EPIET REPORT

# Summary of work activities

Carmen Montaño-Remacha
European Programme for Intervention Epidemiology Training (EPIET), 2011 cohort

# Background

## Pre-fellowship short biography

Prior to EPIET, Carmen Montaño-Remacha worked for three years as an epidemiologist at the local level for the Spanish Health Service (2008–2011). Responsibilities included epidemiology of communicable diseases (monitoring, surveillance and evaluation), vaccination, occupational health, community health, health education, health promotion, and health information systems. She studied medicine and specialised in Preventive Medicine and Public Health (2008). Master in Public Health, Master in Health Promotion, and Master in Physical Activity and Health.

## EPIET assignment

On 19 September 2011, Carmen Montaño was assigned to the unit of epidemiology of communicable diseases (REMI) National Centre of Epidemiology, Surveillance and Health Promotion (CNESPS) at the Istituto Superiore di Sanità (ISS), Rome, Italy, under the direct supervision of Fortunato D'Ancona. During the assignment she was involved in outbreak investigations, conducted research and surveillance, and taught. She also participated in a task force created by the Ministry of Health in response to a large hepatitis A outbreak in 2013.

# Fellowship projects

## Surveillance projects

**Evaluation of measles surveillance in Italy**

In Italy, measles is still an endemic disease. An evaluation of measles surveillance was included as one of the activities relevant to the elimination of measles by 2015.

In Italy, measles cases are reported to the national mandatory notification system (SIMI); in addition, an enhanced measles surveillance system (SSM) was introduced in 2007. No case definition is used in SIMI while SSM uses the European case definition. An evaluation of SSM was performed to assess sensitivity, timeliness and completeness.



Stockholm, May 2014

The evaluation was performed on 2009 data, a non-epidemic year. Cases reported to SSM and to SIMI were matched. The number of measles hospitalisations in SSM was compared to national hospital discharge data (SDO). Data quality was evaluated by measuring completeness of information on a minimum set of six variables. Timeliness was based on calculating the interval between date of onset of symptoms and date of reporting to the national level.

In 2009, 315 suspected measles cases were reported to SSM and 757 to SIMI; of these, 250 cases were recorded in both databases. Eight of 21 regions did not report cases to SSM. Two regions were responsible for the majority of cases missing in SSM. Seventy-eight SSM cases were hospitalised while 365 hospitalisations were recorded in SDO. The median reporting delay was 10 days. Information on the minimum set of variables was present for 75% of cases.

The assessment revealed a substantial degree of underreporting to SSM. The discrepancy in the number of cases may be partially due to lack of a precise case definition in SIMI being a system based on a law promulgated in 1990. Awareness of the SSM by physicians needs still to be improved. A web-based electronic system for reporting cases to SSM is being to be implemented. Carmen Montaño was involved in conducting data analysis and writing the protocol and the final report.

Abstract available from: http://ecdc.europa.eu/en/ESCAIDE/Materials/abstracts/Pages/abstracts.aspx

Status: Completed (internal report; poster at ESCAIDE, 2012).

**Situation analysis of rubella, congenital rubella infection (CRI) and congenital rubella syndrome (CRS) surveillance systems in Europe**

Taking into account the new elimination goals and the needs of ECDC, ECDC commissioned a new survey to assess the surveillance systems for rubella, CRI and CRS in Europe. In June 2012, a literature review was conducted. The review also included WHO guidelines; the WHO Global Measles and Rubella Strategic Plan: 2012–2020; and the results of the European survey on rubella, CRI and CRS conducted by EUVAC-NET in 2008.

The survey describes existing surveillance systems at the national level and explores the surveillance system by looking at the type of system, used case definitions, collected variables, frequency of data collection, epidemiological investigation methods, follow up of cases, notification flow, reference laboratories and performed tests, as well as the modality and frequency of data dissemination. For countries which had no active surveillance systems, plans for the future were investigated. The questionnaire was prepared in Excel format; it consisted of three separate sheets for rubella, CRI and CRS, with 27, 26 and 28 questions, respectively. The questionnaire was pre-filled with data available from the 2008 survey.

In mid-July, the questionnaire was tested in five countries (France, Romania, Italy, Belgium and Germany) in order to verify its completeness and clarity. The survey was modified following feedback, and in the last week of September it was sent to the remaining 24 contact points. In October, the completed surveys from all 29 invited countries were analysed. The team prepared a preliminary report and sent it to the 29 contact points for validation. Carmen Montaño was involved in all steps of project: data analysis, protocol, creation of the form, and production of the final report.

