Summary of work activities
Alexander Spina
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;

The views expressed in this publication do not necessarily reflect the views of the European Centre for Disease Prevention and Control (ECDC).

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.

Stockholm, September 2016

- 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

Alex studied Biochemistry and completed a Master's in Public Health in 2012. Following an internship at the WHO and several academic research positons, he joined the Austrian Agency for Health and Food Safety (AGES) as an epidemiologist in 2013.

Fellowship assignment: Intervention Epidemiology path (EPIET)

On the 14th September 2015, Alex started his EPIET (MS-track) fellowship at the AGES, Austria, under the supervision of Daniela Schmid. His two EPIET frontline coordinators were Kostas Danis (from September 2015-January 2016 and from September 2016- September 2017) and Giri Shankar (from February 2015-August 2016). 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.

---

[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: Infection control in Austrian prisons: Quality assurance of Hepatitis B/C, HIV and Tuberculosis surveillance in Austrian federal penitentiaries, 2016 to 2017

Background

The prison population is considered at increased risk for infection, in particular with hepatitis B and C virus (HBV, HCV), human immunodeficiency virus (HIV) and tuberculosis (TB) compared to the general population. The quality of surveillance in Austrian prisons has never been assessed. We evaluated the prison surveillance system with regards to its objectives.

Methods

To describe the system, we conducted qualitative interviews with the medical director of the prison-health care service and with stakeholders, reviewed prisoner-registers, operation manuals and national epidemic laws. We evaluated the current HBV-, HCV-, HIV-infection and TB surveillance in Austrian prisons by the attributes of completeness of case ascertainment, case validity and data completeness, using performance indicators. Simplicity was assessed by reviewing the prison-data entry mask and the completeness of TB case reporting to the national surveillance systems.

Results

Every prisoner is registered via an electronic prisoner-record in the electronic prisoner-information system (EPIS). Cases of hepatitis B/C, HIV and tuberculosis are defined according to EU Commission Decision 2012/506/EC. Cases are identified actively by systematic admission/discharge screening and contact tracing after incidents or passively by diagnostic examination of prisoners with clinical signs and symptoms. Only positive laboratory tests are entered in EPIS. Surveillance measures/ indicators are not produced or published. Most indicators could not be calculated due to lacking structured data collection. There is no data entry mask to easily collect data screening and confirmatory tests, treatment and outcome in the prisoner-record. Eight (15%) TB cases recorded in EPIS matched with cases in the national dataset.

Conclusion

Our evaluation indicates that EPIS is not suited to reliable surveillance of HBV, HCV, HIV-infection and TB among prisoners of Austrian federal prisons. We recommend regular calculation of epidemiological and performance indicators as well as changes to the data entry mask to enable structured data collection required for surveillance in Austrian prisons.

Role and outputs:

Alex was the principal investigator. Conducted interviews with stakeholders, reviewed surveillance protocols and legislation, evaluated the prison surveillance system, produced a report for stakeholders (1)

Supervisor(s): Daniela Schmid (AGES)

Title: Infection control in Austrian prisons: Admission prevalence and during-stay incidence of HBV-, HCV-, HIV-infection and TB among prisoners admitted to Austrian prisons in 2016

Background

An evaluation of the Austrian federal prison electronic information system (EPIS) indicated that surveillance indicators had never been calculated. This study aimed to calculate the prevalence and during-stay incidence of HBV-, HCV-, HIV-infection and TB among prisoners admitted to Austrian prisons in 2016.

Methods

Data of prisoners admitted in 2016, to all 27 Austrian federal prisons was extracted from the EPIS on 15 February 2017. Cases were classified according to the EU-surveillance definitions. For overall prevalence, we calculated any case identified prior to admission, at admission or during stay among all 2016-arrivals. For the frequency of newly diagnosed cases at admission, we calculated cases identified within 6 weeks after admission among all 2016-arrivals. For the during-stay incidence rate, we calculated cases that were disease-free until 6 weeks after admission, divided by the total number of prison-days of the 2016-arrivals.

Results

Overall prevalence per 100,000 prison admissions for HBV was 1035 (range per prison: 0-3846), for HCV was 5061 (range per prison: 0-12500), for HIV was 551 (range per prison: 0-1613) and for TB 522 (range per prison: 0-1742). Frequency of newly diagnosed at admission for HBV was 449 (0-3571), for HCV 1703 (0-5705), for HIV 162 (0-635) and TB 342 (0-1409) per 100.000 2016-admissions. During-stay incidence rate for HBV was 0.5 (0-8.6), for HCV 2.4 (0-32.3), for HIV-infection 0.2 (0-4.5) and TB 0.2 (0-3.7) per 100,000 prison-days.

Conclusions

Our results indicated high overall prevalence and new diagnoses at admission in Austrian prisons, orders of magnitude higher than in the general population. The range in overall prevalence and new diagnoses at admission varied substantially among Austrian prisons. We also found a low during-stay incidence among Austrian prisoners; though this may be an underestimate. Our results underline the importance of implementing a prison-based surveillance system to monitor and prevent infections.

