REVIEW 10.1111/1469-0691.12430

Vaccine-preventable diseases: the role of the European Centre for Disease Prevention and Control

P. Kramarz[1], P. L. Lopalco[2], E. Huitric[1] and L. Pastore Celentano[1]

1) *Office of the Chief Scientist and* 2) *Surveillance and Response Support Unit, European Centre for Disease Prevention and Control, Stockholm, Sweden*

Abstract

The role of the European Centre for Disease Prevention and Control (ECDC) is to strengthen the capacity of the European Union (EU) Member States to protect human health through the prevention and control of infectious diseases. The main objective of the programme on vaccine-preventable diseases and invasive bacterial infections (VPD) is to provide robust evidence and high-quality technical support to the EU Member States to help them in their efforts to prevent and control VPD. Since the establishment of ECDC, several existing VPD surveillance networks have been transferred to ECDC, namely EU-IBIS, DIPNET and EUVAC. In addition to surveillance of diseases, ECDC is collecting information and monitoring other parameters that are of crucial importance for a well-functioning immunization system, including vaccination coverage. The VPD programme also provides independent scientific opinions in the area of immunization and initiates and coordinates scientific studies in the area of vaccination to answer specific questions of public health importance, including risk perception and analysis of behaviour in different population groups. One of the overall ECDC priorities over recent years is the Centre's involvement in measles elimination. The 'Message' tool and the 'Measles Atlas' are examples of work aiming at supporting the efforts of Member States in the elimination phase.

Keywords: Epidemiology, European Union, vaccination programmes, vaccine-preventable diseases
Article published online: 19 December 2013
Clin Microbiol Infect 2014; **20** (Suppl. 5): 2–6

Corresponding author: P. Kramarz, European Centre for Disease Prevention and Control, SE-171 83, Stockholm, Sweden
E-mail: **piotr.kramarz@ecdc.europa.eu**

The overall role of the European Centre for Disease Prevention and Control (ECDC) is to strengthen the capacity of the European Community and the European Union (EU) Member States to protect human health through the prevention and control of infectious disease [1]. ECDC does this through bringing together the tasks and the responsibilities of the Member States, the EU Institutions and other international organizations. The Programme on vaccine-preventable diseases and invasive bacterial infections (VPD) is one of seven disease programmes operated by ECDC [2]. The main objective of this programme is to provide robust evidence and high-quality technical support to the EU Member States to help them in their efforts to prevent and control VPD [3]. The programme covers diphtheria, invasive infections with *Haemophilus influenzae*, measles, invasive meningococcal disease, mumps, pertussis, invasive pneumococcal disease, poliomyelitis, rubella, tetanus and varicella. Like all the other ECDC disease programmes, it is active in various areas including surveillance, scientific advice, epidemic intelligence and response, scientific studies, interactions with external stakeholders, public health training and health communication. We will cover these various fields of the programme's activity in the rest of the paper.

ECDC is the hub of European communicable disease surveillance, working on integration of molecular surveillance into its main surveillance activities. ECDC runs the epidemiological networks, funds the laboratory networks, is in charge of data collection, analysis and dissemination at EU level, and works towards better data quality and comparability.

In particular, since 2008, ECDC has been collecting disease surveillance data from EU Member States on >50 communi-

cable diseases and conditions using the European Surveillance System, known as TESSy [4]. After thorough evaluation and assessment, coordination of the existing dedicated surveillance networks in Europe was gradually transferred to ECDC [4]. In total, 16 out of 17 dedicated surveillance networks functioning in the field of public health before establishment of ECDC were transferred by the end of 2011. During this transfer process, ECDC formalized the disease-specific networks of national experts nominated by Member States, along with the Coordination Groups for each of the transferred networks, and ensured representation of all Member States with linkage to the National Public Health Institutes or equivalent structures in these networks. The coordination of these EU surveillance networks fell under different ECDC Disease Programmes. In addition to the surveillance networks, laboratory networks were established (where they did not exist before) for the different diseases or groups of diseases. For these networks, national laboratory experts were nominated by Member States. Moreover, ECDC established contractual support to consortia of national reference laboratories. These laboratory networks have delivered a number of EU-coordinated activities, including technical capacity building, quality assurance, epidemic intelligence and event response support, technology assessment, technical guidance and molecular microbiological surveillance.

