



FELLOWSHIP REPORT

Summary of work activities

Flavia Riccardo

Intervention Epidemiology path (EPIET)

Cohort 2014

Background

The ECDC Fellowship Training Programme includes two distinct curricular pathways: Intervention Epidemiology Training (EPIET) and Public Health Microbiology Training (EUPHEM). After the two-year training EPIET and EUPHEM graduates are considered experts in applying epidemiological or microbiological methods to provide evidence to guide public health interventions for communicable disease prevention and control.

Both curriculum paths are part of the ECDC fellowship programme that provides competency based training and practical experience using the 'learning by doing' approach in acknowledged training sites across the European Union (EU) and European Economic Area (EEA) Member States.

Intervention Epidemiology path (EPIET)

Field epidemiology aims to apply epidemiologic methods in day to day public health field conditions in order to generate new knowledge and scientific evidence for public health decision making. The context is often complex and difficult to control, which challenges study design and interpretation of study results. However, often in Public Health we lack the opportunity to perform controlled trials and we are faced with the need to design observational studies as best as we can. Field epidemiologists use epidemiology as a tool to design, evaluate or improve interventions to protect the health of a population.

The European Programme for Intervention Epidemiology Training (EPIET) was created in 1995. Its purpose is to create a network of highly trained field epidemiologists in the European Union, thereby strengthening the public health epidemiology workforce at Member State and EU/EEA level. Current EPIET alumni are providing expertise in response activities and strengthening capacity for communicable disease surveillance and control inside and beyond the EU. In 2006 EPIET was integrated into the core activities of ECDC.

The objectives of the ECDC Fellowship - EPIET path are:

- To strengthen the surveillance of infectious diseases and other public health issues in Member States and at EU level;
- To develop response capacity for effective field investigation and control at national and community level to meet public health threats;

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This portfolio does not represent a diploma. Fellows receive a certificate acknowledging the 2-year training and listing the theoretical modules attended. Additionally, if all training objectives have been met, they receive a diploma.

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- To develop a European network of public health epidemiologists who use standard methods and share common objectives;
- To contribute to the development of the community network for the surveillance and control of communicable diseases.

Fellows develop core competencies in field epidemiology mainly through project or activity work, but also partly through participation in training modules. Outputs are presented in accordance with the EPIET competency domains, as set out in the EPIET scientific guide¹.

Pre-fellowship short biography

Dr Riccardo is an Italian medical doctor with a 4-year specialization in Infectious Diseases. Her education includes also a PhD in Infectious Diseases and basic post graduate training in field epidemiology and public health. Prior to EPIET, between 2004 and 2009, Flavia worked for humanitarian agencies (NGOs, Red Cross, UN) both in conflict and development settings in Africa, Asia and the Middle East. Since 2009 she has worked in Rome, Italy, in the Communicable Disease Epidemiology Unit of the National Centre for Epidemiology, Surveillance and Health Promotion, in Istituto Superiore di Sanità. Her main interests are infectious disease epidemiology, event based surveillance, migrant health, IHR implementation and cross border preparedness.

Fellowship assignment: Intervention Epidemiology path (EPIET)

On 1.10.2014, Flavia Riccardo started her EPIET fellowship at the Communicable Disease Epidemiology Unit, in the National Centre for Epidemiology, Surveillance and Health Promotion, in Istituto Superiore di Sanità, Rome, Italy. Her supervisors were Paolo D'Ancona and Silvia Declich.

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

Title: *Set-up, implementation and evaluation of an Event Based Surveillance Component within an Epidemic Intelligence Early Warning System for Infectious diseases during the EXPO 2015 mass gathering (May-October 2015, Milan Italy)*

- Mass gatherings can increase the risk of communicable disease spread. Event Based Surveillance (EBS) Systems using Digital Disease Detection Technology can complement traditional indicator based surveillance for early warning purposes.
- This was the first time EBS was implemented at a national level in Italy, for a protracted time and with regional focal points with a validation role. It was also the first time such a system was used to monitor a large protracted mass gathering in Italy and the first time it was evaluated. Finally it was the first time a training programme ahead of the system implementation was set up and implemented.