Role and outputs:

Alex was the principal investigator. Analysed surveillance data, produced a report for stakeholders (2)

Supervisor(s): *Daniela Schmid (AGES)*

Title: Modelling the total number of people currently living with HIV in Austria and estimating representativeness of the Austrian HIV cohort study for use in national surveillance

Background

The Joint United Nations Programme on HIV/AIDS (UNAIDS) has set a "90-90-90" target to curb the human immunodeficiency virus (HIV) epidemic by 2020, but methods used to assess whether countries have reached this target are not standardized, hindering comparisons.

Methods

Through a collaboration formed by the European Centre for Disease Prevention and Control (ECDC) with European HIV cohorts and surveillance agencies, we constructed a standardized, 4-stage continuum of HIV care for 11 European Union countries for 2013. Stages were defined as (1) number of people living with HIV in the country by end of 2013; (2) proportion of stage 1 ever diagnosed; (3) proportion of stage 2 that ever initiated ART; and (4) proportion of stage 3 who became virally suppressed (≤200 copies/mL). Case surveillance data were used primarily to derive stages 1 (using back-calculation models) and 2, and cohort data for stages 3 and 4.

Results

In 2013, 674,500 people in the 11 countries were estimated to be living with HIV, ranging from 5500 to 153,400 in each country. Overall HIV prevalence was 0.22% (range 0.09%–0.36%). Overall proportions of each previous stage were 84% diagnosed, 84% on ART, and 85% virally suppressed (60% of people living with HIV). Two countries achieved ≥90% for all stages, and more than half had reached ≥90% for at least 1 stage.

Conclusions

European Union countries are nearing the 90-90-90 target. Reducing the proportion undiagnosed remains the greatest barrier to achieving this target, suggesting that further efforts are needed to improve HIV testing rates. Standardizing methods to derive comparable continuums of care remains a challenge.

Role and outputs:

Alex contributed to an ECDC working package which had two parts; the first was to estimate the total number of people living with HIV based on adapting a modelling protocol to the Austrian setting and the second was to estimate the coverage of the current national surveillance data in Austria. The first part was completed and published with colleagues from around the EU (abstract above). The second part is currently ongoing. Alex analysed Austrian surveillance data, contributed as a co-author to a manuscript published to a peer-reviewed journal (3)

Supervisor(s): Daniela Schmid (AGES)

Competencies developed:

Both the prison projects and the HIV project enabled me to gain competencies around engaging and managing various stakeholders and presenting statistical analyses in a way that non-technical decision makers are able to understand and use. These projects also provided insight in to areas of the Austrian surveillance and public health systems I had not previously been exposed to. In addition, I was able to observe how these projects lead to mandates for establishment of surveillance in prisons and the incorporation of further data-sources for HIV.

2. Outbreak investigations

Title: A large outbreak of Hepatitis E virus genotype 1 infection in an urban setting in Chad likely linked to access to water and sanitation, 2016-2017

Background

In September 2016, three acutely jaundiced (AJS) pregnant women were admitted to Am Timan Hospital, eastern Chad. We described the outbreak and conducted a case test-negative study to identify risk factors for this genotype of HEV in an acute outbreak setting.

Methods

Active case finding using a community based surveillance network identified suspected AJS cases. Pregnant or visibly ill AJS cases presenting at hospital were tested with Assure® IgM HEV rapid diagnostic tests (RDTs) and some with Polymerase Chain Reaction (PCR) in Amsterdam; confirmed cases were RDT-positive and controls were RDT-negative. All answered questions around: household makeup, area of residence, handwashing practices, water collection behaviour and clinical presentation. We calculated unadjusted odds ratios (ORs) and 95% confidence intervals (95%CI).

Results

Between September and April 2017, 1443 AJS cases (1293 confirmed) were detected in the town (attack rate: 2%; estimated 65,000 population). PCR testing confirmed HEV genotype 1e. HEV RDTs were used for 250 AJS cases; 100 (40%) were confirmed. Risk factors for HEV infection, included: having at least two children under the age of 5 years (OR 2.1, 95%CI 1.1-4.3), having another household member with jaundice (OR 2.4, 95%CI 0.90-6.3) and living in the neighbourhoods of Riad (OR 3.8, 95%CI 1.0-1.8) or Ridina (OR 3.3, 95%CI 1.0-12.6). Cases were more likely to present with vomiting (OR 3.2, 9%CI 1.4-7.9) than controls. Cases were less likely to report always washing hands before meals compared with controls (OR 0.33, 95%CI 0.1-1.1).

Conclusion

Our study suggests household factors and area of residence (possibly linked to access to water and sanitation) play a role in HEV transmission; which could inform future outbreak responses. Ongoing sero-prevalence studies will elucidate more aspects of transmission dynamics of this virus with genotype 1e.

Role and outputs: *Principal investigator*

Principal investigator. Alex led the investigation, analysed outbreak data, submitted a manuscript to a peer-reviewed journal (4)

Supervisor(s): *Annick Lenglet (MSF)*

Title: Norovirus outbreak at a boarding-school in Salzburg, Austria, November 2016

Background

A boarding school of gastronomy in Salzburg, Austria, reported a cluster of gastroenteritis cases on November 23, 2016. Norovirus was suspected to be the causal agent as one student tested positive. We investigated to verify the suspected causal agent and identify the source(s).

Methods

We defined probable cases as students/staff with diarrhea or vomiting developed during 18-25 November and confirmed as probable cases with Norovirus positive stool specimen. We collected information on food exposures using a self-administered questionnaire, and calculated risk ratios (RR) and 95% confidence interval (95%CI) within a cohort study. Stool specimens were tested by the Norovirus reference laboratory using real-time RT-PCR.

