxony

In May 2015, an increase of notified Hepatitis E (HEV) cases to the national surveillance system (SurvNet) was observed at the Governmental Institute of Public Health of Lower Saxony (NLGA). Between calendar weeks 15/2015 and 23/2015 the number of cases was double compared to the corresponding time period during previous years. Cases were mostly between 40-59 years old and male. A regional cluster was observed in the western part of Lower Saxony on the border with the Netherlands. We started investigations to confirm the existence of an outbreak.

Five recently notified confirmed cases with HEV compatible symptoms without travel history outside Germany during the incubation period were interviewed with a trawling questionnaire developed for this investigation. The questionnaire focused on possible exposures, including contact to animals, travelling history, contact to ill people, leisure activities (such as restaurant visits, event visits and hunting) and food exposures (including various meat and sausage products, raw milk products, fish, vegetables and berries). The Robert Koch Institute, the Public Health Institute in Rhineland-Palatinate and the health authorities in the Netherlands were contacted to ascertain the findings.

Based on the interviews, no commonalities were identified among the interviewed cases. Similar increase in case numbers was also observed in the Netherlands but the conducted investigations could not identify a source. The monitoring of new notified Hepatitis E cases continued. Compared to previous years, more cases were still notified but the spatial cluster disappeared. The investigations were stopped and the existence of an outbreak was not confirmed.

Role and outputs: Principal investigator

Salla Toikkanen identified the peak in the surveillance data and was responsible for the development of a trawling questionnaire for hypothesis generation. She helped to maintain a line list of the cases with descriptive statistics, and communicated with the Robert Koch Institute, the Public Health Institute in Rhineland-Palatinate and the authorities in the Netherlands and wrote a report (12).

Supervisor: Dr. Elke Mertens, NLGA

Competencies developed:

By having engaged in the abovementioned investigations, I was able to further develop my competencies in outbreak investigation: formulating case definitions, describing the outbreak by time, place and person, developing questionnaires and performing both face-to-face and telephone interviews, generating hypotheses based on trawling questionnaires and epidemiological data, and communicating the results. Moreover, I acquired skills in risk assessment and communication and environmental health and zoonoses. By presenting the results of these projects

in several scientific conferences, I was able to gain certainty and experience in oral communication also in German language. I gained pathogen-specific knowledge on sorbitol-fermenting enterohaemorrhagic Escherichia coli O157:H7, Leptospira and HEV.

3. Applied epidemiology research

The effect of introducing PCV and DPT-Hib-HepB into the routine immunisation schedule on the lower respiratory tract infections in Adjumani, Uganda January 2014 – July 2015

In 2014, lower respiratory tract infections (LRTIs) were the second most common cause of admission in MSF inpatient departments (IPD) in Adjumani refugee settlements. In July-September 2014 MSF conducted a mass vaccination campaign (MVC) using PCV-10 and DPT-Hib-HepB vaccines among 1.5-23 months old children followed by reinforcement of routine vaccination. We aimed to examine the effect of the vaccinations on LRTIs and pneumococcal carriage.

In October 2014, MSF conducted a vaccination coverage survey among MVC-targeted children in Adjumani settlements and three nasopharyngeal pneumococcal carriage household surveys (July 2014, March and July 2015) among residents in three main settlements. Streptococcus pneumoniae was cultured from nasopharyngeal swab specimens. We compared all admissions attributed to clinically-diagnosed LRTIs in two MSF IPDs before (January-September 2014) and after (September 2014-July 2015) the MVC.

Of the 521 recruited children, 96% (501/521; 95%CI 94-98%) and 84% (440/521; 95%CI 81-87%) received at least one dose of PCV-10 or DPT-Hib-HepB, respectively. The median age of the 409 hospitalised LRTI patients was 1.4 years. Of all admissions, 8.4% (99/1,180) were attributable to LRTI before MVC and 10% (37/358) after (p-value=0.30). Pneumococcal carriage increased from 58% (1,029/1,726; 95%CI 56-61%) in the first survey to 67% (1,189/1,759; 95%CI 64-69%) in the third (p-value<0.001).

The observed burden of LRTIs and pneumococcal carriage remained high after the MVC. This might have resulted from pneumococcus serotype mismatch or study limitations including sampling errors in the carriage surveys, unknown IPD catchment areas and use of short-term LRTI data not allowing adjustments for seasonality or trends. To further elucidate the effect of vaccinations in complex emergency settings, we recommend long-term surveillance combined with carriage and vaccination coverage surveys among well-defined populations.

Role and outputs: *Co-investigator*

Salla Toikkanen analysed the data, submitted an abstract to ESCAIDE 2016 (13), presented the project at the EPIET/EUPHEM project review module 2016 and wrote the report (14).

