FELLOWSHIP REPORT

Summary of work activities

Theofilos Papadopoulos
Intervention Epidemiology path (EPIET)
Cohort 2016

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 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.

This portfolio does not represent a diploma. Fellows receive a certificate listing the theoretical modules attended and the 23-month training. Additionally, if all training objectives have been met, they receive a diploma.

Stockholm, September 2018

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.

Pre-fellowship short biography

Theofilos Papadopoulos is a Veterinary surgeon who has been working as an Official Veterinary Surgeon in State Region of Western Macedonia in Greece since 2005. He graduated from the School of Medicine Aristoteles' University of Thessaloniki in Greece in 2003 and he received a Master of Science's degree in Aquatic Animal Health in 2008 from the School of Veterinary Medicine in the University of Thessaly, and a Master of Science's degree in Public Health in 2011 from the National School of Public Health, Athens. The fellow completed his PhD in Molecular Microbiology from the School of Veterinary Medicine Aristoteles' University of Thessaloniki in Greece in 2015. Before EPIET, he worked for nearly 10 years in the field of Surveillance of Zoonoses and Food Safety and in subtyping of foodborne pathogens.

Fellowship assignment: Intervention Epidemiology path (EPIET)

In 15th September 2016, Theofilos Papadopoulos started his EPIET fellowship at the SCIENSANO (former Scientific Institute of Public Health, WIV-ISP), Brussels Belgium, initially under the main supervision of Dr Marie-Laurence Lambert (until 31/5/2017) and then by Dr Els Duysburgh and co-supervision by Amber Litzroth and Javiera Rebolledo. This report summarizes the work performed during this fellowship.

Methods

This portfolio demonstrates the competencies acquired during the ECDC Fellowship, EPIET path, by working on various projects, activities 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. The portfolio presents a summary of all work activities conducted by the fellow, unless prohibited due to confidentiality regulations.

Results

The objectives of these core competency domains were achieved partly through project or activity work and partly through participation in the training modules. Results are presented in accordance with the EPIET core competencies, as set out in the EPIET scientific guide[1].

Fellowship projects

1. Surveillance

1.1 Supervisors: Laure Mortgat and Marie-Laurence Lambert

Title: Transmission of Clostridium difficile infection (CDI) in Belgian hospitals 2015-2016

Clostridium difficile (*C. difficile*) is an important cause of hospital-associated (HA) infections. However, the extent of transmission within hospitals is unclear. We aimed to estimate what proportion of HA *C. difficile* infections (CDI) in Belgian hospitals resulted from case-to-case transmission within the same hospital, in order to guide prevention measures. Between 1/1/2015 and 31/1/2016, 30 hospitals voluntarily recorded all CDI cases and sent isolates for typing to National Reference Laboratory. We defined (1) HA-CDI as CDI episode with clinical symptoms' onset ≥2 days after admission, (2) possible secondary case as a HA-CDI sharing the same ribotype as a previous (HA or non-HA) CDI in the same hospital and isolated within ≤31 days (3) recurrent as an episode in the same person with onset of symptoms >15 days and < 8 weeks after the first. We excluded from analysis (1) hospitals with >30% missing typing data, (2) episodes occurring during the first month of the study and (3) recurrent episodes. Thirty hospitals registered 1,397 CDI episodes (median number per hospital 46; range 2-144); 57% (median number per hospital 21; range 2- 91) were HA-CDI. After excluding 5 hospitals with >30% missing typing data, we identified 143 different ribotypes from 1011 isolates corresponding to 1,131 episodes; 68/143 (48%) ribotypes were identified once. We found 137/539 (25%) possible secondary cases (range 0%-50% across hospitals; median: 19%). The different circulating *C. difficile* strains in Belgium suggest a variety of transmission routes. The majority of HA-CDIs could not be attributed to case-to-case hospital transmission, although variation between hospitals was high. More discriminatory typing methods are needed to assess whether secondary cases are really linked. We recommend further studies to identify main transmission routes within hospitals to better control HA-CDIs.

Role: Theofilos was the main investigator together with Marie-Laurence Lambert and Laure Mortgat. He was actively involved in the data analysis and he wrote the report and became acquainted with CDI surveillance systems at hospital, regional and national level. He performed part of the analysis for the first part of the study (ribotype study), and formulated recommendations for the second part (molecular subtyping). He participated in several meetings with the National Reference Center (NRC) for *C. difficile* regarding planning, interpretation and analysis of the data. He drafted the final report for the Institute (R4), he presented the findings orally in the monthly team meeting (P13) and in an

[1] European Centre for Disease Prevention and Control. European public health training programme. Stockholm: ECDC; 2013. Available from: http://ecdc.europa.eu/en/publications/Publications/.pdf

institutional seminar (P11). The study was presented as poster in ESCAIDE 2017 (P6) and a paper is in preparation to be submitted to a peer reviewed journal (A6).