**Congenital rubella surveillance in the European Union: current status and future perspective of harmonised practices to monitor elimination. Results from a multi-country survey, 2012 (abstract)**

Background: The elimination of rubella and prevention of congenital rubella syndrome (CRS) by 2015 are established goals for the WHO European Region. Surveillance data are essential to monitor the achievement of this goal, and CRS incidence data are not available at European level. We surveyed 27 EU Member States plus two EEA countries (Norway and Iceland) to describe existing CRS surveillance at national level in view of planned EU-wide enhanced CRS surveillance.

Methods: From June to September 2012, we surveyed 29 country contact points of the European Centre for Disease Prevention and Control (ECDC) for rubella to collect information on characteristics and coverage of surveillance systems, case definitions, variables collected, data collection frequency, analysis and dissemination, reference laboratories, epidemiological investigation and follow-up of cases.

Results: The response rate was 100%; 28/29 countries (97%) had national CRS surveillance. The systems were mainly mandatory (26/28, 93%), comprehensive (27/28, 96%) and case-based (27/28, 96%). Eight countries (29%) had active surveillance and six (21%) required zero reporting. Reports originated from general practitioners (23/28, 82%), hospitals (21/28, 75%) and laboratories (18/28, 64%). Twenty-four countries (86%) adopted the EU case definition. Twenty-three countries (82%) investigated the source of infection but only 13 (46%) collected information on the follow-up of asymptomatic infections. All countries had identified a reference laboratory for congenital rubella: 27 at national level and one at sub-national level; genotyping was performed in 15 countries.

Conclusion: Collection of congenital rubella incidence data at ECDC level seems to be feasible because surveillance systems for congenital rubella syndrome are in place in all countries but one. Coordination of these systems by ECDC would allow introduction of common indicators and harmonisation of laboratory procedures to ensure data comparability data between countries, which in turn would support the WHO elimination goals.

Status: Completed (ECDC technical report; abstract submitted to TEPHINET international night; poster at ESCAIDE Conference, 2013; manuscript in progress).

# Outbreaks

**Legionella**

In January 2013, a cluster of *Legionella* cases at Umberto I Hospital in Rome was noticed through the local surveillance scheme for legionella disease. In January the number of notifications had reached a historic high. An investigation the outbreak was inconclusive; instead, a laboratory problem was detected as many reported cases were not confirmed by the ISS reference laboratory. A specific protocol was prepared. Several months later, the Ministry of Health was notified of a batch of faulty laboratory tests giving false positive results. Carmen Montaño was involved in all steps of the investigation, supporting the local health unit that was in charge of the investigation.

Status: Completed (internal report; presented at the 4th annual meeting of the European Legionnaires' Disease Surveillance Network (ELDSNet); article published).

**Hepatitis A**

On 8 May 2013, through the Epidemic Intelligence Information System (EPIS) of the European Centre for Disease Prevention and Control (ECDC) and the Early Warning Response System (EWRS) of the European Commission, the ISS received information about an outbreak of hepatitis A in patients resident in Germany who had returned from a stay in Italy. On 9 May 2013, the Polish public health service (State Sanitary Inspection) reported five cases of acute hepatitis A in patients with a history of travel to the Provinces of Trento and Bolzano (Italy) to the Italian health authorities. After the notifications from Germany and Poland, the Netherlands also reported one case of acute hepatitis A in a patient with travel history to Italy.

Information on the molecular characteristics of isolates was available for seven travellers to Italy and for 19 residents in Italy. All isolates were sub-genotype IA and shared an identical sequence. The outbreak sequence GenBank number was KF182323. The sequencing was performed in different laboratories.

On 28 June, Ireland reported (via EWRS) three cases of HAV infection in Irish residents who had no history of travel to Italy during the exposure period. The isolates from the Irish cases had an HAV RNA sequence identical to the Italian outbreak strain.

The Italian Food Authority sent out four RASFF notifications regarding the mixed frozen berries found to be contaminated with HAV in Italy on 17 May, 30 May and 24 June 2013. The frozen berry mix originated from Italy, with raw berry material from Canada (via Switzerland), Bulgaria, Poland, Serbia and Ukraine (via Austria). Following the notifications, the mixed frozen berries were withdrawn from the national market. An investigation into the traceability of the product is currently underway.

A task force was created by the Ministry of Health. The task force was composed of experts from the ministry, the ISS and the National Reference Center of Emerging Risks in Food Safety.

Italy (ISS) immediately started an epidemiological investigation and confirmed an unusual increase of cases notified in the area starting in January 2013. A case-control study is ongoing. The aim of this investigation was primarily to identify a possible source for hepatitis A acquired in the north of Italy, but also to allow a better understanding of the epidemiology of sporadic hepatitis A in Italy. The hypothesis that consumption of frozen berries is associated with the cases is explored because a large number of cases reported consumption of berries prior to disease onset.