Results

Among the 212 students and school staff-members, we identified 102 cases (AR: 48%) (99 probable, 3 confirmed). Compared with those who did not eat spaghetti Bolognese on November 21, those who ate this meal were more likely (RR 1.7, 95%CI 1.2-2.5) to become ill within the following two days. Among participants who did not eat spaghetti Bolognese, consumption of salad was associated with the disease (RR: 2.4; 95%CI: 1.8-3.3). Those who consumed "Selchfleischknödel" dumplings on November 22, had a higher (RR: 3.1; 95%CI: 1.5-6.4) risk to develop the disease compared to the unexposed. Among those who did not eat "Selchfleischknödel", consumption of "Grammelknödel" was associated with the disease (RR: 3.0; 95%CI: 1.1-8.3). Leftover food, environmental and food-handler stool specimens for laboratory testing was not available.

Conclusion

During this Norovirus outbreak, spaghetti Bolognese sauce, salad and the two dumpling meals, all prepared in the school kitchen, were the likely sources of infection. The potential food contamination by student-food handlers in the gastronomy school reaffirms the importance of good food-handling practices, especially as students of the school are being trained to work in the gastronomy industry.

Role and outputs:

Principal investigator. Alex actively participated in the outbreak control meetings, developed the questionnaire and data extraction form, developed data entry mask, analysed outbreak data, wrote an outbreak report for public health authorities (6)

Supervisor(s): *Daniela Schmid (AGES)*

Title: *Shigellosis in refugees, Austria, July to November 2015*

Background

From June 2015, large numbers of refugees arrived in or transited through Austria, but no routine screening programme for Shigella carriage or other enteric pathogens was in place. We report on the occurrence of shigellosis in refugees and Austrian residents, identified between 18 July and 18 November 2015.

Methods

Cases among refugees were detected during patient consultations at transit centre medical facilities (passive case finding) or during compulsory entry health examinations at reception centres (active case finding). In vitro resistance testing was performed on Mueller Hinton E agar using E-test strips (bioMérieux). We extracted epidemiological and laboratory testing information from the national reference laboratory dataset to describe cases.

Results

Between 18 July and 18 November 2015, we identified 21 cases in refugees and two in local residents who worked in refugee transit centres (a cleaner and a translator); 16/23 cases were ≤10 years old (range: 1 – 65 years); 15 cases were male. Three unrelated cases were identified in different reception centres. The remaining 20 cases were identified in eight transit centres for refugees in six of the nine Austrian provinces. The cleaner developed diarrhoea after cleaning a toilet using a high-pressure cleaner without personal protective equipment. Species isolated from cases included S. sonnei (n=13), S. flexneri (n=10) and S. boydii (n=1). Of 18 tested isolates, 11 (61%) were extended spectrum beta-lactamase (ESBL)-positive, including five of six ciprofloxacin-resistant and three azithromycin-resistant.

Conclusion

Limited personal hygiene and sanitary facilities in asylum centres may have led to the occurrence of Shigellosis cases among refugees. Sources of infections remain unknown. Shigella infections in local residents working with refugees indicate that clinicians should be aware of the possibility of secondary cases. We recommend that persons in asylum centres apply appropriate personal hygiene measures, including personal protective equipment, to maintain a low risk of infection.

Role and outputs:

Co-investigator. Alex analysed outbreak data, contributed to a manuscript published in a peer-reviewed journal as a co-author (5)

Supervisor(s): *Daniela Schmid (AGES)*

Competencies developed:

The outbreak of Shigella among refugees provided insight on to the screening pathways employed in Austrian refugee and transit centres. With the investigation of norovirus in the boarding school I was able to apply skills in attempting to disentangle a mixed source outbreak and be part of an investigation from start to finish. The outbreak investigation in Chad provided me with the opportunity to perform actual field work and shed light on the challenges of a low resource setting. It also enabled me to gain experience with managing large groups of data collectors and communicating with high-level stakeholders.

3. Applied epidemiology research

Title: Hospital admission-prevalence and determinants of C. difficile colonisation and infection: a cross-sectional survey with nested case-control and case-case studies among patients of Vienna General Hospital, Austria, 2013-2015

Background

Estimated hospital-admission C. difficile (CD) colonization (CDC) prevalence is 3-5% in industrialised countries. CDC risk factors knowledge is sparse. We aimed to estimate CDC admission-prevalence at Vienna General Hospital and identify colonisation determinants.

Methods

Non-diarrhoeal patients, admitted to five non-oncological departments (selected based on availability) between July 2013-July 2015, submitting admission stool samples were included in the CDC-admission-prevalence study. Consenting CDC-patients were included as cases in the nested case-control (CD negatives) study. CD infection (CDI) patients from departments were included in the CDC/CDI case-case study. Investigated colonisation determinants were age, sex, comorbidities, comorbidity-severity, proton pump inhibitor (PPI) use 7 days, antibiotic use 2 months and previous hospital stay 6 months prior to admission and pathogen characteristics (toxin encoding genes, risk-associated ribotypes and antimicrobial resistance). A study-coordinator collected information using hospital discharge data, personal interviews and laboratory data. CDC-cases were compared with controls and CDI-cases using univariate and stratified logistic-regression.