The CDI project helped me to learn about the surveillance of *C. difficile* infections in Belgium and how data are collected from hospitals and the NRC. I understood the importance of an adequate surveillance system that includes hospitals and laboratories but I also learned how to connect data from multiple sources. It also helped me to consolidate my technical skills on the management of data sets (i.e. data cleaning and recoding) using STATA. Furthermore, I gained experience on public health guidance developing, how to find scientific evidence to orientate recommendations and how to identify gaps in scientific evidence and propose the subsequent research needed.

1.2 Supervisors: Annick Lenglet, Kostas Danis

Title: Surveillance of neonatal admissions for colonisation with multi-drug resistant bacteria in a neonatal care unit, Port au Prince, Haiti

Nosocomial invasive gram negative bacterial (GNB) infections are common causes of mortality in neonatal care units (NCU). Gastrointestinal tracts of hospitalized infants can serve as a reservoir for these infections. We aimed to estimate the faecal colonisation proportion by GNB and ESBL (+) GNB of systematically sampled newly admitted neonates in a NCU in Haiti, to describe the antimicrobial resistance profiles (AMR) of isolated GNB and identify factors associated with colonisation. We included all neonates admitted to the NCU from May to August 2016 who were started on prophylactic antibiotics or treated for infection. Neonates had faecal swabs taken before treatment was initiated; these were tested for GNB, AMR profiles and ESBL status. We calculated adjusted prevalence ratios (aPR) using binomial regression. Of the 800 neonates admitted in NCU, 409 received a first antibiotic course and 78 a second one. One hundred and twenty-five out of 279 (45%) screened neonates were colonised by GNB, 85% before the second treatment and 34% before the first treatment (aPR 2.5; 95% CI: 2.0–3.0). Twenty-three percent (52/224) of neonates were colonised by ESBL (+) GNB, 70% (32/46) before the second treatment, 8.8 (95% CI: 5.6–14) times higher than those before first treatment (7.9%; 20/254). Ninety-eight out of 175 (56%) of isolated GNB were *Escherichia coli*, *Klebsiella oxytoca* and *Klebsiella pneumoniae*. Fifty percent of the tested GNB were susceptible to first-line antimicrobials and 99% to second-line antimicrobials; 4% and 35% of isolates indicated intermediate resistance to amikacin and ceftazidime, respectively. Vaginal delivery (aPR 2.1; 95% CI: 1.4–3.2) and length of stay (aPR 1.82; 95% CI: 1.2–2.7) were associated with GNB colonisation among newly admitted neonates. Neonates sampled > 48 h after admission were 19 times more likely to be colonised by ESBL (+) GNB (aPR 19; 95% CI: 8.9–41) than those sampled < 24 h. GNB colonisation was high and increased with length of stay. Second line antimicrobial treatment seems still adequate, but signs of intermediate resistance to ceftazidime were observed. We recommend to re-enforce surveillance for suspected pathogens of nosocomial infections using blood cultures for septic infants and monitoring of antimicrobial treatment failure in infants receiving antibiotics.

Role: Theofilos was the lead investigator to this investigation under the supervision of Annick Lenglet and was actively involved in all stages of this project. The research was done on an already available dataset. Theofilos formulated the research question, revised the study protocol, cleaned the databases and performed the analysis. He drafted the final report (R2), authored a scientific article to be submitted in a peer reviewed scientific journal (A8) and presented the results as poster to European Congress of Epidemiology (EUROEPI)(P9).

I gained experience on drafting and reviewing a research protocol, formulating the research question and analysing hospital data. I further developed my skills on scientific writing and creation of a poster.

2. Outbreak investigations

Supervisors: Kassiani Mellou, Georgia Mandilara, Kyriaki Tryfinopoulou.