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

- The project proved that implementing a national EBS system can be sustainable in Italy for a protracted time. The evaluation showed that system performed well and was found simple, acceptable and useful. The system demonstrated an added-value mainly in contexts of non-enhanced surveillance. These findings can guide future implementation of EBS in Italy.

Role and outputs: *Team leader*

- *Designed and extensively contributed to the rapid Risk Assessment, with the support of disease experts in the unit, to guide the Event Based surveillance development,*
- *Interacted with national and regional authorities, designed and coordinated the analyst trainings in Milan, with the JRC IT system developers in Ispra, and coordinated the analyst team in Rome regarding duty rotations, roundtable meetings and presentation of results,*
- *Was the first author of a published paper on the system implementation and results [1].*
- *Presented a poster on the RRA at the ESCAIDE 2015 conference [9].*
- *Designed and coordinated the evaluation of the surveillance system.*

Supervisor(s): *Silvia Declich*

Competencies developed:

- *It was the first time for me to be a team leader tasked of setting up ex novo such a system. I had experience as an EBS analyst, but not as project manager and team leader in this area. This was therefore a great learning opportunity, also considering that we were working under a notable pressure to set up everything in time for the EXPO mass gathering. This was the first time a full EBS implementation was rolled out in Italy and results were highly valued by national and regional health authorities.*
- *I also learned how to set up an interactive hands-on training for EBS analysis (I developed ad hoc training modules for this activity, reported in Section 5, collaborating with the Rome analyst team).*
- *Among EPIET Modules, the Time Series Analysis module was particularly useful because I analysed EBS data trends and periodicity using TSA with one of our analyst team members. This analysis was published in a peer review, open access journal. I had never analysed data using TSA before (Publication 1 in section 4. Communication).*
- *Finally, I led the design and implementation of the system evaluation. This was particularly stimulating because it is a very novel area with little existing scientific experience. Aside future publication, this study will provide useful input to authorities shaping how EBS might be in future implemented in Italy.*

2. Outbreak investigations

Title: *Outbreak of measles linked to a dog show in Slovenia, 8–9 November 2014*

- An outbreak of measles was reported in November 2014 from Slovenia linked to an international dog show held in Vrtjoba/Sempeter from 8 to 9 November 2014, involving 44 cases. There was strong epidemiological evidence that the audience and exhibitors at this event were exposed to a contagious measles case. It is possible that some of the international visitors may have become infected and later developed measles in their respective countries of residence.
- An epidemiological investigation was conducted in Italy. The investigation collected epidemiological and laboratory evidence suggesting spread of measles in four regions in Italy linked to the international dog show in Slovenia.
- Health authorities should raise awareness of the risk of measles outbreaks among participants of large public gatherings and promote vaccination.

Role and outputs: *Co-investigator.*

- *Contributed in constructing a questionnaire, developing a dissemination list, collecting the completed questionnaires, creating a database, data cleaning and analysis.*
- *Under supervision analysed the outbreak data.*
- *Presented orally the findings of the investigation at the ESCAIDE 2015 conference [8].*
- *Contributed to the publication of a letter to the editor of Euro surveillance [2].*

Supervisor(s): *Dr. Antonietta Filia, Dr. Antonino Bella*

Competencies developed:

- *This was a new topic for me, because it is a vaccine preventable disease, because it is an elimination target disease, and because the activity took place in the context of an outbreak. The fact that it was a cross-border spread following a mass gathering made it particularly interesting for me. Therefore all the activities I described were extremely useful and developed competencies I did not have.*
- *Presenting on a topic that I had never worked on before during ESCAIDE was challenging and instructive.*
- *Finally, I had the opportunity to interact with colleagues in the institute I had never worked with and this strengthened links and the possibility of future collaborations.*