Results

CDC admission-prevalence was 5.5% (n= 63/1136; 95%CI: 4.4-7.0). Comparing 29 CDC-cases to 116 controls, CDC-cases were more likely exposed to PPI (OR 3.4; 95%CI 1.4-9.1), antibiotics (OR 2.6; 95%CI 1.1-6.3) and previous hospitalisation (OR 3.3; 95%CI 1.3-9.6). Comparing 29 CDC-cases to 35 CDI-cases, CDC-cases were less likely to be ≥60 years (OR 0.2; 95%CI 0.1-0.5) and to have diabetes (OR 0.3; 95%CI 0.1-1.0). Stratified outcomes were similar. Isolates did not differ in pathogen characteristics.

Conclusion

Admission-prevalence results confirm previous international findings. Results suggest an association of CDC with PPI, antibiotics use or hospital stay. Despite low study power, we found that following CD-acquisition, older patients and those with diabetes are more likely to develop CDI than CDC, while CD-strain characteristics seemed to not be associated with clinical presentation.

Role and outputs:

Principal investigator. Developed data entry mask, analysed data, presented findings at an international conference (7), preparing a manuscript for a peer-reviewed journal

Supervisor(s): *Daniela Schmid (AGES)*

Title: Learning from water treatment and hygiene interventions in response to a hepatitis E outbreak in an open setting. Am Timan, Chad, September 2016 to January 2017

Introduction

From September 2016 to May 2017, MSF responded to a hepatitis E virus (HEV) outbreak in Am Timan, Chad (population≈50,000). Bucket chlorination was implemented at private wells (n=70) and chlorine-dosing systems were attached to the town network. Hygiene promotors visited all households and water collection points, and distributed hygiene kits to ~10,000 households. We conducted a cross-sectional study to evaluate the coverage and use of these interventions in the target population.

Methods

A random sample of 395 households was drawn from a list of households in town. Over 8 days, investigators interviewed an adult woman at each household, on the household's main water source, water storage habits, and understanding of hygiene messages. Investigators measured free residual chlorine (FRC) in water containers using pool-testers. We calculated medians (for continuous variables), frequencies, proportions, prevalence ratios and 95% confidence intervals.

Results

392 households completed the survey. Water came from private wells in 269 households (69%), in-home taps in 141 (36%), and the river in 13 (3%). 384 households (98%, 95%CI 96-99) accepted water chlorination. 390 households (99%, 95%CI 98-99) received hygiene kits. 99% of households (95%CI 97-99, n=388) had heard about preventing jaundice. Household water median FRC was 0.1mg/L (range 0.1-3.0), and 167 households (42.6%, 95%CI 38-48) had acceptable levels (≥0.2mg/L). Households refilling water containers within the last 18 hours (PR 1.8, 95%CI 1.1-3.1), those who sourced water from private-wells (PR 1.4 95%CI 1.0-2.0) and those who poured water into a previously empty container (PR 2.4, 95%CI 1.8-3.3), were all more likely to have safe FRC levels.

Conclusion

High coverage for acceptance of chlorination, hygiene messaging, and hygiene kit ownership was achieved. FRC values in stored drinking water indicated the need for alternative approaches to maintaining acceptable levels during an outbreak response, particularly when water is obtained from mixed sources and diluted into larger containers.

Role and outputs:

Principal investigator. Wrote the protocol, developed questionnaire and data entry mask, trained field workers, implemented study, analysed data, contributed to report writing and prepared a manuscript for a peer-reviewed journal (8)

Supervisor(s): *Annick Lenglet and Dawn Taylor (MSF)*

Title: Rapid needs assessment of the refugee migrant population in the three camps of Elliniko, June 2016, Athens, Greece

Background

In early 2016, MSF launched support activities in the three refugee camps of Elliniko (3,612 individuals) in Athens. MSF planned to conduct a vaccination campaign in the camps. We aimed to assess the health and sanitary needs of refugees and to estimate baseline measles/measles-mumps-rubella (MMR) vaccination coverage among <15 year-olds.

Methods

We conducted a survey among a random sample of refugees residing in the camps. The number of participants by camp was proportional to camp size. In two camps, we used systematic sampling to select tents and in the third, we used simple random sampling. We interviewed one randomly selected individual above 15 years-old from each selected tent. We calculated weighted proportions using the number of people per tent as weights and adjusted for clustering for the vaccination coverage estimate; a cluster was defined as a single shelter.

Results

We included 214 individuals in the analysis. 44 (23%) reported having at least one chronic disease; of which 12 (30%) reported having high blood pressure, 12 (30%) heart and 11 (28%) kidney diseases. Among those with these pathologies, 50%, 68% and 83% reported not taking the appropriate treatment, respectively. 106 (51%) respondents reported not having adequate access to soap and 157 (59%) to clothe-washing. 90 (43%) respondents did not feel safe within the camp. Vaccination against measles was known for 220 of the 348 (63%) <15 year olds. Among those, 15 (6.8%) were vaccinated based on vaccination records and 168 (76%) based on parental/guardian recall.

Conclusion

This assessment indicated low access to proper care for chronic diseases with the majority of respondents reporting not taking appropriate treatment. It also indicated insufficient hygiene conditions in the camps, with limited access to basic hygiene material. Refugees in Elliniko camps need to be provided with sufficient access to chronic disease and sufficient hygiene material.