Title: Investigation of an outbreak of Salmonella Typhimurium 1,4 [5],12:i:- in Central Greece, August 2017

In August 2017, an increase of human salmonellosis cases due to serotype Typhimurium 1,4 [5],12:i:- was observed in Magnisia and Pieria prefectures, Greece, by the Reference Laboratory; an outbreak investigation was initiated to identify the source and implement control measures. The outbreak strain was defined as: "*Salmonella* Typhimurium 1,4 [5],12:i:-" with AMR profile "ACSSuTTM" and PFGE profile "*Xba*I.GR01". We defined outbreak cases as residents or visitors of Magnisia or Pieria, laboratory confirmed with the outbreak strain from August 2017 onwards. We interviewed outbreak cases to identify exposures and carried out a retrospective case-case comparison study. We compared outbreak cases with sporadic *Salmonella* cases with other serotype, matching on date of symptoms onset and age group. Adjusted odds ratios were calculated using logistic regression analysis. We traced back the distribution chain of suspected food items and sampled them for microbiological analysis. During August 2017, 40 outbreak cases were identified; 59% were female and age-range was 1-81 years (median 27). Thirty outbreak cases and 30 matched cases participated in the case-case comparison study. Outbreak cases were more likely to have consumed pork in the three days before symptoms onset (aOR 19, 95% CI 1.2-309). Trace-back investigations led to a common supplier for two restaurants; all food samples collected there were negative. Monitoring criteria for prevention of similar events were suggested. In the absence of microbiological evidence, epidemiological evidence from a case-case comparison study made it possible to identify pork as the most likely vehicle of this outbreak. This choice of study design should be considered more frequently in field investigations. The outbreak was first detected by the Reference Laboratory illustrating the importance of laboratory-based *Salmonella* spp. surveillance.

Role: Theofilos participated in all different steps of the outbreak investigation, developed the questionnaires, and conducted telephone interviews with cases and the controls (being *Salmonella* cases with other serotype). He framed case definitions, entered data in Epidata, and performed descriptive and analytic statistical analyses with the use of Stata. The fellow cooperated with veterinarians from the regional authority and the National Food Safety authority, ensuring a multidisciplinary coordinated follow up of the outbreak, as indicated by the One Health approach. He was actively involved in the formulation of conclusions and public health recommendations and he wrote the final outbreak report that was shared with the Greek National Food safety authority. Theofilos drafted the final report (R3), an abstract accepted as a poster presentation at ESCAIDE 2018 (P10) and co-authored a scientific article to be submitted in a peer reviewed scientific journal (A7).

This outbreak was my first outbreak investigation as principal investigator. It strengthened my capacity to develop a protocol and questionnaire and use bioinformatics and statistical software to analyse the data collected. I had the opportunity to highlight the use of a case-case study design in this outbreak and analyse the data accordingly. I learnt about the value of public health information for action and had the opportunity to work jointly with a group of public health actors. Finally, I got to understand the different limitations in solving an outbreak investigation primarily related to lack of laboratory confirmation and I further developed my skills on creation of a poster.

3. Applied epidemiology research

Supervisors: Brecht Devleesschauwer, Stephanie Jacquinet, Sofieke Klamer

Title: The health and economic impact of acute gastroenteritis in Belgium, 2010–2014

Acute gastroenteritis (AGE) is a common illness that causes considerable morbidity in developed countries. However, there is a lack of information on the health and economic impact in the society. In the present study we estimated the burden of disease in Belgium during 2010–2014 in terms of deaths, patients admitted to hospitals, patients consulting their general practitioner and community-acquired cases. We further quantified the health impact in terms of Disability-Adjusted Life Years (DALYs) and the economic impact in terms of cost-of-illness. The burden and the economic cost of the disease was estimated for a 5-year period (2010–2014) in Belgium. We conducted a retrospective study using mortality and cause-of-death data, hospital discharge data, primary care data, health interview survey data, and published literature. We estimated 343 deaths, 27,707 hospitalized patients, 464,222 GP consultations and 10,058,741 episodes occurring in the community (0.91 cases/person) on average per year. AGE was associated with 11,992 DALYs per year (109 DALY per 100,000 population). The economic burden was estimated to represent direct costs of €114 million, indirect costs of €927 million (90% of the total costs) and a total cost of €104 per case and €94 per inhabitant. AGE causes a substantial health and economic burden in Belgium and the economic costs are mainly attributed to productivity losses.

Role: Theofilos was the main investigator to this project. He wrote and revised the study protocol, analysed the data and drafted a paper as first author that was submitted to a peer reviewed journal (A2).

By working in the AGE project I had the opportunity to be involved in all the stages/steps of an applied epidemiological research. I formulated the research question and I gained experience in how to organise a research project using mostly surveillance and already published data. This project helped me to develop my skills on the management of different databases originating from different surveillance systems. Furthermore, I gained experience on drafting and reviewing a research protocol and I further developed my skills on scientific writing.