3. Applied epidemiology research

Title: *MediLabSecure Project*

- A One Health Approach integrating human, entomological and animal surveillance for arboviral diseases is being promoted as a tool to increase early warning capacity and ultimately reduce the impact of outbreaks. However how this integration can occur, be described and how countries are managing to integrate these different sectors is not well known. The MediLabSecure Project is a DG DEVCO funded initiative that focuses on the creation of a network of human, animal and entomological laboratories in the Mediterranean, South-East Europe and Black Sea Region with competence on arboviroses (<http://www.medilabsecure.com/>). The Istituto Superiore di Sanità, is leader of a "Public Health" Work package that is tasked of assessing the level of integration between the animal virology, human virology and medical entomology entities and the central national surveillance system in Countries of the Mediterranean and Black Sea Region. The project will end in 2017. The fellow will continue working on this project also after the end of the fellowship.
- Through a scoping review and a survey among 19 non EU countries of the Mediterranean, South-East Europe and Black Sea Region, a framework to describe integrated surveillance was designed and tested. Among 3 countries reporting high integration levels, situation analysis studies are being performed.
- This work is documenting ways of integrating surveillance systems and the added value of this approach at national level. This evidence can support current scientific discussions on the value of adopting a One Health Approach to surveillance in the framework of international regulations (e.g. the IHR).

Role and outputs: *co-investigator.*

- *Wrote the literature review protocol and the surveillance integration framework used for the design of the survey.*
- *Wrote the draft MediLabSecure Situation Analysis (MeSA) Study protocol that was completed under the guidance of the project supervisors and participated in the MeSA study teams as co-investigator (including during a site visit in Serbia in 2016)*
- *In the context of the MediLabSecure Mid Term Meeting & Technical Workshop on Public Health that was held in Paris on the 15-17th of December 2015, contributed in the preparation of presentations on the activities conducted and the trainee and facilitators' material for the implementation of an exercise on risk assessment and integrated surveillance for West Nile Virus (WNV). During the exercise, with the project supervisor, oversaw the working groups, supported the exercise facilitators and collected the training outputs.*
- *As described in section 4, under "other presentations", presented the project and the Italian experience on WNV integrated surveillance during a workshop in Tunisia and during a WHO EURO IHR training in Austria.*
- *Contributed in the screening of literature for the review and collaborated in the publication of a paper on the project's initial findings [3].*

Supervisor(s): *Silvia Declich, Maria Grazia Dente*

Title: *PERPHECT: Developing tools for assisting EU Member States and other relevant stakeholders in enhancing preparedness for infectious disease control during situations of sudden influxes of migrants*

- The increasing number of people entering the EU as asylum seekers and irregular migrants has challenged public health authorities to provide relevant, proportionate and appropriately targeted action. International Organizations including Doctors without borders (MSF) in 2010 and more recently the International Organization for Migration (IOM) through the EquiHealth Project and the World Health Organization (WHO) through the PHAME project have conducted situational analysis studies in migrant reception/detention centres in several European countries in an effort to document the quality and appropriateness of response of health systems to large unexpected influxes of migrants. At the same time ECDC has produced an extensive number of reports analysing the risk of infectious disease introduction/spread in the context of this migration crisis. The available evidence points firstly to the fact that migrant reception facilities in many European Union (EU) Member States have the potential to be overwhelmed with much higher numbers of migrants than the sites were originally designed for. Secondly it highlights that, although migrants entering Europe tend to be in relatively good health, crowded living situations can favour communicable disease spread.
- In order to support European Union Member State preparedness in migrant hosting sites, ECDC commissioned to the Istituto Superiore di Sanità the development of a two tools: one aimed at establishing a quick and flexible evidence-based approach for the assessment of reception/detention centre needs for infectious disease (ID) control also during sudden influxes of migrants, one to assist public health authorities in developing syndromic surveillance protocols aimed to complement routine surveillance and assist in detecting events (such as large outbreaks or single cases of very severe conditions) that could potentially flag a public health emergency in migrant hosting sites.
- These tools can respectively strengthen preparedness to early detection and better management of outbreaks in migrant holding sites, also during large sudden influxes of migrants.

