



FELLOWSHIP REPORT

Summary of work activities

Guilherme Duarte

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;

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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

Guilherme Duarte graduated as a medical doctor in 2012 and he is currently finishing his residency in the Public Health Specialization path in a local Public Health Unit (USP) of the Regional Health Administration of Lisbon and Tagus valley (ARS-LVT). Since the Ebola Outbreak in 2014 he consults with the Public Health Emergency Centre at the Directorate-General of Health in Lisbon, Ministry of Health of Portugal.

Fellowship assignment: Intervention Epidemiology path (EPIET)

On 14th September 2015, Guilherme Duarte started his EPIET fellowship at the Directorate-General of Health (DGS), Lisbon, Portugal at the department of Information and Analysis, headed by professor Paulo Nogueira and under the supervision of Dra. Paula Vasconcelos. His EPIET frontline coordinator was Dr. Christopher Williams. This report summarizes some of 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

Prepare, detect and respond for Zika virus in 2016

In the 2016 Zika virus (ZIKV) outbreak, Portugal faced special challenges due to its historical relationship with Latin America. Early detection of cases was particularly important in Madeira (RAM), due to the risk of autochthonous transmission; Madeira has both the vector (*Aedes aegypti*) and 0.5% of residents from affected countries.

A Task Force was constituted in the DGS with experts from different fields to address these challenges. Portugal's ZIKV surveillance uses data from clinicians and from the National Notifiable Disease system (SINAVE) as well as from the National Reference Laboratory (INSA). Before this outbreak ZIKV was notified as a hemorrhagic fever (together with other arboviruses) – during this time ZIKV was introduced as mandatory reporting disease at the SINAVE as an individual notifiable disease. ZIKV cases are classified as probable or confirmed, using the ECDC criteria. Pregnant

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

cases are offered monthly follow-up. Congenital anomalies are notified through an existing surveillance system for congenital malformations; neurological disease was not part but was being considered for ZIKV surveillance. Entomological surveillance is established since 2005 (RAM) and 2008 (continent) consisting of grid placement of ovitraps (larvae) and BG-traps (adult mosquitoes) supporting application of control measures. A constant communication channel for public and professionals was created and run in the form of direct e-mail. Existing telephone communication was reinforced to ensure alert information among clinicians, laboratory experts and public health officers.

To 21st April 2016, 295 samples were tested in INSA, of which 16 (5,4%) were confirmed. Most (15/16) were travel-associated with a single case of sexual transmission and 9/16 were non-nationals. No pregnant, or locally acquired cases were reported. Two of the cases reported were from RAM, one of sexual transmission. None of the ZIKV cases have been associated with neurological disorders. Reporting through the electronic system had a mean/median delay between symptoms, diagnosis and reporting of 19,8 days. Entomological survey in Madeira showed no signs of ZIKV infected mosquitoes.

In April 2016 more ZIKV cases were expected in following months prompting the need to improve already existing surveillance systems. By then, electronic notification delays were identified and it was raised the need to minimize them, in order to prevent infection of invasive mosquitos in Madeira, while promoting consistent sexual precautions and maintaining mosquito control. Neurologic surveillance was established.

On the end of 2016, by the lift of declaration of the PHEIC, an internal evaluation of the Zika electronic surveillance system was compiled, based on some of the seven attributes for evaluating surveillance systems.

Role and outputs:

Principal investigator and member of Zika's Task Force. Guilherme participated in running the surveillance system; he analysed the surveillance data creating weekly update reports with analysis of the Zika virus cases; helped establishing and reviewing the case definition and laboratory criteria for confirmation and reporting cases to international stakeholders including ECDC's Tessa. He provided the description of the surveillance system (historically and currently), met with stakeholders from National Reference Laboratory and from Autonomous Madeira Region. During this time, he also contributed to writing "frequently asked questions", information for public and technical guidelines for professionals and supported discussion of epidemiologic aspects that would support decision making for public health measures.

He co-authored the published National Strategy Plan for Prevention and Control of Vector-Borne diseases (1), the National Plan for Prevention and Control of Zika Virus Disease (2) and Technical Guidelines (3). He co-authored a submitted manuscript describing sexual transmission submitted for a peer-reviewed journal (4).

He authored an internal description of the surveillance system for ZIKV(5) and authored and submitted an abstract to ESCAIDE accepted for an oral presentation (6).