4. International assignments

Title: Surveillance of neonatal admissions for colonisation with multi-drug resistant bacteria in a neonatal care unit, Port au Prince, Haiti

This mission was coordinated by MSF and involved analysing in the host Institute data from a hospital in Haiti. (see surveillance and communication sections).

5. Communication

Theofilos submitted one publication as first author (A2) and four publications as co-author (A1, A3, A4, A5), he drafted three reports as first author (R2, R3, R4) and two as co-author (R1, R5). He presented as the first author one oral (P3) and three posters (P6, P9, P10) presentations and co-authored four oral (P1, P4, P5, P8) and two poster (P2, P7) presentations. Finally, he presented as first author in three meetings (P11, P12, P13).

6. Teaching and pedagogy

6.1 Supervisors: Pr. Herman Van Oyen, Amber Litzroth

Title: WIV-ISP Epidemiology week course 2017

Annual epidemiology teaching week (7 hours per day) organized by the department Surveillance and Public Health. The course is taught by staff members (including EPIET/EUPHEM fellows) and the target audience are staff members with limited experience in epidemiology. The course and the teaching materials are EPIET based. There are different modules being offered to audience. Three lectures given, being: Introduction to epidemiology, Causality and Validity. Two cases studies facilitated. I learned to deliver training on different areas of epidemiology and public health but also prepare, modify and deliver the material for the courses. This teaching involvement strengthened my capacity of case study facilitation. I also gained experience in keeping up an active discussion in a case study and motivating participants to get involved and ask questions.

6.2 Supervisors: Pr. Herman Van Oyen, Amber Litzroth

Title: WIV-ISP Epidemiology week course 2018

Annual epidemiology teaching week (7 hours per day) organized by the department Surveillance and Public Health. The course is taught by staff members (including EPIET/EUPHEM fellows) and the target audience are staff members with limited experience in epidemiology. There are different modules being offered to audience. The course and the teaching materials are EPIET based. There are different modules being offered to audience. Four lectures given, being: Introduction to epidemiology, Frequency measures, Causality and Validity. Two cases studies facilitated. Apart from all mentioned in the course of the previous year, in 2018 there was an evaluation done for the overall module. The

commentaries about the lectures and the case studies were very positive. I gained experience in organising such training and cooperate with the other trainers.

6.3 Supervisor: Dr Els Duysburgh

Title: Molecular typing methodologies for microbial source tracking and epidemiological investigations - Interpretation of subtyping data

A two-hour workshop was organised by Theofilos Papadopoulos and Lorenzo Subissi (EUPHEM fellow-cohort 2017) in SCIENSANO targeting the scientific staff who would like to be introduced in the use of molecular microbial subtyping methods in surveillance and outbreak investigations. The workshop included two interactive lectures about subtyping methods and their implementation in studies and outbreak investigations. I have learned and gained experience on planning and delivering lectures, including defining learning objectives, preparing lecture material and delivering training to people with different backgrounds.

7. Other activities

As a part of general aspects of Public health Theofilos was involved in several other projects following his previous experience in Greece. Furthermore, he was partially involved to routine tasks and projects in the Institute (Sciensano). For several of these projects he carried out part of the analysis and co-authored eight (8) abstracts presented in conferences and meetings (P1, P2, P3, P4, P5, P7, P8, P12), co-authored six (6) publications (A1, A3, A4, A5, A9, A10) and two (2) reports (R1, R5). He also attended seven (7) scientific conferences, eight (8) scientific seminars, two (2) workshops and several meetings. He also reviewed four (4) papers in scientific journals with high impact factor.

Conferences attended (7)

C.1. 26th Pan-Hellenic Military Medical Congress, Thessaloniki, Greece, 2016
C.2. European Scientific Conference on Applied Infectious Disease Epidemiology (ESCAIDE), Stockholm, Sweden, 2016.
C.3. 4th Pan-Hellenic Congress of food Animals & Food Hygiene, Volos, Greece, 2017
C.4. AMICI (Antimicrobial innovative coating solutions to prevent infectious diseases) conference: Antimicrobial coatings in healthcare: from innovation to the market, Pori, Finland, 2017.
C.5. European Scientific Conference on Applied Infectious Disease Epidemiology (ESCAIDE), Stockholm, Sweden, 2017.
C.6. European Congress of Clinical Microbiology and Infectious Diseases (ECCMID), Madrid, Spain, 2018.
C.7. European Congress of Epidemiology (EUROEPI), Lyon, France, 2018.