Role and outputs: *Principal investigator for the development of the first tool, co-investigator for the development of the second tool*

- *Wrote the protocol of the scoping review and performed the study drawing recommendations for the development of the assessment tool.*
- *An oral presentation, of which the fellow is first author, on the scoping review was accepted at ESCAIDE 2016 [10].*
- *Developed the assessment tool including the set of indicators and the excel interface and revised it on the basis of ECDC comments and suggestions. The latter with the support of the Unit statistician [4].*
- *Supported the development of the syndromic surveillance tool with colleagues in the unit by contributing to the definitions of the syndromes, to the analysis and threshold definition methods proposed and to the drafting and editing of the text during the ECDC clearance process [5].*

Supervisor(s): *Silvia Declich*

Title: *EURO-MoMiH (Monitoring Migrant Health): towards a conceptual framework for improving the monitoring of migrant health and infectious diseases in the EU/EEA*

- Monitoring migrant health and infectious diseases in the EU/EEA is a matter of growing importance particularly in the present context of enhanced migration. There is controversy in literature on the role migration could play in the introduction or burden of infectious diseases in the EU, and this underlying uncertainty increases the sensitivity of this topic. The current limitations in our capacity to interpret point estimates and trends of infectious diseases occurring among diverse migrant populations living in the EU/EEA are an important aspect driving this uncertainty.
- This ECDC funded project focussed on the design of a data collection framework to capture information on factors associated with increased risk of ID in migrant populations in the EU/EEA. The framework was tested by performing a systematic literature review in order to identify whether its factors well reflected the reported risks factors for infectious disease in these populations. The fellow then assessed the feasibility of applying this framework to relevant available EU/EEA data sources.
- This was, as per the fellow's knowledge, the first time such an exercise on TeSSy data potentiality to monitor migrant health and possible stratification strategies was conducted. This study could serve as an information

basis in future discussion on how to optimize TESSy variables in the framework of monitoring migrant health and ID in the EU/EEA.

Role and outputs: *Principal investigator for the described activities*

- *Wrote the protocol of the scoping review and performed the study drawing recommendations for the development of the framework described.*
- *Prepared the project report*
- *Was the first author of a published paper on the framework developed [6].*
- *Was first author of a letter to the Editor on experience acquired through this project on the theme "monitoring migrant health"[7].*
- *Co-authored two papers in which Italian current data are being used to analyse, stratifying, migrant health related outcomes as suggested in the framework designed for this project (Manuscripts submitted to peer reviewed journals - in review process) [8,9].*

Supervisor(s): *Silvia Declich*

Competencies developed:

- *These research projects all pushed me to develop ad hoc studies to meet the framed objectives. This was a very instructive process and exposed me to the design of literature reviews, surveys and qualitative studies.*
- *During the EURO-MoMiH and the PERPHECT projects I was also put in the position to implement studies in a very independent way.*
- *In addition I was involved in designing a Risk Assessment exercise for participants of a large meeting involving 19 countries. This was a new, challenging and exciting experience.*
- *Finally, these projects led to presenting results in very different settings (in one case in French), which again was instructive and led to interacting with different ECDC and WHO experts, which was enriching.*

4. Communication

Provide a list of publications, unpublished and published manuscripts, reports, book chapters, and conference presentations in Vancouver style.

Publications in peer reviewed journals

Five articles were published in peer reviewed journals during the fellowship. Three publications as first author [1,6,7] two publications as co-author [2,3].

Manuscripts submitted to peer reviewed journals (in review process)

Two articles have been submitted and are currently under review. In both I am a co-author [8-9].

Conference presentations

The fellow presented three abstracts, two as oral presentations and one as a poster presentation, to ESCAIDE in 2015 and 2016 [10-12].

Other presentations

1. In the context of the MediLabSecure project the fellow participated to three work package leader meetings (one in Paris and two in Rome). The fellow contributed in the organization of the meetings in Rome and for all meetings presented the status of ongoing activities in relation to WP5.
2. The fellow presented the WNV surveillance multisectorial integration in Italy and the activities of the WP5 of the MediLabSecure project Tunis on February 10th 2016 (in French). The fellow also arranged a meeting the following day with the Public Health Focal Point of the MediLabSecure Project when she presented more in detail the MeSA Study and explored Tunisia's interest in participating. Following this meeting, Tunisia accepted to participate in the study.