Supervisors: *Sophie Masson and Dr. Sandra Cohuet, Epicentre. Dr. Pauline Lechevalier, MSF*

The effect of introducing PCV and DPT-Hib-HepB into the routine immunisation schedule on the lower respiratory tract infections in Yida refugee camp, South Sudan, January 2012 – December 2015

Following the mass influx of refugees in Yida refugee camp in Northern South Sudan at the end of 2012, a retrospective mortality survey carried out by Epicentre revealed an acute health crisis characterized by a sudden increase in mortality among the refugee population. The analysis of morbidity and mortality in the in-patient department operated by Doctors Without Borders (MSF) showed that acute respiratory infections contributed to these figures substantially.

A mass vaccination campaign (MVC) introducing the 13-valent pneumococcal conjugate vaccine (PCV) and the pentavalent vaccination for diphtheria, pertussis, tetanus, *Haemophilus influenzae* type B and hepatitis B (DPT-Hib-HepB) into the routine Extended Program of Immunization (EPI) was conducted between July-September 2013. Our objective was to describe the evolution of LRTIs before and after the MVC in order to evaluate the effect of the campaign and the introduction of these vaccines to the routine EPI.

We described the hospitalised LRTI cases by time place and person and compared the incidence of LRTIs in the MSF IPD before and after the MVC. A time-series analysis was carried out to quantify the change in incidence introduced after the MVC.

Children below 5 years of age were the population most affected accounting for 82% of all LRTI admissions. The incidence of hospitalisations due to LRTIs was in general higher during the pre-MVC period compared to the post-MVC period with a peak during post-MVC period in the end of 2014. The time series analysis estimated the reduction in the LRTI hospitalisations to be 42% after the MVC.

Although evidence on decrease in the LRTI incidence was observed in Yida after the introduction of the PCV-13 and DPT-Hib-HepB via the MVC, the overall clinical burden remained high. The analysis was limited due to short period with surveillance data before the MVC. Moreover, the comparisons do not capture the peak in the end of 2014.

The results emphasize the need of comprehensive and prolonged, standardized surveillance of LRTI hospitalisations to evaluate the effect of the introduction of PCV and pentavalent vaccines on LRTIs in a refugee population. Surveillance should be paired with epidemiological studies to capture all aspects of the evolution of LRTIs in the population. Moreover, increasing of vaccination coverage should be considered.

Role and outputs: Co-investigator

Salla Toikkanen analysed the data and wrote the final report (15).

Supervisors: Sophie Masson and Dr. Sandra Cohuet, Epicentre

Immunization coverage among children aged 12 to 23 months in Yida Refugee camp, Unity State, South Sudan, October-November 2015

In order to assess the current vaccination coverage, Epicentre performed a multi-antigenes (PCV, DPT-Hib-HepB, OPV and measles) vaccination coverage (VC) cross-sectional survey among the children aged 12 to 23 months, in Yida refugee camp in South Sudan between October 31st and November 5th 2015.

The VC was calculated by card/oral history for each antigen and dose and the proportion of fully vaccinated (FV) was obtained. The proportion of children receiving vaccinations before/after reaching 11 months of age and the proportion of children receiving the vaccination timely according to the schedule were obtained. The utilization of health services in Yida and the reasons for non-vaccination were assessed.

In total, 1494 households were visited and 322 children were eligible for the survey. The VCs reported for first doses of PCV, DPT-Hib-HepB and OPV exceeded 90%. The one dose measles VC was 64%. The drop-out rate between first and third dose for these antigens was around 30% yielding VCs around 65% for the third doses. The proportion of FV children was 47%. 81% of the FV had finished their immunization before 11 months of age. Less than 22% of them had been immunized according to the vaccination schedule. The reasons for non-vaccinations during the campaigns were most frequently linked with lack of information (49% of all reasons). 14% of all reasons were linked with the acceptability of the vaccines. Except for one child, every child had visited the OPDs in Yida at least once during the previous 12 months.

The VCs measured were considerably higher than previously reported from Yida. However, the drop-out rates between the first and third doses were high. Attitudes against vaccinations were reported seldom and thus the high proportion of incompletely vaccinated children implicates missed opportunities of vaccination. These - together with the fact that the role of vaccines given after 11 months of age to the coverage was minor - imply that the catch-up procedures are not reaching the incompletely vaccinated children in Yida. Thus we recommend an evaluation of this process and revising the strategy. A measles vaccination campaign should be considered. The reasons for non-vaccination should be comprehensively assessed with a proper qualitative study to improve the MSF immunization strategy in Yida.