The study included a total of 538 subjects, 119 cases (22.1%) and 419 controls (77.9%). The median age was 37.0 years (range, 3–70) for HAV cases and 38.0 years (range, 1–72) for controls. The majority of study participants in both groups were male. No significant difference in the gender of cases and controls was observed. Most of the HAV cases (68/119, 57.1%) were from Emilia Romagna Region. The two analyses performed, univariate and multivariate, both showed three risk factors associated with the illness: berries, raw seafood and a travel history. In the multivariate analysis, the odds of HAV were 4.2 times higher (CI 95%, 2.54–7.02) for people who consumed berries compared with those who did not.

Among the interviewed that reported berry consumption, 26.95 % had eaten them fresh, 38.67% frozen, 3.13% dried, and 31.25% didn't know the state of berries consumed. Most of the people had eaten the berries at home (72%) or in a restaurant (15%). The food that included the berries were yogurt (32%), cakes (25%), ice cream (19%), pannacotta (7%), cheesecake (5%), cornflakes (3%) and juice (1%). The remaining people (8%) referred consumption directly. The type of berries consumed were blueberries (7%), strawberries (3%), raspberries (2.5%), blackberries (2.5%), red currants (2%) and mixed berries (83%). Raw seafood was found to have the second highest significant association with HAV (OR, 3.83; CI 95%, 2.54–7.02). The third factor associated with the illness was a travel history (OR, 1.98; CI 95%, 1.15–3.41). Most of the cases (59.8%) who referred to travel history during the incubation period, had travelled in Italy (distributed as 61.4% in the North of Italy, 21.4% in the Centre of Italy and 17.2% in the South). 30% of the people who travelled abroad had been outside of Europe. The attributable fraction in the population was the same for berries and raw seafood.

**Outbreak hepatitis A associated with berries in Italy in 2013: results from the matched case-control study (abstract)**

Background: In May 2013, Germany, Poland and Netherland reported hepatitis A cases among travellers returning from Italy. In January–May 2013, Italian sentinel surveillance reported a 70% increase in hepatitis A compared with 2010–2012. We investigated to identify the vehicle of infection.

Methods: We defined a case as a positive IgM anti-HAV test, with onset between 1 January and 31 May 2013 among residents in Trento, Bolzano, Emilia-Romagna, Friuli-Venezia-Giulia and Apulia. We compared each case with four age-matched neighbourhood controls to explore potential risk factors. We calculated crude and adjusted odds ratios (AOR) in univariate and multivariable analysis, using conditional logistic regression and attributable fraction in the population (PAF).

Results: The five regions reported 119 cases (mean age 37.0, 44% female), mainly Emilia-Romagna (57%) and Trento (26%). The number of cases increased progressively, reaching a peak in week 20. Compared with the 419 controls, cases were more likely to eat berries (AOR 4.2; CI 95%, 2.5–7.0; PAF 26%), eat raw seafood (AOR, 3.8; CI 95%, 2.2–6.8; PAF 26%) and travel (OR, 2.0; CI 95%, 1.2–3.4). Laboratories amplified sub-genotype 1A and genotype KF182323 from 25 cases and berries, identical to the cases in the Netherlands, Germany and Poland. Conclusion: Epidemiological and laboratory evidence suggested that berries were the source of this outbreak; back-tracing is still in progress. In addition, raw seafood also regularly leads to a number of cases, as reported by Italy.

Status: Completed (Two publications; oral communication and poster in ESCAIDE Conference, 2013).

# Research

**HProImmune: Review of the immunisation status of EU healthcare workers**

The aim of this EU-funded project was to provide a comprehensive, up-to-date overview regarding the immunisation of healthcare workers (HCWs) in the EU and prepare material to promote vaccination in this group. As part of this project, we conducted a prioritisation exercise of the most important vaccine-preventable diseases (VPDs) for HCWs and reviewed existing information on these VPDs in HCWs in Europe. First we agreed on a list of infectious agents through a consensus process, and later we did an extensive literature review in all EU Member States (legal framework, policy, statistics, guidelines, vaccination records, health educational programmes, intervention and communication campaigns, existing data and literature on risk perception, nosocomial outbreaks and incidence of diseases). Compiled information and final report were entered into a database available from the project website. Carmen Montaño was involved in collecting and analysing the data for the final report regarding the current situation and the survey.