Workshops, seminars, courses attended (12)

T.1. United Nations Department of Safety and Security online courses Basic Security in The Field II
T.2. United Nations Department of Safety and Security online courses Advanced Security in The Field
T.3. Tuesday seminar in WIV-ISP "Quality indicators for infection prevention and control in Belgian hospitals, and public disclosure" Brussels, February 2017.
T.4. Tuesday seminar in WIV-ISP "Quantifying the quality of care" Brussels, February 2017.
T.5. Healthcare-Associated Infections & Antimicrobial Resistance (NSIH) unit workshop, Brussels, April 2017.
T.6. WIV-ISP seminar for "Diagnosis and surveillance of infectious diseases 2017", Brussels, May, 2017
T.7. Tuesday seminar in WIV-ISP "Next Generation Sequencing", Brussels, June 2017.
T.8. Joint seminar of the COST AMiCI Action 15114 Core Group and WG3 meeting. Tallinn, Estonia, November 2017.
T.9. Workshop in the European Parliament "Prevention of Healthcare associated infections in Europe", Brussels, Belgium, January 2018.
T.10. Seminar of the COST AMiCI Action 15114 "Antimicrobial Coatings Applied in Healthcare Settings – Implications for Cleaning Procedures", Ljubljana, Slovenia, March 2018.
T.11. Sciensano "Seminar for diagnosis and surveillance of infectious diseases 2018" Brussels, May, 2018.
T.12. Seminar of the COST AMiCI Action 15114 "Antimicrobial Coatings Applied in Healthcare Settings – Efficacy Testing" Berlin, Germany, June 2018.

Scientific meetings attended (6)

M.1. First AMICI Working Group meeting, COST action 15114, Heerlen, The Netherlands, 2016.
M.2. Training site forum meeting as cohort representative, Stockholm, Sweden, 2016.
M.3. EUPHEM site appraisal meeting and gave an oral presentation "EPIET program in WIV-ISP", Brussels, Belgium, 2017.
M.4. Participated in the EPIET site visit meeting", Brussels, Belgium, 2018.
M.5. Participated in the EUPHEM site visit meeting", Brussels, Belgium, 2018.
M.6. Participated in the foundation meeting of the European Study Group of Public Health Microbiology during ECCMID Madrid 22nd April 2018

Reviewer in peer reviewed journals (4)

J.1. Reviewed a paper for the "Scientific Journal of the Hellenic Companion Animal Veterinary Society" 2017.
J.2. Reviewed a paper for the "Archives of Public Health", 2017.
J.3. Reviewed a paper for the "International Dairy Journal", 2017.
J.4. Reviewed a paper for the "Archives of Public Health", 2018.

1. EPIET/EUPHEM modules attended

Md.1. Introductory Course, Spetses, Greece, 26 September - 14 October 2016
Md.2. EPIET outbreak investigation module, Berlin, Germany, 05 - 09 December 2016
Md.3. EPIET module on Multivariable Analysis, Zagreb, Croatia, 13 - 17 March 2017
Md.4. EPIET RAS module, Athens, Greece, 08 - 13 May 2016
Md.5. EPIET Project Review Module, Lisbon, Portugal, 28 August - 1 September 2017
Md.6. EPIET module on Time Series Analysis, Bristol, UK, 20 - 25 November 2017
Md.7. EPIET Vaccinology Module, Cardiff, UK, 11 - 15 June 2018
Md.8. EPIET Project Review Module, Lisbon, Portugal, 27 - 31 August 2018

Discussion

Supervisor's conclusions

During his two-year EPIET fellowship at Sciensano (formerly 'Scientific Institute of Public Health, WIV-ISP'), Theofilos Papadopoulos was involved in the daily activities of the unit of 'healthcare-associated infections and antimicrobial resistance' which is part of the 'epidemiology and public health' Scientific Direction. When starting his work at the department Theofilos had limited experiences in the field of epidemiology and public health including in working with datasets and data analysis software. However Theo benefited greatly from his fellowship and gained and improved his skills in this field. At Sciensano he conducted research on the health and economic impact of acute gastroenteritis in Belgium and surveillance on transmission of *Clostridium difficile* infection in Belgian hospitals and was involved in different training and communication assignments. He conducted also a surveillance of neonatal admissions for colonisation with multi-drug resistant bacteria in a neonatal care unit at Port au Prince, Haiti which was coordinated and supervised by Médecins Sans Frontières. His outbreak investigation assignment was conducted in Greece under supervision of the Hellenic Centre for Disease Control and Prevention in Athens. In reaching the EPIET fellowship's objectives Theo had to learn good project and time management. Theo was a nice and helpful team member eager to share his knowledge with colleagues. He achieved the EPIET fellowship requirements and developed personally and professionally throughout his fellowship.