Role and outputs: Principal investigator

Salla Toikkanen wrote the study protocol (16), developed the questionnaire, participated in the development of the training material and training of the interviewers and their supervisors, developed the data entry mask, coordinated the supervisors during data collection, performed data quality checks and data analysis and wrote the final report (17).

Supervisors: Sophie Masson and Dr. Sandra Cohuet, Epicentre

MRSA in Lower Saxony

Methicillin-resistant *Staphylococcus aureus* (MRSA) is a major cause of healthcare- and community-associated infections worldwide. Within the healthcare setting, MRSA infections are estimated to affect more than 150 000 patients annually in the European Union. In Germany, 4341 invasive MRSA infections were reported in 2013 with the highest incidence among the elderly. Data from different sources suggested that the amount of MRSA infections in the state of Lower Saxony was above the national average, varying substantially between sub regions. The objective of our research was to study whether these regional differences in number of notified cases were due to different regional risk factor profiles or explained by regional surveillance and screening practices.

Role and outputs: *Co-investigator*

Salla Toikkanen conducted data management and wrote a summary study protocol (18) to be used in further research and performed preliminary data analysis.

Supervisors: *Dr. Johannes Dreesman, NLGA*

Competencies developed:

During the abovementioned activities I learned about LRTIs and immunisation activities in emergency settings and was able to further develop my competencies in analysis of survey data and time-series analysis of surveillance data as well as questionnaire design. Moreover, I gained basic knowledge on MRSA and the practices in Germany. During my field work in Yida, South Sudan I learned how to conduct and organize a vaccine coverage survey and draw a representative sample of the population and gained experience in supervising community health workers. The competencies acquired through the training of community health workers are summarized below in the "Training"-section.

4. Communication

Publications in peer reviewed journals

One manuscript published in International Journal of Environmental Research and Public Health (1)

Manuscripts submitted to peer-reviewed journals (in review process)

One manuscript prepared for submission (4)

Conference presentations

- i. Four oral presentations at national conferences [66. Wissenschaftlicher Kongress Öffentliche Gesundheit im Spiegel der Zeit, 2016 (3,8), V. EHEC-Workshop, 2016 (6), 22. Robert Koch –Tagung, 2015 (9)] and a fifth as a co-author [National Symposium on Zoonoses Research, 2015 (11)]
- ii. One poster at an international conference [ESCAIDE 2015 (2)] and a second and third as co-author [ESCAIDE 2015 (5), 2nd ELS Meeting on Leptospirosis and other rodent borne haemorrhagic fevers (10)]
- iii. One poster in a national conference [66. Wissenschaftlicher Kongress Öffentliche Gesundheit im Spiegel der Zeit, 2016 (7)]

Other presentations

1 oral presentation at „Fortbildung zu Asyl und Gesundheit“ –training, 2015 (13)

1 oral presentation at at „Infektionsschutz, Umwelt und Hygiene – Fortbildung für Gesundheitsaufseher, Hygieneinspektoren, Hygienekontrolleure, Gesundheitsassistenten, Gesundheits-ingenieure und Hygieneingenieure“ -training, 2015 (14)

Reports

One outbreak report (12) and three study reports (14,15,17)

5. Teaching activities

Lectures: Immunisation coverage among children aged 12 to 23 months in Yida refugee camp, Unity State, South Sudan, October-November 2015

We organised a total of 3 days teaching for community health workers (CHW) in Yida refugee camp, South Sudan in 29.-31.10.2015 on using the questionnaire designed for a vaccination coverage survey. The training included two days of lectures and one practical day when the survey was piloted in the community and role plays were carried out. A reference guide on use of the questionnaire was written and distributed to the CHWs as the training material. The training and material development was carried out with the help of a senior epidemiologist from Epicentre.

***Role:** Lecturer and co-facilitation of the pilot and role plays*

Workshop: SORMAS-open Design Thinking Workshop, Abuja, Nigeria

The Surveillance, Outbreak Response Management and Analysis System (SORMAS) has been developed by a consortium of Nigerian and German partners in the aftermath of the outbreak of Ebola virus disease in Nigeria in 2015. The objective of SORMAS is to establish a system for bidirectional information exchange and integrated management functionalities for disease control measures that are applicable in African settings of low communication infrastructure. Through funding from the German Ministry of Research, SORMAS was developed within eight months and piloted in Oyo and Kano State, Nigeria in July 2015. The results of the pilot were encouraging and demonstrated high acceptability and practicability in the field. The German Association for International Cooperation (GIZ) provided financial support in April 2016 to the Helmholtz Centre for Infection Research (Braunschweig, Germany) to develop a novel version of SORMAS by March 2017 which would be programmed fully in open source software, called "SORMAS-open".