Role and outputs:

Principal investigator (joint). Wrote the protocol, developed questionnaire and data entry mask, trained field workers, implemented study, contributed to data analysis and report writing (9)

Supervisor(s): *Kostas Danis (EPIET/Sante Publique France (SPF))*

Title: Biannual point prevalence surveys of healthcare-associated infections and antibiotic use among inpatients in long-term care facilities for elderly people in Vienna, Austria in 2014

Background

There is no consistent surveillance of infections in long-term care facilities (LTCF) in Austria. The aim of our study was to obtain point prevalence estimates of healthcare-associated infections (HAI) and antibiotic use among residents of LTCFs for elderlies in Vienna.

Methods

In 2014, we conducted a biannual point prevalence survey (spring: PPS-1, autumn: PPS-2) on urinary, respiratory tract and skin-soft tissue infections (UTI, RI, SSTI) using the updated clinical McGeer criteria among residents of 31 LTCFs. Residents participating in PPS-2 were compared to PPS-1 by calculating prevalence ratios (PR). We collected information on care load indicators, risk factors for infections (uretic catheter, skin ulcer, recent operation, hospital stay) and antimicrobial consumption. Urinary and stool samples and ulcer swabs were tested by culture; isolates obtained were tested for antimicrobial resistance. Multidrug-resistance was defined according to international standard definitions.

Results

We recruited 1068 residents in PPS-1 and 1080 in PPS-2; residents did not differ in sex, age and risk factors, except in the presence of skin ulcer (11.3% vs 17.3%). The prevalence of at least one HAI was 2.9% (95%CI: 1.9-3.9) in PPS-1 and 2.6% (95%CI: 1.6-3.5) in PPS-2. The SSTI-prevalence was lower in PPS-2 (PR: 0.32, 95%CI: 0.10-1.01) and remained significantly different after adjustment for age and presence of ulcers (adPR: 0.26, 95%CI: 0.07-0.8). The prevalence of UTI and LTRIs, and antibiotic use did not differ between the two survey periods. Among 23 isolates found in PPS-1, four of nine Staphylococcus aureus isolates were multiresistant, and among 17 isolates in PPS-2, two of eight Escherichia coli isolates were multiresistant.

Conclusion

The prevalence of HAIs was consistent with findings of the 2010 and 2013 European LTCF surveys (2.4%, 3.4%, respectively). A significant reduction in SSTI-prevalence was observed despite higher frequency of skin ulcer. The HAI surveys may have increased awareness of ulcer care among staff.

Role and outputs:

Co-investigator. Analysed data, contributed to abstract and presentation for a conference (10), preparing a manuscript for a peer-reviewed journal

Supervisor(s): Daniela Schmid (AGES)

Title: Associations between national viral hepatitis policies/programmes and country-level socioeconomic factors: a sub-analysis of data from the 2013 WHO viral hepatitis policy report

Background:

As more countries worldwide develop national viral hepatitis strategies, it is important to ask whether context-specific factors affect their decision-making. This study aimed to determine whether country-level socioeconomic factors are associated with viral hepatitis programmes and policy responses across WHO Member States (MS).

Methods:

WHO MS focal points completed a questionnaire on national viral hepatitis policies. This secondary analysis of data reported in the 2013 Global Policy Report on the Prevention and Control of Viral Hepatitis in WHO Member States used logistic regression to examine associations between four survey questions and four socioeconomic factors: country income level, Human Development Index (HDI), health expenditure and physician density.

Results:

This analysis included 119 MS. MS were more likely to have routine viral hepatitis surveillance and to have a national strategy and/or policy/guidelines for preventing infection in healthcare settings if they were in the higher binary categories for income level, HDI, health expenditure and physician density. In multivariable analyses, the only significant finding was a positive association between having routine surveillance and being in the higher binary HDI category (adjusted odds ratio 26; 95% confidence interval 2.0–340).

Conclusion:

Countries with differing socioeconomic status indicators did not appear to differ greatly regarding the existence of key national policies and programmes. A more nuanced understanding of the multifaceted interactions of socioeconomic factors, health policy, service delivery and health outcomes is needed to support country-level efforts to eliminate viral hepatitis.

Role and outputs:

Co-investigator. Analysed data, prepared a manuscript published in a peer-reviewed journal as last author (11)

Supervisor(s): *Jeffrey Lazarus (University of Copenhagen/WHO EURO)*

Competencies developed:

From the Clostridium difficile and long term care facilities projects, I was able to advance my knowledge on managing large datasets and the creation of relational databases. I also gained insight in to the flow of information within Austrian healthcare institutions. From the WHO hepatitis policy projects, I learned how qualitative analysis can be applied to attempt to understand national level planning and health structure.

With the rapid needs assessment in Greece and the evaluation of water and hygiene interventions in Chad, I was able to conduct research projects from conception through to completion. I was able to apply knowledge on study design, sampling techniques, training of data collectors and implementation of field work in addition to analysing data and writing reports.