Supervisor(s): Paulo Nogueira; Marina Ramos; Isabel Falcão

Infofamília Survey - Evaluation of Food Safety and other health issues related to socioeconomic conditions in Portuguese households

Infofamília is a study coordinated by DGS within the National Priority Programme of Healthy Eating, with the objective of evaluating and monitoring the situation of Food Safety in the Portuguese population since 2011. This study in 2016 has been replicated and was based on the three surveys conducted before. It aims to reflect the purchasing power of households, changes in the patterns of food consumption and the health status of the population.

Lack of Food Safety (being Food safety considered as the capacity for purchasing, consuming, handling and having healthy eating habits) was diagnosed for the third consecutive year. This new survey included more variables in the instrument related to the identification of population groups at risk.

This study estimated a high percentage of families in situations of lack of Food Safety (50.7%). Comparing the results obtained in this study with the results of previous years, there was a tendency for a 0.6 percentage point increase in the prevalence (from 48.4 to 50.7%) between 2011 and 2013. The results also showed some regional asymmetries (families in the Algarve and Lisbon and the Tagus Valley in comparatively unfavourable situations) and, above all, disparities in household income Size of households, number of people contributing to income, professional situations and the level of education of individuals.

Role and outputs:

Co-investigator. Guilherme participated in the analysis of the annual questionnaire results and new available data interpretation, both descriptively and analysis of association between variables plus comparison of trends from previous years reports data. He co-authored the internal report (7).

Supervisor(s): Paulo Nogueira; Pedro Graça

Surveillance and Monitoring of MMR vaccination coverage in Amadora local health region

Measles is a mandatory notifiable disease in Portugal since 1987. Within the scope of the National Programme for Measles Elimination (PNES) any suspected measles case notified is investigated. Vaccination against measles is included in the national immunisation programme (Programa Nacional de Vacinação, PNV) since 1974 and is available for free.

National vaccine coverage with 1 and 2 doses of MMR has been $\geq 95\%$ since 2006. However, regional and local asymmetries exist, increasing the risk of having susceptible individuals. Even though the introduction of measles vaccination resulted in a steep decrease in the number of reported cases, epidemics occurred in 1987-89 and 1993-94; in 1998-2000 a vaccination campaign included around 400.000 susceptible individuals.

PNV is locally coordinated by Public Health Units (USP) which monitor and evaluate vaccination coverage. Primary health care nurses are the ones responsible to administrate the vaccinations and to make sure every individual gets the right vaccine at the right time. Local action is essential to manage vaccination asymmetries with the primary goal of preventing the occurrence of outbreaks and propagation of infection chains from imported cases.

In November 2016, the USP detected vaccination pockets of unvaccinated individuals in Amadora. Vaccination coverage in 5 of 9 primary health care units ranged from 78-94%, endangering herd immunity. We used an administrative method for monitoring vaccination coverage levels. In addition, we conducted an internal audit to primary health care units, calling unvaccinated children from chosen cohorts; we produced reports for internal use and for communication to stakeholders; we developed trainings for health professionals; and we evaluated vaccination coverage periodically.

In February 2017, a measles outbreak occurred in Portugal, after twelve years without endemic measles transmission. We investigated suspected cases in Amadora for measles but none was laboratory confirmed. After this, 3 primary healthcare units in Amadora improved its vaccination coverage.

Role and outputs:

Main investigator. Guilherme analysed surveillance data, conducted meetings with stakeholders, contributed to reports and presentations to stakeholders, reviewed surveillance protocols and legislation, updated once a week measles local database for vaccination coverage. Specific sessions on public health measures to reach an elimination target were performed at primary healthcare units and in Hospitals.

He authored several presentations, preliminary reports and the final internal report (8).

Supervisor(s): Etelvina Cale

Competencies developed:

Within the surveillance projects, I was able to gain competencies in the best use of surveillance systems - from theory to practice.

Working in Zika virus infection was a great challenge as we had to address surveillance for an emerging infectious disease without fully understood morbidity and risks, e.g. the process of creating a case definition and surveillance objectives. I was able to recognize the importance of matching disease needs of surveillance with system requirements. The vaccination coverage project allowed me to work in an important area of Public Health while facing reintroduction of measles - a disease previously considered eliminated, being another project where data was collected to guide action. Lastly, the Infofamilia project it was a great opportunity to use monitoring tools to perform a situational diagnosis in a public health area.