Abstract: European healthcare workers and vaccination: A situation analysis in 2012

Background: The HProImmune is project of the Directorate-General Health and Consumers investigating the barriers which impede the immunisation of healthcare workers (HCW). The project aims to develop educational material for health professionals and propose recommendations for policy-makers. As part of this project, we conducted a prioritisation exercise of the most important vaccine-preventable diseases (VPDs) for HCWs and reviewed existing information on these VPDs in HCWs in Europe.

Methods: We conducted prioritisation through an adaptation of the WHO Delphi method used for periodically reviewing list of priority diseases for surveillance. Initially, we asked each partner in the project to score VPDs against agreed criteria of present burden of disease, epidemiological profile, vaccination coverage and health promotion, and social and economic impact; we then conducted a further ranking based on the partners' expert opinion. Moreover, we reviewed literature and directly asked countries for their policies, national legislation and recommendations governing this issue in European countries.

Results: We prioritised hepatitis B, influenza, MMR, tuberculosis, Tdap and varicella vaccination for HCWs. We identified 88 official guidelines for HCW vaccination, 73 legal framework and policy documents, 32 documents on vaccination coverage data, and 186 peer-reviewed articles from 23 of 30 participating countries. More than 90% of those documents focused on influenza. Vaccination coverage data among HCWs were only available for influenza vaccines.

Conclusion: Most guidelines indicate that there are no uniform recommendations for vaccination for HCWs in the participating countries. No data are available on vaccination coverage among HCWS, apart from influenza vaccines. Uniform vaccine policies for HCW in Europe are imperative to promote HCW safety.

Status: Completed (report for website; oral communication in viral hepatitis prevention board meeting; abstract submitted to ESCAIDE conference, 2012; poster in ESCAIDE conference, 2013).

**Study on carbapenem-resistant *Klebsiella pneumoniae***

The spread of antibiotic-resistant bacteria is a major public health problem. In Europe, Italy is one of the countries most affected by the phenomenon of antibiotic resistance. Through a prospective cohort study we want to estimate the mortality rate due to *Klebsiella pneumoniae* resistant to carbapenems (KPRC) in patients with a sample of Italian

hospitals and describe the clinical characteristics of patients with KPRC and *Klebsiella pneumoniae* sensitive to carbapenems (KPSC). Our study population are hospitalised adult patients (≥18 years) with a strain of KP isolated from blood or respiratory tract samples (bronchial aspirate and protected bronchial alveolar lavage, BAL) during the study period (November 2012–November 2013).

Status: Data collection ongoing.

**Impact of vaccination against *Streptococcus pneumoniae* and *Neisseria meningitidis* C in Italy**

In Italy, vaccination against *N. meningitidis* serogroup C and *S. pneumoniae* were introduced in the National Health Plan 2003–2005. For vaccination against *N. meningitidis* serogroup C three doses are recommended in the first year of life, or, alternatively, a single dose at the age of 12 month. The vaccine against *S. pneumoniae* is recommended for children at 3, 5, or 12 months. The marketing of this pneumococcal conjugate vaccine (PCV-7, 10, 13) has modified the epidemiology of invasive pneumococcal disease. Universal vaccination in newborns with PCV-7 was introduced between 2006 and 2008, but in 2010 only 18 of the 21 Italian regions offer free this vaccination. From June 2010, the 7valent vaccine was gradually replaced by the 13valent. The rationale of the study is to verify that the vaccine strategies of a sample of Italian regions are effective for the control of Invasive Pneumococcal Diseases and Invasive Meningococcal Diseases through the study of the incidence of disease before and after the entry of vaccination in each region.

Status: Data collection ongoing

# Scientific communication

- Review of HCW immunisation status in the EU. Oral presentation. HProImmune meeting. 7 May 2012.
- Evidence-based health promotion. Oral presentation. First Symposium on Health Promotion in the Mediterranean Arc. 29–30 May 2012.
- Career paths for epidemiologists. Oral presentation. Second National Congress of the Andalusian Society of Preventive Medicine. 7–8 June 2012.
- Towards the measles elimination goal: an evaluation of the Italian enhanced measles surveillance system. Poster. ESCAIDE conference, 24–26 October 2012.
- Reasons for non-vaccination against Human Papillomavirus (HPV) in a sample of Italian girls (results from VALORE project), 2012. Poster. ESCAIDE conference, 24–26 October 2012.
- HProImmune: European project for the promotion of immunisation for health professionals. Oral presentation. Viral hepatitis prevention board meeting: How to reach healthcare workers. 15–16 November 2012. Available from: http://www.vhpb.org/files/html/Meetings_and_publications/Presentations/BARS51.pdf
- *Klebsiella pneumoniae* resistant to carbapenems in Italy. Published in Infectio'ro 2013; 35: 22-25.
- Hepatitis A outbreak associated with berries in Italy in 2013: results from the matched case-control study. Oral presentation. ESCAIDE conference, 4–7 November 2013.
- Hepatitis A outbreak in Italy, 2013: disentangling the role of risk factors associated with the disease. Poster. ESCAIDE conference, 4–7 November 2013.
- Congenital rubella surveillance in the European Union: Current status and future perspective of harmonized practices to monitor elimination. Results from a multi-country survey, 2012. Poster. ESCAIDE conference, 4–7 November 2013.
- Immunization-related behaviour among healthcare workers in Europe – Results of the HProImmune survey. Poster. ESCAIDE conference, 4–7 November 2013.
- Pseudoepidemic due to falsely positive urine antigen test results. Published in J. Clin. Microbiol. June 2014 52:6 2279-2280.
- Hepatitis A outbreak in Italy, 2013: a matched case-control study of risk factors. Accepted in Eurosurveillance