The coordination of the three VPD EU surveillance networks, namely the European Union Invasive Bacterial Diseases Surveillance System (EU-IBIS), the Diphtheria Surveillance Network (DIPNET), and the European surveillance network for selected vaccine-preventable diseases (EUVAC), has been subsequently transferred to ECDC. The former Invasive Bacterial Infections Surveillance Network (EU-IBIS), including surveillance of diseases caused by *Neisseria meningitidis* and *H. influenzae*, was transferred to ECDC in 2007. In 2010 the enhanced EU surveillance system for invasive diseases due to *Streptococcus pneumoniae* was set up and integrated with the surveillance of diseases caused by *N. meningitidis* and *H. influenzae*. Currently the Invasive Bacterial Diseases (IBD) network integrates surveillance of the three invasive bacterial diseases from an epidemiological and laboratory point of view, to promote data comparability and high data quality, monitor the epidemiological trends, as well as the serotype replacement, and strengthen laboratory capacities in Member States. The activities include annual data collection, analysis, dissemination of relevant scientific and technical data, promotion of the harmonization and external quality assurance (EQA) of laboratory methods and improvement of the laboratory performance to accurately characterize the isolates of *N. meningitidis*, *H. influenzae* and *S. pneumoniae*. The coordination of the laboratory surveillance activities, mainly EQA schemes, and training are outsourced to a consortium of European laboratory experts, coming from national reference laboratories, led by the University of Wurzburg, Germany (the Invasive Bacterial Disease Laboratory Network: IBD-Labnet). Reports on EQA schemes performed to assess the laboratory capacity of the IBD National Reference Laboratories, are regularly published on the ECDC website [5–7].

ECDC coordinates a pilot project 'Assessing the impact of vaccination with the conjugate vaccines on the epidemiology of the invasive pneumococcal disease in Europe' since 2012. The aim of the project is to set up active surveillance for Invasive Pneumococcal Disease (IPD) in the EU and European Economic Area (EEA) to monitor the impact of PCV vaccination programmes. A network of 12 partner institutions from nine countries is part of it, coordinated by EpiConcept and with the creation of 11 surveillance sites. In each of them, laboratory experts and epidemiologists work closely together to actively detect and report IPD cases in a timely manner.

Responsibilities of the European Diphtheria Surveillance Network, EDSN (former DIPNET), including surveillance for diphtheria caused by toxigenic strains of *Corynebacterium diphtheriae* and *Corynebacterium ulcerans* have been transferred to ECDC in 2010. The activities of the network are aimed at integrating epidemiological and laboratory surveillance. The coordination of the laboratory surveillance activities, mainly EQA schemes and training, are outsourced to a consortium of European laboratory experts from national reference laboratories, led by the National Public Health Institute of England & Wales [8].

Finally, EUVAC.NET was a European surveillance network for measles, mumps, rubella, congenital rubella syndrome, pertussis and varicella whose responsibilities were transferred to ECDC in 2011. Currently, EU enhanced surveillance for measles, mumps, rubella and pertussis is in place at ECDC. Most of the surveillance data are gathered once a year through a data call. Measles and rubella data are collected on a monthly basis, and a monthly bulletin is published on the ECDC website, containing information on national and European trends, as well as on outbreaks in the EU for the two diseases [9].

The European Pertussis Laboratory Network (EUpert-Labnet) was set up in 2011. The coordination of the activities, mainly EQA schemes, is outsourced to a consortium of European laboratory experts led by the National Public Health Institute of Finland [10]. The main outputs of this network so far are two complementary guidance and protocols on *Bordetella pertussis*, the first on serological diagnosis of human infection and the second on the use of RT-PCR for diagnosis of *Bordetella* infections [11,12].

In addition to surveillance of diseases, monitoring of other parameters is of crucial importance for a well-functioning