2. Outbreak investigations

Staphylococcus aureus enterotoxin outbreak in Lisbon, 2015: need for active enforcement of public health recommendations

On 15th December 2015, 30 schoolchildren presented to the emergency room of Amadora hospital with gastrointestinal symptoms. A common exposure to a community kitchen from a social program was identified; this facility had been previously inspected twice due to unsanitary conditions. The local Public Health Unit undertook an investigation into the source of disease.

We defined cases as anyone with vomiting, prostration or abdominal pain who ate lunch prepared by the kitchen on 15th December. We interviewed 350 people to explore potential exposures. Leftover food samples, vomitus from cases, and swabs from food handlers were sent to the reference laboratory and tested for foodborne pathogens. Environmental investigations were carried out for flaws in food preparation chains.

S. aureus enterotoxin was detected in samples from 4 patients, 1 food handler and 1 food item. The epidemic curve suggested a point source outbreak with contamination on 15th December; food was distributed from the common kitchen leading to approximately 600 people being exposed to the same meal. 226 children and 49 adults sought hospital care; 9% were admitted.

Flaws identified on previous kitchen visits persisted, including deficient food temperature control, hand hygiene, and improper handling of food utensils risking cross-contamination.

Epidemiological investigation, symptom and microbiological profile suggest an *S. aureus* toxin outbreak with a food handler source. Deficient kitchen processes and conditions were previously identified but not remediated, leading to contamination of food, bacterial growth and dissemination.

With proper legal support, Public health departments could avoid the hospitalization, human and economic costs of such outbreaks by using existing powers including temporary kitchen closures.

Role and outputs:

Main investigator. Guilherme lead the outbreak investigation, suggesting measures for control and prevention. He adapted the questionnaire using as baseline existing instruments at national level and the ECDC food-borne toolkit instrument for food-borne poisoning. He also developed data entry masks, performed data analyses and wrote the final internal report.

This epidemiological investigation contributed to evidence-base implementation of control measures, collaborating with food safety authorities.

He authored an internal report (9) and authored and submitted an abstract to ESCAIDE accepted for a poster presentation (10).

Supervisor(s): Etelvina Cale

GOARN Yellow Fever Outbreak in Angola, 2016

Yellow Fever is a viral haemorrhagic disease endemic in certain areas of Africa (thirty-four countries) and Central and South America (thirteen). On 21st January 2016, WHO received official notification through the International Health Regulations of a yellow fever outbreak in Angola. The disease transmitted in urban settings by the *Aedes aegypti* mosquito, spread rapidly in Luanda and was exported to the rest of the country. By early May, all Angola's provinces had reported suspected cases of yellow fever and one-third had confirmed local mosquito-borne transmission.

A GOARN mission request was sent to EPIET focal point and Portuguese MOH in June 2016, with the overall objective to contribute to the rapid control of the outbreak and prevention of further spread by breaking the cycle of transmission in the community and healthcare facilities. The mission lasted from 24th July – 21st August.

Upon arrival, data suggested a new phase in the outbreak. Since December 5th 2015, the total cases reported accounted for 3748, with 879 being confirmed cases. The number of deaths ascended to 364, with 119 deaths among confirmed cases. The number of suspected and confirmed cases continued to decline, with only sporadic confirmed cases being reported. In week 29 of the outbreak (16th -21st July) no confirmed case was positive for YF out of 66 cases reported and 47 samples tested. For the total duration of the mission, no YF case was confirmed.

Role and outputs:

Main activities and field experiences included active case finding, rumours chasing and confirmation, revision of hospital books for YF admission cases, stakeholder's sensitization (in both provinces of Luanda and Benguela); consultation for CDC on the follow-up KAP study to assess effectiveness of social mobilization efforts and encourage adult men to receive the YF vaccine; strengthening province preparedness, interview and sensitization of municipal teams on surveillance, vaccination, logistics, social mobilisation and vector control; visits to Health Units; support to Angolan FETPs in field epidemiology concepts including data presentation, data management and sampling techniques in the context of KAP study; training of health professionals regarding YF.

Guilherme authored an internal report with findings on preparedness of provincial teams (11), an internal report with findings and results of the mission (12) and authored and administered a training session in form of case-study (13).