4. Communication

Publications in peer reviewed journals

Three manuscripts published in peer reviewed journals (contributed as co-author) (3,5,11)

Manuscripts submitted to peer reviewed journals (in review process)

One manuscript submitted for peer review as first author (4)
Three further manuscripts in preparation as first author (7,8,10)

Conference presentations

One oral presentation at ESCAIDE 2016 (7) and one poster at MSF Scientific Days 2017(12)

Reports

One outbreak report (6), two surveillance reports (1,2) and one research report (9)

Other

One short interview for an Austrian medical newspaper (13), two editorials for EPIET Alumni Network (EAN) newsletters (14,15)

5. Teaching activities

Title: Facilitating case study, "Gastroenteritis following a barbecue in Northern Ireland", for medical students at the University of Innsbruck

Alex facilitated a case study for medical students at the University of Innsbruck as part of a module on Social Medicine and Prevention. This was split over two days and lasted a total of 3 hours. This case study and facilitation was evaluated formally and informally.

Supervisor(s): *Peter Kreidl (University of Innsbruck)*

Title: Creation of R-statistical software guides for Outbreak, MVA and RAS module case studies

Together with Patrick Keating (Cohort 2015), Alex adapted case study guides for three EPIET modules (i) Outbreak, ii) Multivariable analysis and iii) Rapid assessment and survey methods) so that participants could use R-statistical software rather than STATA.

Supervisor(s): *Kostas Danis (EPIET/SPF), Alicia Barrasa (EPIET/ Instituto de Salud Carlos III), Irina Czogiel (EPIET/RKI)*

Title: Mobile data collection and sampling methods for epidemiologists, RAS 2016 and 2017

Alex, Patrick Keating, Amrish Baidjoe, and Lutz Ehlkes developed and facilitated a case study on mobile data collection using the EpiCollect+ data collection tool. This case study was delivered during a 1.5 hour session as part of the RAS module in Athens, 23rd June 2016. Alex held an additional two hour training session specifically for the rapid needs assessment at Eliniko (see research and international assignments sections), where investigators were trained on the data collection and sampling for this research project. Alex, Patrick Keating, Amrish Baidjoe, and Lutz Ehlkes prepared a completely revised version of the case study for the 2017 RAS module, using KoBoCollect as the mobile collection tool.

Supervisor(s): *Kostas Danis (EPIET/SPF)*

Title: Data collection, sampling, research ethics and water chlorination testing for field teams, Am Timan, Chad 2017

Alex trained field workers who did data collection as part of water and hygiene interventions during the Hepatitis E outbreak in Am Timan, Chad (see outbreak and research and sections). These teams had never been exposed to this type of research before, so the training began from the very basics of interviewing for data collection and research ethics up to sampling methods and testing water for chlorine.

Supervisor(s): *Annick Lenglet and Dawn Taylor (MSF)*

Educational outcome:

Facilitating the case study in Innsbruck was very interesting because it involved trying to get medical students, without much prior exposure to the topic, to begin thinking like epidemiologists; I learnt a lot about how to ask questions in order to engage learners. Preparing material on analysis and data collection software was also very interesting because it forced me to think through the very basics steps in order to be able to explain these clearly. Finally, the training of data collectors in Chad was a very rewarding experience and I learnt a lot about communication, not only because this was all in French but because also because these were entirely new concepts to the team of collectors.

6. International assignments

Title: A large outbreak of Hepatitis E virus genotype 1 infection in an urban setting in Chad likely linked to access to water and sanitation, 2016-2017

(see outbreak, research and teaching sections)

Title: Rapid needs assessment of the refugee migrant population in the three camps of Elliniko, June 2016, Athens, Greece
(see research section)

7. Other activities

Title: Additional training attended

During the fellowship Alex attended the following additional training courses:

- UN Security in the field E-learning
- Innovative surveillance and the Epicore platform E-learning, provided jointly by TEPHINET, ProMed Mail, HealthMap, Skoll Global Threats Fund for digital disease detection
- Preparation for primary departure training provided by Medecins Sans Frontieres in Bonn, Germany
- HIV modelling tool provided by ECDC in Bratislava, Slovakia

Title: Meetings attended

Within the fellowship, Alex attended the following meetings as a national expert:

- ECDC HIV Network meeting in Bratislava, Slovakia
- International Panel Physicians International Migration Symposium on Tuberculosis Standards and Strategies for Screening Migrants, Prague, Czech Republic
- Austrian Society of Hygiene, Microbiology and Preventive Medicine Annual Conference, Zell am See, Austria
- Austrian HIV cohort annual situation update, Kühtai, Austria
- International Meeting on Emerging Infectious diseases 2016 Hackathon – project won ProMed Mail 3rd prize

Title: Routine surveillance activities

Within the fellowship, Alex continued to contribute to the routine surveillance and analytical activities of the Department for Infectious Disease Epidemiology and Surveillance in the following areas:

- Establishment of viral hepatitis B and C surveillance databases through merging and validation of newly available reference laboratory datasets (Joint project)

  - A recent evaluation of the hepatitis C surveillance system in Austria, carried out by Patrick Keating (Cohort 2015) found that there were issues with data completeness and validity; it was recommended that the surveillance data be merged with a reference laboratory dataset. As Alex has been involved with routine viral hepatitis surveillance in Austria for several years, he contributed to the procedure planning for merging and validation of these newly established data sources.