3. On the 18th of March 2016, the fellow presented the Medilabsecure project and the WNV surveillance multisectorial integration in Italy in the context of facilitating the entire session on One Health of the WHO EURO IHR Forum, a week long training workshop held in Austria.

Reports

1. Five technical project reports in Italian to document activity progress for the mentioned surveillance project
2. Contributed to the MediLabSecure mid-term project report finalization
3. Developed the EURO-MoMiH (Monitoring Migrant Health) project report for the aspects described in this portfolio
4. Developed the PERPHECT assessment tool - scoping review report

Other

1. Consulted as a national expert for the ECDC "Expert Opinion on the public health needs of irregular migrants, refugees or asylum seekers across the EU's southern and south-eastern borders", September 2015 available at <http://ecdc.europa.eu/en/publications/Publications/Expert-opinion-irregular-migrants-public-health-needs-Sept-2015.pdf>

5. Teaching activities

Title: *Module on infectious diseases in the context of the annual course "Health Systems through Conflict and Recovery - HSCR" held in the Scuola Superiore Sant'Anna (Pisa, Italy)*

- Was involved in developing the training plan and the training materials for a one day module in the context of an existing mid-career international training. The training objectives were:
 - To present theory and examples on the effect of protracted crises on ID transmission in countries;
 - To present theory and examples on how major outbreaks can destabilize fragile health care systems;
 - To present theory and examples of infectious disease control programmes in insecure/unstable contexts discussing challenges and solutions experimented in the field;
 - To present through real-life examples and an exercise the issues faced when assessing limited and patchy data with the aim of identifying distortions in healthcare provision in order to set up a health system reform process;
 - To present and discuss current literature on ID related to health system analysis in insecure/unstable settings.
- The training methods used included prezi presentations and interactive exercises.
- Target audience: Mid-career professionals for various fields working for international humanitarian organizations (NGOs, Red Cross, World Bank, Global Fund etc.) in conflict settings in the field of health.
- The module was held in the S. Anna Superior School in Pisa, which is a highly renowned university level training institution.
- The first module was held on the 17th of April 2015 and evaluated as very successful. The fellow was therefore invited by the course organizers to update it, conduct it again, and support the course facilitation on the 7-8 April 2016. She did so successfully.

Supervisor(s): *Enrico Pavignani (HSCR course coordinator)*

Title: *Training in the context of the establishment of an event based surveillance system during the EXPO Milan mass gathering event.*

- This training was linked to the implementation of the surveillance project. Between 9-11 March 2015 the fellow, supported by two ISS-CNESPS trainers and two JRC developers, conducted a practical hands on training in Milan for 12 doctors (Infectious disease and public health specialists) who worked as analysts and analyst supervisors for the Lombardia Region during the monitoring of the EXPO mass gathering. On the 30th of March 2015 and on the 9th of April 2015, the fellow participated as trainer and facilitator in two

Lombardia regional workshops targeting local health officials who were tasked of validating events identified during EBS monitoring.

- Training objectives: to present the methodology and tools of Event Based Surveillance using Digital Disease Detection; to train analysts in monitoring, selecting and assessing events; to train validators on the nature of the information they would receive and on how to validate it, to simulate respectively the analyst and validator tasks through hands on and simulation exercises.
- The first training targeted medical doctors that would act as EBS analysts during EXPO in Lombardia. The following two workshops targeted local health authorities who would be asked to validate events detected through EBS, also in Lombardia.
- The training was successful and also allowed to test the operating procedures with the local health officials, collect feedback and work on the adjustments needed to the system ahead of the beginning of the EBS EXPO surveillance.