Coordinator's conclusions

Theofilos Papadopoulos entered the Fellowship with some considerable experience of veterinary science and microbiology research, and specialist knowledge of zoonotic and food-borne infections. During his two-year Fellowship based at Sciensano (formerly 'Scientific Institute of Public Health, WIV-ISP'), Theo has successfully extended and built on his previous knowledge and skills to gain a good understanding of the role of field epidemiology in public health practice. During his Fellowship he has worked on a range of topics including healthcare associated infection and gastrointestinal disease and has learnt a range of skills, including the steps in outbreak investigation and techniques used in health economics. Theo contributed to training within his host institution and thus made an important contribution to capacity building. There was some disruption to Theo's Fellowship with a changeover of both primary site supervisor and scientific coordinator during the two years. However, Theo and his new supervisory team managed this organisational change well and did not let it interfere with his progress. Since taking over as Coordinator, I have enjoyed working with Theo and have found him to be personable, self-motivated and diligent. Feedback from the supervisory team is that Theo has made good progress and developed both personally and professionally as a result of his Fellowship. I wish Theo best wishes for his future career.

Personal conclusions of fellow

During the two-year EPIET Fellowship, I was placed in an excellent training site which provided me with learning opportunities and support in undertaking field assignments. Those helped me to broaden my knowledge of infectious disease epidemiology and to use recent developments to guide public health and epidemiological practice. Furthermore I had the opportunity to work in a professional environment and develop my competencies on time management and team working. EPIET has been a big professional and career leap for me regarding the fact of my previous professional and academic experience based mostly in Public Health Microbiology. I have learned many new skills through the modules, I had had opportunities to broaden my understanding of the epidemiology of a wider range of infectious diseases, and to lead on several projects. Besides all the learning-by-doing, I appreciated that I had the chance to further develop my network of public health professionals by attending the EPIET training modules, conferences and meetings. I would certainly recommend the two year EPIET fellowship to those public health epidemiologists willing to build up and develop competencies in communicable disease surveillance and response.

Acknowledgements of fellow

First I want to thank ECDC, the EPIET Selection committee and my former supervisor Marie-Laurence Lambert for giving me the opportunity to participate in the EPIET programme. Thanks to Els Duysburgh, Javiera Rebolledo and Amber Litzroth for supervision and Kostas Danis, Public Health France and Daniel Thomas, Public Health Wales, for being my coordinators and supporting me constantly. I appreciate the work of the other coordinators during the modules, during review process and conferences and say thanks to them all. I want to thank all my colleagues in NSIH and PHS-SCIENSANO and especially Boudewijn Catry and Herman Van Oyen for their support. Many thanks to the Hellenic Centre for Disease Control and Prevention in Greece for hosting me during the investigation of the *Salmonella* outbreak. I want also to thank my project supervisors Laure Mortgat, Annick Lenglet, Kassiani Mellou and Brecht Devleesschauwer for their supervision. I also want to include in my thanks the participants of different projects for their contribution. I would also like to thank my cohort 2017 EPIET/EUPHEM colleagues Sofieke Klamer and Lorenzo Subissi with whom I had the pleasure to work closely with in the last year of the fellowship. Thanks to the other EPIET/EUPHEM/EAP fellows in my cohort who made these two last years really great.

References

Publications

A.1. P. Papadopoulos, **T. Papadopoulos**, A. S. Angelidis, E. Boukouvala, A. Zdragas, A. Papa, C. Hadjichristodoulou, D. Sergelidis (2018) Prevalence of Staphylococcus aureus and of methicillin-resistant S. aureus (MRSA) along the production chain of dairy products in north-western Greece. ***Food Microbiology*** 2018 Feb;69:43-50. doi: 10.1016/j.fm.2017.07.016. Epub 2017 Jul 28.