- Contribution to annual surveillance reports. Contributed to:

- o the Austrian Annual Tuberculosis Surveillance Report and Austrian Tuberculosis Annual Antimicrobial Resistance Report 2015
- o the Austrian Gonococcal Annual Antimicrobial Resistance Report 2015
- o descriptive GIS analyses to the Austrian Annual Surveillance Reports 2016 for Shigella and for Shiga-toxin producing *E. coli*

- Response to provincial, ministerial and parliamentary enquiries. Contributed to:
  - o parliamentary enquiry regarding hepatitis B and C
  - o risk assessment brief for the Director General of Public Health at the MoH for an interview with national news regarding Tuberculosis among refugees
  - o parliamentary enquiry regarding risk to the Austrian population in terms of notifiable disease among refugees
  - o parliamentary enquiry regarding age distribution of AIDS cases in 2014
  - o parliamentary enquiry regarding imported cases of infectious diseases
  - o parliamentary enquiry regarding incidence of specific diseases (hepatits A, B and C, MERS, Polio and Zika)
  - o a response to an Austrian press (Falter newspaper) enquiry on ghonorrhoea

- Response to international organisation surveys on Austrian surveillance systems and data availability. Filled out:
  - o the EUROSTAT country data availability for disease specific morbidity estimations
  - o the ECDC HIV surveillance system survey 2016
  - o the ECDC Hepatitis B and C testing policy and practice, morbidity and mortality data as well as Hepatitis E surveillance, testing, diagnosis and screening 2016

- Re-coding of Austrian surveillance data for reporting to international databases
  - o Completed the WHO Annual communicable disease reporting form 2016
  - o Completed the WHO Tuberculosis annual report 2015 and 2016 surveys
  - o Establishment of a platform for re-coding of datasets from the Austrian surveillance data format to report to The European Surveillance System (TESSy) in the appropriate format using excel and R-statistical programming software (together with department statistician Lukas Richter)

- Creation of data entry masks for Zika and Chikungunya in the national electronic reporting system

- Laboratory survey of currently held polio virus and polio virus material samples at Austrian institutions within the WHO global action plan for risk minimisation in poliovirus storing institutions

Role and outputs: *Co-investigator*

Co-investigator. Analysed surveillance data, contributed to reports, re-coded and reported data to international organisations (for regional and global disease reports), responded to international surveys on the Austrian surveillance system/data

Supervisor(s): *Daniela Schmid (AGES)*

7. EPIET/EUPHEM modules attended

1. Introductory Course, Spetses, Greece 28th September -6th October 2015
2. Joint EPIET/EUPHEM outbreak module, Berlin 7th-11th December 2015
3. Joint EPIET/EUPHEM module on Multivariable Analyses, Vienna 14th-18th March 2016
4. Joint EPIET/EUPHEM RAS module, Athens 20-26th June 2016
5. Joint EPIET/EUPHEM Project Review Module, Lisbon, 22-26th August 2016
6. EPIET module on Time Series Analyses, Bucharest, 7th-11th November 2016
7. EPIET module on Vaccinology, Stockholm, 12rd-16th June 2017
8. EPIET Project Review Module, Lisbon, 28th August-1st September 2017

Supervisor's conclusions (Daniela Schmid)

Alex had a very successful two-year EPIET fellowship. He achieved all of his EPIET training objectives, being very engaged and thorough in all his projects. He made important contributions to improving HIV surveillance in Austria by establishing the EU HIV model for the Austrian HIV cohort study data. His work brought new insights to burden of disease of vulnerable populations in Austria by assessing the surveillance of Hepatitis B/C, HIV and TB in Austrian prisons, and by conducting Hepatitis B/C, HIV and TB prevalence and incidence surveys in these population subgroups. Thanks to his technical and analytical skills, Alex was able to establish several analyses by use of R-software, which is presently already used for all routine surveillance data analyses in Austria. As contribution to responding to the refugee crisis in 2015-2016, Alex was initially responsible for enhanced surveillance of TB among refugees in Austria, for investigating a shigella cluster among refugees in Austrian transit centres, as well as writing a protocol and leading the field work for Epicentre rapid needs assessment in Elliniko refugee camps in Athens. He was the primary investigator in two studies on *C. difficile* infection – *C. difficile* infection admission-prevalence, and risk factors including analyses of the enteric microbiome for *C.difficile* colonization and infection in the general hospital of Vienna, and finished a point prevalence survey of healthcare associated infections and antibiotic prescriptions among patients of long term care facilities. Both projects raised awareness of healthcare associated infections in Austria. In addition, he successfully accomplished a mission with MSF in response to an outbreak of hepatitis E in Chad. It has been a great pleasure to work with Alex as he is knowledgeable, hardworking and enthusiastic, and has in-depth interest in statistical analyses, in addition to being a kind and gentle person. We are sure he will be a great asset wherever he chooses to work in the future.

Coordinator's conclusions (Kostas Danis)

During his EPIET fellowship, Alex Spina was involved in a wide range of public health projects (including surveillance of Hepatitis, TB and HIV in Austrian prisons, a rapid needs assessment of refugees in Greece, prevalence study of C. difficile colonisation and infection in Austrian hospitals, several other research, surveillance projects and outbreaks). He also investigated a hepatitis E outbreak in Chad, as an international assignment with MSF, where he conducted several surveys that informed public health interventions targeting a highly vulnerable population. His work and interactions during those assignments were highly appreciated. Furthermore, he created teaching material for R software and facilitated in EPIET modules. Despite having a lot of routine work as a MS-track fellow, he managed to achieve all his EPIET objectives and produced a large amount of high quality outputs. He was able to work independently and effectively, but also in a team. 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 Alex has considerable professional and technical skills for any epidemiological and public health related work, both at national and international level.