The aims of the SORMAS- open initiative are to develop SORMAS-open as open source software, improve functionalities and user friendliness based on experience from pilot study, develop user interfaces for additional user groups, implement two additional diseases into the functional scope of SORMAS and decide on an interface for data exchange between SORMAS and District Health Information System (DHIS2).

In order to address these goals through a user centred approach we organized a design thinking workshop from August 15th to 19th, 2016 in Abuja. The professional background of the 26 participants included local and state disease notifications officers, epidemiologists, clinicians, laboratory managers and public health experts from Ogun state, Gombe state and Abuja, Nigeria.

Salla Toikkanen prepared and gave plenary introduction lectures and jointly facilitated the brainstorming sessions in smaller working groups to developed process models for SORMAS-open user interfaces for Lassa fever in Nigerian context.

***Role:** Lecturer and co-facilitation of brainstorming in a working group*

Lecture: "Infektionssurveillance auf Basis des Infektionsschutzgesetzes (IfSG): Teil 2 – Die Falldefinitionen des Robert Koch-Instituts (RKI)" [Infectious disease surveillance based on German Infectious disease Act: Part 2- the case definitions of Robert Koch –Institute]

Salla Toikkanen adapted and gave the abovementioned lecture 15th March 2016 at the Hannover Medical School (MHH). The audience were undergraduate medical students and the lecture is a part of their „Public Health II“ – course.

Role: Lecturer**Case study: Retrospective survey on cholera related mortality during the epidemic period Gonaïves, Haïti, 2011**

Salla Toikkanen co-facilitated the abovementioned case study at the EPIET/EUPHEM Rapid Assessment and Survey methods (RAS) module on 23rd June 2016 in Athens, Greece

Role: Co-facilitation**Educational outcome:**

By engaging in these activities I learned to adapt my teaching style as well as material to different target groups with different background knowledge. The facilitation of interactive brainstorming sessions required immediate adaptation to the needs of the group and direction of the discussions.

6. Other activities

- Accomplishment of a Master of Applied Epidemiology at the Berlin School of Public Health (BSPH), with thesis title "Insights into the immunisation against vaccine preventable diseases among displaced persons - drawing on two examples: arriving asylum seekers in Lower Saxony, Germany and Sudanese refugees in Yida, South Sudan"
- Routine surveillance activities at NLGA: description and interpretation of daily notification data
- Participation in regular meetings of epidemiology, hospital hygiene and microbiology, on NLGA and federal-state level
- Participation in weekly bulletins of NLGA
- One-week internship at the local public health authority of Hildesheim, May 2016
- Participation at "ARMIN- Qualitätzzirkel" -meeting, 11.6.2015, Hanover, Germany
- Participation at EPIET Alumni Network Workshop "Outbreak anthropology for epidemiologists", 18.-19.5.2015, London, UK
- Participation at "Niedersächsisches Impfsymposium 2015", 22.4.2015, Hanover, Germany.
- Participation at „Göttinger Forum (Krankenhaus- und Kommunalhygiene für den öffentlichen Gesundheitsdienst)" -conference at 27.-28.11.2014, Göttingen, Germany.
- Participation at „Infektionshygienische Überwachung von Krankenhäusern, Schwerpunktthema: Surveillance gemäß § 23 (4) IfSG" – meeting, 14.11.2014 Hanover, Germany.
- Participation at „Grundkurs für Hygienebeauftragte Ärztinnen und Ärzte" –training, 20. And 23.-24.10.2014, Hanover, Germany.
- "Tag der Niedersachsen (the Day of Lower Saxony)" 27.6.2015: Informing the public about tick-borne diseases and risks in Germany at an exposition booth

7. EPIET/EUPHEM modules attended

1. EPIET/EUPHEM Project Review Module, 22.-26.8.2016 Lisbon, Portugal
2. EPIET/EUPHEM Risk assessment and Survey methods module, 20.-25.6.2016, Athens, Greece
3. EPIET Vaccinology Module, 16.-20.5.2016 Paris, France
4. EPIET Time series analysis –module, 23.-27.11.2015, Bilthoven, the Netherlands
5. EPIET/EUPHEM Project Review Module, 24.-28.8.2015 Lisbon, Portugal
6. EPIET/EUPHEM Multivariable analysis Module, 23.-27.3.2015 Vienna, Austria
7. PAE/EPIET Laboratory module, 23.-27.2.2015, Berlin and Wernigerode, Germany
8. EPIET/EUPHEM Outbreak Module, 8.-12.12.2014, Berlin, Germany
9. EPIET/EUPHEM Introductory course, 29.9. – 17.10.2014, Spetses, Greece
10. PAE/EPIET Einführungswoche, 15.-16.9.2014 and 22.-25.9.2014, Berlin, Germany

Supervisor's conclusions

By Elke Mertens, August 2016

The content of Salla's fellowship and her professional development are well described in her Fellowship Summary Report, therefore I will focus on the perspective of the host site supervisor and on particularly remarkable points.