Supervisor(s): *Silvia Declich*

Educational outcome:

- *The Pisa training was very stimulating because of the high competence and experience of the organizers, trainers and participants. In particular I:*
 - *Dedicated quite an amount of time in documenting thoroughly the presentations and the exercise. This was highly instructive.*
 - *By using Ebola as an example for analysis during the group work in 2016, learned a lot from people who had worked in different countries in West Africa and for different organizations (military, humanitarian etc.) during the outbreak.*
- *Concerning the EXPO related training, I learned how to set up an interactive hands-on training for EBS analysis in Italian. The trained team successfully implemented EBS during EXPO. This training package is now available and could be more widely implemented in the future.*

6. Other activities

Contributed to the survey in Elliniko Camp (Greece) as interviewer, June 2016.

7. EPIET/EUPHEM modules attended

1. *INTRO Course, 29 Sept. 17 Oct. 2014, Spetses, Greece*
2. *Outbreak Investigation module, 8-12 Dec. 2014, Berlin, Germany*
3. *Multi Variable Analysis module, 23-27 March 2015, Vienna, Austria*
4. *Project Review module, 24-28 August 2015, Lisbon, Portugal*
5. *Time Series Analysis module, 23-27 Nov. 2015, Bilthoven, Netherlands*
6. *Vaccinology module, 16-20 May 2016, Paris, France*
7. *Rapid Assessment and Survey methods module, 20-25 June 2016, Athens, Greece*
8. *Project Review module, 22-26 August 2016, Lisbon, Portugal*

Supervisor's conclusions (Silvia Declich)

Reflection about Flavia: she is a rich, variegated, and an always surprising researcher

Reflection about Flavia performance: she has been very dedicated and hard worker. She grew in her field epidemiology competencies, but also in the interaction with Unit colleagues, national and regional authorities and ECDC and WHO officers. She became more autonomous in conducting and leading studies, researches, trainings and in coordinating staff teams.

Reflection about the added value for the site by engaging in training Flavia as a fellow:

1. all the activities she has been involved has been finalized and documented with high level reports and disseminated through presentation and peer-reviewed articles
2. the EBS surveillance activity is very new in Italy: she prepared a training package, methods and tools that have been very much appreciated by the Italian Ministry of Health and will be used further in the Italian context
3. the handbook and framework she developed for Perphect and MoMih research projects are of high value and will be used at European level
4. Medilabsecure Situation Analysis (MESA) protocols will be used to document the integration of surveillances in the framework of One Health

Coordinator's conclusions

Flavia has proven to be an independent, responsible and highly motivated professional.

During these two years she was able to not only integrate her previous background into the different projects with an international component, but also to increase her knowledge and professional competence by developing complex projects like setting up an Epidemic Intelligence Early Warning System for Infectious diseases during the EXPO in Milan, for which she was the team leader. She has acquired also an impressive knowledge on preparedness and response

All this makes Flavia a highly qualified professional, able to manage groups and to develop projects both in epidemiological surveillance or applied research.

Personal conclusions of fellow

- As described in this report, I learned different study designs and data analysis methods, and how to apply them in different settings (my main weakness when I started). I also experimented with new activities and designed and conducted an evaluation of an event-based surveillance system for the first time.
- Learning more about ECDC and meeting people involved in different technical areas in my institution was enriching. Joining a network of fellows within and across cohorts from different backgrounds, this was stimulating as well as fun.
- I would not change my approach to the fellowship should I face the same working circumstances (reorganization transition period of the training site, severe staff shortages during the fellowship period). This had positive and negative effects. It led to a greater amount of responsibility and independence in the projects I followed (for the first time I was the leader of a team for example). However it also meant I focussed mainly on areas in which I had had experience of prior to EPIET.
- My coordinator and supervisors were very helpful in supporting the process while, at the same time, allowing me a certain amount of independence.
- If deemed useful I would be happy to share some further reflections on the fellowship programme

Acknowledgements

I would like to acknowledge all the project supervisors that supported me in ISS-Rome, my training site supervisors Paolo D'Ancona and Silvia Declich, my coordinator Alicia Barrasa, and all the EPIET staff of trainers and coordinators I crossed in these two years. I would like to acknowledge the fellows in my cohort and the other cohorts I crossed because they were, and are, an unending source of enrichment.

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