A.2. **T. Papadopoulos**, P. Beutels, S Jaquinet, S. Klamer, A. Litzroth, Z. Moumouris, J. Rebolledo, B. Vaes, D. Van Cauteren, B. Catry, D. Thomas, B. Devleesschauwer (2018) The health and economic impact of acute gastroenteritis in Belgium, 2010–2014 ***Epidemiology and Infection*** (under review)

A.3. B. Catry, K. Mertens, K. Latour, B. Legiest, E. Duysburgh, T. Papadopoulos, E. Vandael, T. Struyf, L. Mortgat, N. Benhammadi, H. De Pauw, H. Van Oyen (2018) Care infections & antibiotic resistance in Belgium***.*** ***Epidemiol Public Health Rev*** 3(3): dx.doi.org/10.16966/2471-8211.165

A.4. P. Papadopoulos, **T. Papadopoulos**, A. S. Angelidis, C. Kotzamanidis, A. Zdragas, A. Papa, G. Filiousis, D. Sergelidis (2018) Prevalence, antimicrobial susceptibility and characterization of *Staphylococcus aureus* and methicillin-resistant *Staphylococcus aureus* isolated from dairy industries in north-central and north-eastern Greece. ***International Journal of food microbiology*** (under review).

A.5. P. Papadopoulos, **T. Papadopoulos**, A. S. Angelidis, C. Kotzamanidis, A. Zdragas, A. Papa, G. Filiousis, D. Sergelidis (2018) Isolation, antimicrobial resistance, enterotoxin genes, and biofilm production of methicillin-resistant *S. aureus* (MRSA) isolated from dairy farms in Northern Greece. ***Food control*** (under review)

A.6. L. Mortgat & **T. Papadopoulos**, E. Duysburgh, F. Neely, J. Van Broeck, M. Delmée, M.L. Lambert. (2018) Transmission of *Clostridium difficile* from symptomatic cases in Belgian hospitals, 2015-2016 (in preparation)

A.7. Mellou K., Mandilara G., **Papadopoulos T.**, Saranti-Papasaranti E., Trifinopoulou K., Georgakopoulou T., Vatopoulos A. (2018) Investigation of an outbreak of Salmonella Typhimurium 1,4 [5],12:i:- in Central Greece, August 2017 (in preparation)

A.8. **Papadopoulos T.**, Evens E., Senat-Delva R., Badjo C., Danis K., Lenglet A. "High rates of colonisation with ESBL (+) Gram negative bacteria in newly admitted neonates in a neonatal care unit, Port au Prince, Haiti" (in preparation)

A.9. Sakaridis I., **Papadopoulos T.**, Boukouvala E., Ekateriniadou L., Samouris G. and Zdragas A. "Prevalence, antimicrobial resistance and molecular typing of *Campylobacter* spp. in a Greek poultry slaughterhouse: Evidence of cross-contamination through the slaughtering procedure" ***Journal of Food Processing and Preservation*** (under review)

A.10. Kotzamanidis C., **Papadopoulos T.,** Vafeas G., Tsakos P., Giantzi V., Zdragas A. "Genetic characterization of *Listeria monocytogenes* isolates from encephalitis cases and the farm environment indicates persistence of virulent strains in small ruminants" ***Veterinary Microbiology*** (under review)

Reports

R.1. Catry B, **Papadopoulos T**, Valencia C, Uwineza A, Duysburgh E, Fonguh S, Ingenbleek A, Latour K, Lambert M-L, Legiest B, Mertens K, Jans B. (2017) Surveillance of Healthcare-Associated Infections Status Report of Belgian Data 2013-2015,NSIH report (SCIENSANO-Brussels).

R.2. **Papadopoulos T**. Lenglet A. (2017) Surveillance of neonatal admissions for colonisation with multi-drug resistant bacteria in a neonatal care unit, Port au Prince, Haiti. (MSF-Amsterdam)

R.3. **Papadopoulos T.**, Mellou K., Saranti-Papasaranti E., Mandilara G., Trifinopoulou K., Georgakopoulou T., Vatopoulos A. (2018) Investigation of an outbreak of Salmonella Typhimurium 1,4 [5],12:i:- in Central Greece, August 2017 [Hellenic Center for disease control and prevention (KEELPNO)- Athens]

R.4. **Papadopoulos T.**, Mortgat L., Lambert M-L. (2018) Transmission of CDI infections in Belgian Hospitals part 1: Ribotype study (SCIENSANO-Brussels)

R.5. B. Catry, K. Mertens, K. Latour, B. Legiest, E. Duysburgh, **T. Papadopoulos**, L. Ben Abdelhafidh, E. Vandael, T. Struyf, L. Mortgat, N. Benhammadi, H. De Pauw, S. Dequeker, H. V. Oyen. Zorginfecties & Antibioticumresistentie Activiteitenrapport 2017 (WIV-ISP-Brussels)

Conference presentations

P.1. Papadopoulos P., **Papadopoulos T.**, Zdragas A., Angelidis A., Sergelidis D. "Isolation and antimicrobial resistance of *Staphylococcus aureus* in the dairy production chain in Epirus region, Greece" 26th Pan-Hellenic Military Medical Congress, Thessaloniki, Greece, 2016.