# Teaching experience

Taught for a public health programme (master of applied epidemiology and population health in Calabria; the overall goal of the project is to improve prevention through epidemiological network support). In March 2013, Carmen Montaño-Remacha taught parts of the first module which trained fellows in cross-sectional surveys and their application in applied epidemiology (survey protocol, sampling, questionnaire, data collection, data analysis, interpretation of results, etc.) with lectures and a case study.

Status: Completed

# Other

Attendance:

- Workshop 'Invasive Bacterial Diseases Surveillance in Italy'. February 28-29, 2012. ISS, Rome, Italy.
- Course for ISS staff 'Laboratory hazards: Identification and prevention'. April 16, 2012. ISS, Rome, Italy.
- ISS Seminar '*Klebsiella pneumoniae* resistant to carbapenems: a new emergency infectious disease: epidemiology, therapy, genetic characteristics and mechanisms of antibiotic resistance'. June 5, 2012 ISS, Rome, Italy.
- Workshop 'Human papillomavirus infection: from primary prevention to early detection'. June 27, 2012. ISS, Rome, Italy.
- Eurovaccine. 21–23 November 2012, Barcelona, Spain
- EpiSouth-Plus first project meeting. 5–7 December 2012. Rome, Italy
- ISS seminar 'The WHO web site: a guide to the use of services and databases'. 16 January 2013. ISS, Rome, Italy
- ISS seminar 'Retrieval of scientific information in the main national and international index'. 23 January 2013. ISS, Rome, Italy
- European Immunisation Week 2013: 'Measles and congenital rubella elimination, HPV vaccination and immunisation access in migrant populations'. 16–17 April 2013. MoH, Rome, Italy
- International Summer School 'Clinical practice guidelines on rare diseases'. 8–12 July 2013. ISS, Rome, Italy

## Supervisors' conclusions

Carmen Montaño arrived at Istituto Superiore di Sanità with a solid background in public health acquired at a local health unit in Spain and quickly adjusted to the demands of working at the national level. Fluent in Italian after only a few months, she was quickly integrated into the unit of infectious disease epidemiology. With strong determination and a lot of energy, Carmen accepted her training tasks, which increased in complexity, starting with the evaluation of the Italian measles surveillance system and arriving at the very complex investigation of a European outbreak of hepatitis A.

Carmen thoroughly enjoys working in the public health sector and her positive attitude contributed to quickly achieve the training objectives.

Carmen is an excellent team player and a good listener and able to quickly assimilate knowledge and experiences from her colleagues. The fellowship exposed her to local, national and international public health problems that she tackled with the same diligence and professionalism throughout the two years she worked at Istituto Superiore di Sanità. Her good command of Italian contributed to the excellent quality of her epidemiological work.

Another positive factor was the presence of Cristina Giambi at Istituto Superiore di Sanità, an EPIET Member State track fellow, who quickly became a close collaborator and friend.

Overall, Carmen's fellowship was a positive experience for the entire unit who found in her a young colleague eager to learn and share her experiences.

Carmen has excellent skills in epidemiology, showed a lot of flexibility in her work, but is also a serious and devoted researcher. I can highly recommend Carmen Montaño for any position in public health.

# Next steps

After graduating from EPIET, Carmen will return to Spain and work as an epidemiologist at the Spanish health system.

# References

European Centre for Disease Prevention and Control. Survey on rubella, rubella in pregnancy and congenital rubella surveillance systems in EU/EEA countries. Stockholm: ECDC; 2013. Available from: http://www.ecdc.europa.eu/en/publications/Publications/survey-rubella-pregnancy-congenital-surveillance-systems-may-2013.pdf

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