Supervisor(s): Fernando da Silveira; Nazaré de Bastos

Competencies developed:

These experiences allowed me to apply epidemiological methods to the breadth of settings and situations in public health practice - including the operationalization of the 10-steps approach and the importance of defining and adjusting the case definition during the investigation. The importance of conducting analytical epidemiological investigation and recommending appropriate control measures in order to avoid health costs was evident in both cases; reporting and presenting sound scientifically evidence was an important lesson and used for legal implications by Food Safety Agency – at the same time it raised the relevance of lack of food safety measures.

In the GOARN Yellow Fever Mission I was exposed to an international organization and another health system with a different structure as in Angola, as well as public health and regulatory systems across national settings that I was not exposed before. These outbreak investigations activities allowed me to perform effectively on multiprofessional teams.

3. Applied epidemiology research

Mortality attributable to HBV and HCV infections in EU/EEA

Viral hepatitis is a leading cause of death in the world with estimated 1.46 million deaths, a comparable toll to that of HIV and TB. Approximately 98% of viral hepatitis deaths are due to late health outcomes of chronic hepatitis B (HBV) and hepatitis C (HCV) namely cirrhosis and hepatocellular carcinoma (HCC). WHO's first Global Health Sector Strategy (GHSS) aims at eliminating HBV and HCV as public health threat - defined as 65% reduction in mortality associated with HBV and HCV by 2030. A specific indicator for monitoring the progress was defined as "deaths attributable to HBV and HCV". This project aimed at exploring availability of data on mortality attributable to HBV, HCV for EU/EEA countries to access capacity to report on GHSS indicator on mortality; and aimed at estimating mortality attributable to HBV, HCV in EU/EEA using Core 10 indicator for the years 2010 – 2015.

We listed and compiled relevant regional and national data-sources reporting deaths from HCC, cirrhosis and chronic liver diseases (CLD). We identified and collated available estimates of the attributable fraction for HBV and HCV on mortality data. We analysed and critically appraised quality of data (by ICD10 codes specificity; timeliness and availability of attributable fraction (AF); by geographical coverage) dividing it into Tiers. We highlighted gaps and weaknesses in current data availability. Lastly, we aimed at estimating mortality due to Cirrhosis, HCC and CLD, attributable to HBV and HCV, for each European Country, in the past 5 years.

We found data on mortality from ICD10 codes to be available for all 31 countries; accuracy varies but 60% of national data sources were capable of reporting the causes of death with level of detail required by WHO indicator. AF estimates are available for 12 countries (approx. 40%); no AF estimates available for CLD. For the proposed time-frame (2010 – 2015) most countries have data on mortality.

The regional and global sources are outdated and obsolete for monitoring the proposed indicator, but national sources should be capable of reporting mortality data. Sources for AF are sparse, outdated, and much needed to estimate precisely the proposed indicator. We recommend improvement of vital registration allowing measurement of this indicator and recognize studies on attributable fractions of HBV and HCV on a national and regional area are much needed and crucial to measure this indicator. The regional/global sources need updating and investment if they are to monitor the proposed indicator.

Role and outputs:

Main investigator. Guilherme wrote the protocol, collected and analysed data and a manuscript is at an advanced stage of preparation for a peer-reviewed journal (14). He also presented the study findings at an international conference (15).

Supervisor(s): *Otilia Mardh; Erica Duffel ; Paula Vasconcelos*

Recent changes in testing practices and association with the early diagnosis of human immunodeficiency virus infection, Lisbon 2015

HIV infection remains a major threat to social and economic development of populations, even in developed countries. With the emergence and spread of antiretroviral therapy, infection with the virus has ceased to be an announced death sentence to acquire characteristics of chronic treatable disease allowing patients to live long and healthy years of life and years of life.

The major priorities in the fight against the virus today are to diagnose all cases, to provide the treatment as soon as possible and to avoid transmission by keeping serological levels of the virus reduced in the carriers. Portugal fits its strategy into the international strategy. This ecological study sought to understand if the effort in the diagnosis of HIV has been translated by a real increase of prescription tests in the region of Lisbon and Vale do Tejo between 2010 and 2015, as well as the effect of Clinical Guideline no. 58/2011 applied in 2012. It was sought to understand if there was an association between the variation of testing and the number of late- stage HIV diagnoses. A Generalized Estimated Equations regression model was used to adjust sociodemographic characteristics. The effect of the norm was statistically significant with an average increase of 7 in every thousand tests in the period before and after the norm when adjusted for sociodemographic factors studied.