Personal conclusions of fellow

EPIET was a great way to gain exposure to the wider public health community and network within Europe. The projects at my site also opened a window in to areas of public health I would not have seen otherwise. International assignments were an invaluable experience, personally and professionally, and were everything that field epidemiology training should be.

Acknowledgements

I would like to thank my site supervisor, Daniela Schmid. My particular thanks go to Kostas Danis and Giri Shankar as frontline coordinators who always went above and beyond with advice, feedback and support. My deepest gratitude goes to Annick Lenglet of MSF for the amazing opportunity of experiencing the field and for her never-ending availability and help. Finally, I thank my cohort and colleagues at AGES for making the experience an enjoyable one.

References

1. Spina A, Winterleitner M, Schmid D. Infection control in Austrian prisons: Quality assurance of Hepatitis B/C, HIV and Tuberculosis surveillance in Austrian federal penitentiaries, 2016-2017. Austrian Agency for Health and Food Safety/ Ministry of Justice; 2017.
2. Spina A, Winterleitner M, Schmid D. Infection control in Austrian prisons: Admission prevalence and during-stay incidence of HBV, HCV, HIV infection and TB among prisoners admitted to Austrian prisons in 2016. Austrian Agency for Health and Food Safety / Ministry of Justice; 2017.
3. Gourlay A, Noori T, Pharris A, Axelsson M, Costagliola D, Cowan S, et al. The Human Immunodeficiency Virus Continuum of Care in European Union Countries in 2013: Data and Challenges. Clin Infect Dis Off Publ Infect Dis Soc Am. 2017 Jun 15;64(12):1644–56.
4. Spina A, Lenglet A, Beversluis D, de Jong M, Vernier L, Spencer C, et al. A large outbreak of Hepatitis E virus genotype 1 infection in an urban setting in Chad likely linked to access to water and sanitation, 2016-2017 [Currently under review]. PLoS ONE.
5. Lederer I, Taus K, Allerberger F, Fenkart S, Spina A, Springer B, et al. Shigellosis in refugees, Austria, July to November 2015. Euro Surveill Bull Eur Sur Mal Transm Eur Commun Dis Bull. 2015;20(48):30081.
6. Spina A, Taus K, Kanitz E, Schmid D. Norovirus outbreak at a boarding-school in Salzburg, Austria, November 2016. Austrian Agency for Health and Food Safety; 2017.
7. Spina A, Mitteregger D, Fenkart S, Hirschl A, Allerberger F, Burgmann H, et al. Hospital admission-prevalence and determinants of asymptomatic C. difficile colonisation: A cross-sectional survey with nested case-control and case-case studies among patients of Vienna General Hospital 2013-2015. European Scientific Conference on Applied Infectious Diseases (ESCAIDE); 2016; Stockholm, Sweden.
8. Spina A, Beversluis D, Irwin A, Chen A, Nassariman J-N, Abdelkhadir A, et al. Learning from water treatment and hygiene interventions in response to a hepatitis E outbreak in an open setting. Am Timan, Chad, September 2016 to January 2017 [In preparation].
9. Ung A, Spina A, Theocharopoulos Y, Cohuet S, Danis K. Rapid needs assessment of the refugee migrant population in the three camps of Elliniko, June 2016, Athens, Greece. European Programme for Internvetion Epidemiology Training (EPIET) / Medecins Sans Frontieres Greece; 2016.
10. Spina A, Kanitz E, Richter L, Fenkart S, Aboulez N, Sigl A, et al. Biannual point prevalence surveys of healthcare-associated infections and antibiotic use among inpatients in long-term care facilities for elderly people in Vienna, Austria in 2014. Annual conference of the Austrian Society for Hygiene, Microbiology and Preventive Medicine; 2016; Zell am See, Austria.
11. Lazarus JV, Sperle I, Safreed-Harmon K, Gore C, Cebolla B, Spina A. Associations between national viral hepatitis policies/programmes and country-level socioeconomic factors: a sub-analysis of data from the 2013 WHO viral hepatitis policy report. BMC Public Health. 2017 Jul 26;18:16.
12. Spina A, Spencer C, Beversluis D, Mahamatahmat D, Irwin A, Vernier L, et al. Acute Jaundice Syndrome community outbreak due to Hepatitis E virus in Am Timan, September 2016 to January 2017 [Internet]. MSF Scientific Days; 2017 May [cited 2017 Aug 17]; London, United Kingdom. Available from: https://f1000research.com/posters/6-641
13. 3 Fragen, 3 Antworten: „Man kann nur versuchen, die Symptome zu vermindern". Ärzte Woche [Internet]. 2017 [cited 2017 Aug 17]. Available from: http://www.springermedizin.at/fachbereiche-a-z/i-o/innere-medizin/hepatologie/?full=57441
14. Spina A. Story from the Field. EAN News. 2017 May;(Spring):5–6.
15. Baidjoe A, Ehlkes L, Keating P, Djurdjica M, Spina A. The strengths of peer learning: how to fully utilise the joint potential of fellows, facilitators and alumni for continued development of the EPIET and EUPHEM fellowship. EAN News. 2017 Sep;(Summer).