Salla is a team player with excellent professional and organizational skills. It was a pleasure to have her in our team. Salla worked independently and was the most reliable fellow. During her fellowship at the Governmental Institute of Public Health of Lower Saxony (NLGA) I recognized her as a highly motivated and talented young woman. I firmly believe that she will be successful in whatever she pursues.

Salla started her fellowship with a sound basis in statistics and very helpful work experience in the Finnish national public health authority. There, she already built up some knowledge on infectious diseases and microbiology. Salla familiarised herself quickly with new topics and used the opportunities at the NLGA to work with and talk to experts, in order to broaden her knowledge and her skills.

The main surveillance project was the analysis of the data on immunity of asylum seekers in Lower Saxony. The results were essential in assessment and management of various outbreaks in reception centres. Valid data on immunity status by origin and age helped and help us i) to assess the risk of spread in specific populations and ii) to develop tailored vaccination strategies in case of strained resources. These data are continuously requested by public health authorities on German federal as well as European national level.

Another project that resulted in sustainable outputs was the leptospirosis outbreak. Salla participated in the post-processing of the outbreak investigation and took part in lessons-learned-meetings and documentation with the local and state public health and veterinary authorities and the strawberry farmers. She developed information leaflets that are used in every new strawberry harvest season.

Salla adjusted the NLGA questionnaire on Hepatitis A risk factors for telephone interviews on Hepatitis E risk factors and we will use it for the next hepatitis E outbreak investigation.

In her project on MRSA and antibiotics prescription data, Salla developed a protocol for the analysis of these routine data. This protocol can be used by the NLGA team for the next seasons.

Salla has shown the ability to clearly explain complex concepts to different audiences and to develop teaching material in English and in German language. She was involved in routine surveillance and epidemiology and gained a good knowledge and skills in epidemiology and infectiology, e.g. vaccine preventable diseases, bacterial and viral infections and zoonoses.

Coordinator's conclusions

By Christian Winter, September 2016

Salla has made good progress throughout her fellowship. It was impressive how quickly she was able to learn German, an important prerequisite to be closely involved in applied public health research and outbreak investigations in the state of Lower Saxony.

Salla is a statistician by background with some previous experience at the National Public Health Institute in Finland. During her fellowship she was able to broaden her knowledge in Public Health and applied epidemiology. She worked independently and in a very structured way and could really focus on relevant tasks.

Salla was always very motivated to learn and apply new skills and was involved in two outbreak investigations (leptospirosis and hemolytic uraemic syndrome), and a surveillance project (seroprevalence of measles, rubella and varicella among asylum seekers arriving in Lower Saxony). She was result-driven in her work and was able to communicate the findings of her projects at national and international scientific conferences and through scientific peer-reviewed journals.

Following her interest in international public health she was able to voluntarily engage herself in three important international assignments (South Sudan, Nigeria, data analysis from Uganda). I wish her great success in the future.

Personal conclusions of fellow

During my two year's EPIET-fellowship at the Governmental Institute of Public Health of Lower Saxony (NLGA) I was able to develop transferable skills to work in the infectious disease field in the future, strengthening my professionalism as an epidemiologist. The EPIET/EUPHEM –modules and the international conferences supported developing these skills and gave opportunity to network with European colleagues. The review process with my EPIET frontline coordinator, site supervisor and also the valuable peer-review from other fellows helped to crystallize the core of my projects. The international mission gave me understanding of public health concerns in humanitarian emergency settings.

At NLGA, I was very pleased to get to work with an interdisciplinary, highly motivated team. I was able to get support and honest feedback when needed as also to work independently. I got exposed to various public health relevant topics. I familiarized myself with the infectious disease surveillance system in Germany and the notification criteria via the routine communication with local Public Health Departments (LPHDs) and other Federal States and the daily ascertainment of the notified cases in Lower Saxony. I was encouraged to present my work in various national conferences and other forums which helped me develop my presentational skills further and network with the public health professionals in Germany. I highly recommend NLGA as EPIET fellow training site in future: the work at NLGA is variable, gives insight into the Federal State policy making and allows the fellows communicate directly with LPHDs and other Federal States. I could not be more pleased on my fellowship site.

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