Role and outputs:

Main investigator. Guilherme wrote the protocol (16), collected and analysed data and a final report is at an advanced stage of preparation for his master's thesis defence. authored and submitted an abstract accepted for an oral presentation (10) in a National Meeting of PH Residents.

Supervisor(s): *Paulo Nogueira*

Competencies developed:

The applied epidemiology research allowed me to be involved and study transmittable diseases from the academic point of view, understanding the needs of advancing science while translating the knowledge to the field and mastering research skills.

4. Communication

Manuscripts submitted to peer reviewed journals (in review process)

One manuscript submitted to a peer-reviewed journal (4) and one manuscript in preparation for submission (14).

Conference presentations

One oral presentation (6) and one poster presentation (10) at ESCAIDE 2016 in Stockholm; one oral presentation (15) at the 4th meeting of the ECDC hepatitis B and C network, hosted in EMCDDA Lisbon.

Other presentations

One oral presentation (17) at the 1st meeting of Public Health Doctors, hosted in ISPUP Porto.

Co-authored one oral presentation (18) at the opening session of the DGS Emergency Operation Centre, hosted at DGS in Lisbon.

Reports

One outbreak report (10), two surveillance reports (2,9) and one report for research project (16).

Other

Moderator of the session: "Emerging viruses" at 19th Annual Meeting of the European Society for Clinical Virology, in Lisbon, 14th-19th September 2016.

Three internal reports for surveillance and research studies (5, 7, 8), three outbreak internal reports (9, 11, 12) and co-author of two published national documents (1, 2).

5. Teaching activities

Epidemiology course for Nursing Graduate Students

Guilherme took previously designed training, redesigned and reviewed some of the material, prepared new material and conducted some of the teaching along with other resident lecturers. This was split over 4 months, 2-hour duration classes divided in 9 lectures plus 7 seminars. This course was evaluated formally and informally.

Supervisor(s): Paulo Nogueira; Andreia Silva

Epidemiological surveillance and notifiable diseases update training for Medical Doctors in Local Health Center

Guilherme designed, prepared and conducted a 2-hour session training for notifying medical doctors from the Health Region. The session was divided in a theoretical presentation and practical exercise including online demonstration of the notifying system. This training session was evaluated formally through a pre- and post- test and informally.

Supervisor(s): Etelvina Cale

Angola Case Study Yellow Fever

Guilherme facilitated a case study for medical doctors at the Hospital of Benguela, Angola as part of the WHO Yellow Fever response. The case study was created based on teaching-objectives previously diagnosed. This case study and facilitation was evaluated informally.

Supervisor(s): Fernando da Silveira

Educational outcome:

During this fellowship, I had the opportunity to teach to different professionals and through the teaching activities I have learnt the importance of selecting, and how to select communication strategies for different audiences and public and to adapt the objectives and prepared learning material to communicate audience-appropriate public health content.

6. Other activities

International Assignment: Yellow Fever Outbreak in Angola, 2016

(see outbreak and teaching sections)

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

Delivered the questionnaire and interviews (with translator) to Afghan refugees, on study – Assessment of Needs in a Greek Refugees Camp.

Additional training or meetings attended

1. UN Basic and Advanced Security in the field E-learning
2. ESCMID – Re-emerging Arbovirus Infections – Thessaloniki, Greece (7th-9th March 2016)
3. ISPUP/ARS Norte - Seminar "Health in Migrants" – Porto, Portugal (22nd April 2016)
4. ARS Norte / CMISP - Elaboration of protocols and reports in Public Health (29th June – 1st July 2016)
5. ARS Norte / CMISP – Auditing and Evaluation programmes in Public Health (28th-30th September 2016)
6. ARS Norte / CMISP – International Health Regulation and Travel Medicine (26th-30th June 2017)

Routine surveillance activities

During the fellowship Guilherme continued to contribute to the routine surveillance, validation of cases and case investigation of regularly reported diseases but also from recent outbreaks (e.g. hepatitis A ; Measles, TB, Syphilis...).

DGS round table "RONDA"

Regular participation in RONDA - DGS weekly meeting concerning news, alarms and information on new and current outbreaks and public health threats.