P.2. Starras A., **Papadopoulos T.**, Filioussis G, Papadopoulos D., Xexaki A., Petridou E., Zdragas A., Arsenos G. "Isolation of multidrug-resistant Escherichia coli strains from healthy donkeys in Greece" in European Congress of Clinical Microbiology and Infectious Diseases (ECCMID), Copenhagen, Austria, 2017

P.3. **Papadopoulos T.**, Petridou E. "Salmonellosis in Greece under One Health approach", 4th Pan-Hellenic Congress of food Animals & Food Hygiene, Volos, Greece, 2017.

P.4. Papadopoulos P., **Papadopoulos T.**, Filiousis G., Zdragas A., Angelidis A., Papa A., Sergelidis D. "Prevalence and genetic characteristics of methicillin-resistant *Staphylococcus aureus* (MRSA) along the production chain of dairy products in Thrace Greece", 4th Pan-Hellenic Congress of food Animals & Food Hygiene, Volos, Greece, 2017.

P.5. Papadopoulos D., **Papadopoulos T**., Filiousis G., Petridou E., Sergelidis D., Kritas S.K., Trevisi P. "Antibiotic resistance of *Escherichia coli* strains isolated from healthy weaning and finishing pigs originated from 14 Greek farms", 4th Pan-Hellenic Congress of food Animals & Food Hygiene, Volos, Greece, 2017.

P.6. **Papadopoulos T.**, Neely F., Van Broeck J., Delmée M., Lambert M.L. "Transmission of *Clostridium difficile* from symptomatic cases in Belgian hospitals, 2015-2016" in European Scientific Conference on Applied Infectious Disease Epidemiology (ESCAIDE), Stockholm, Sweden, 2017.

P.7. Papadopoulos P., **Papadopoulos T.**, Angelidis A., Papa A., Zdragas A., Sergelidis D. "Prevalence and antimicrobial resistance of *Staphylococcus aureus* and MRSA along the production chain of dairy products in Northern Greece" in European Congress of Clinical Microbiology and Infectious Diseases (ECCMID), Madrid, Spain, 2018.

P.8. Papadopoulos P., **Papadopoulos T.**, Angelidis A., Filiousis G., Papa A., Zdragas A., Sergelidis D. "Isolation and genotyping of Methicillin-resistant *Staphylococcus aureus* (MRSA) along the production chain of dairy products in Macedonia, Greece" Joined 14th Pan-Hellenic Veterinary Congress and Annual Meeting of European College of Small Ruminant Health Management, Thessaloniki, Greece, 2018.

P.9. **Papadopoulos T.**, Evens E., Senat-Delva R., Badjo C., Danis K., Lenglet A. "High rates of colonisation with ESBL (+) Gram negative bacteria in newly admitted neonates in a neonatal care unit, Port au Prince, Haiti" in European Congress of Epidemiology (EUROEPI), Lyon, France, 2018.

P.10. **Papadopoulos T.**, Mellou K., Saranti-Papasaranti E., Mandilara G., Trifinopoulou K., Georgakopoulou T., Vatopoulos A."Use of a case-case comparison study for the investigation of an outbreak of *Salmonella* Typhimurium 1,4 [5],12:i:- in Central Greece, August 2017" in European Scientific Conference on Applied Infectious Disease Epidemiology (ESCAIDE), Saint Julian's, Malta,2018

Other presentations

P.11. **Papadopoulos T.**, Lambert M.L. "Transmission of *Clostridium difficile* from symptomatic cases in Belgian hospitals, 2015-2016", Tuesday seminars, WIV-ISP, Brussels, Belgium, 2017.

P.12. **Papadopoulos T**. "AMR in Europe: The view of the veterinary sector" Joint seminar of the COST AMiCI Action 15114 Core Group and WG3 meeting Tallinn, Estonia, 2017.

P.13. **Papadopoulos T.**, Neely F., Van Broeck J., Delmée M., Lambert M.L. " Transmission of *Clostridium difficile* from symptomatic cases in Belgian hospitals, 2015-2016 Part 1: Ribotype study", Tuesday seminars, WIV-ISP, Brussels, Belgium, 2017.