Opening of DGS Emergency Operation Centre

One oral presentation (18) for the Portuguese Minister of Health, WHO and ECDC representatives in formal opening of new PH EOC - hosted at DGS in Lisbon.

Evaluation of the IHR implementation at national Points of Entry

Guilherme participated in the evaluation of IHR compliance by assessing the ability of existing national structures, capacities and resources to meet minimum requirements for public health surveillance and response. Evaluation visits to Ports of Portimão, Aveiro and Figueira da Foz. Evaluation visit to Faro Airport.

Organizing committee National Meeting of Public Health Doctors

Guilherme organized the 2016 yearly national meeting of Public Health Doctors – where two Epidemiological workshops were included, chaired by two *EPIET family members*: Outbreak investigation (Paula Vasconcelos) and Mass Gathering Events (Ricardo Mexia).

Updating of Portuguese EPIET Guide

Updated the host site guide for EPIET Alumni website.

7. EPIET/EUPHEM modules attended

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

Supervisor's conclusions

Guilherme was a first fellow within the MS-track of EPIET in Portugal. It was a learning process, for both fellow and hosting side. Guilherme had to learn to manage both demands from the residency and the fellowship. The hosting site had to learn how better to interact with residency supervision and fellowship coordination to facilitate such demanding situation. Guilherme shown a great capacity to adopt to the challenges of such doubling training settings; when support was identified he was able to very fast to apply, on the best way, the guidance provide; he was able to cope with deadlines on both trainings and he shown very good skills to focus on essential aspects of the work he developed. He has a great sense of public health and had shown that in all initiatives he was engaged with. We are

sure he's able to best use the knowledge and skills achieved with the EPIET fellowship. We are certain that within his complementary competencies of public health and field epidemiology he can contribute for the any outbreak and public health interventions, being that local, regional, national or international level.

Coordinator's conclusions

Guilherme has shown himself to be a committed public health professional, through his EPIET work at the DGS and local public health responsibilities.

He has shown good evidence of learning and development during his two years and has some good outputs, including the presentations on European data on measuring the burden of hepatitis, and the surveillance in place for Zika virus in Portugal. Guilherme has worked to overcome difficulties in finding time and projects for his fellowship in order to meet the EPIET programme requirements.

It has been a great pleasure to work with Guilherme, and I expect him to make a good contribution to public health in Portugal and the wider EU in the future.

Personal conclusions of fellow

The fellowship brought me intense periods of personal and professional growth, incisively shaping my thoughts and perception on Public Health while setting solid methodologies and tools in Epidemiology. In addition to the innate acquired skills and competencies, the Program was a pinpoint in the development of soft skills. Professionally, it was a very enriching defining experience that allowed me to work with different and accomplished professionals, live different scenarios and practices otherwise distant while absorbing relevant knowledge on Health Systems, both at European and at the global level.

I am grateful for every piece of work and projects that I have been involved on and the mentors and colleagues involved. The fellowship allowed me to leave my comfort zone countless times, with a special remark for missions and international projects. I am truly certain that this fellowship will impact my professional future whilst providing me with the feeling of already making a small contribution to Public Health.

Acknowledgements

I would like to acknowledge my EPIET coordinator, Christopher Williams, for his tireless supervision and feedback and for going the extra mile to provide me guidance during my fellowship. His support was paramount for the completion of the program and I highly benefited from his expertise and skills.

I would like to acknowledge my local coordinator Dr Paula Vasconcelos to whom I am immensely grateful for her supervision, kindness and support, as well as guidance. I would like to thank Dr Paulo Nogueira for the encouragement needed at times and for all the effort towards finding projects and opportunities. I would like to acknowledge Dr Rui Portugal for his modern and ambitious vision of the Public Health residency in Portugal that allowed me to get involved with the fellowship.

I would like to thank everyone at DGS with a special note for both departments (CESP and Analysis and Information) where I have worked, as well as to everyone at the Amadora Local Public Health Unit.

I would like to personally thank Dr Etelvina Cale, Dr Eugenio Cordeiro, Dr Cristina Santos, Dr Rita Sá Machado for their punctual but important contribution for this fellowship. One way or another, they were important and I learnt a great deal from these professionals and working alongside them.

Lastly, I would like to acknowledge all the public health professionals with whom I have crossed paths, including and specially all EPIET family members.

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