Chapter 7
Health Security and Disease Detection in the European Union

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Abstract In a globalised world, national and international institutions in charge of health security can no longer only rely on traditional disease reporting mechanisms, not designed to recognise emergence of new hazards. New approaches are developing to improve the capacity of surveillance systems in detecting previously unknown threats. More recently, surveillance institutions have been actively searching for information about health threats using internet scanning tools, email distribution lists or networks that complement the early warning function of routine surveillance systems. Since its foundation, ECDC has developed an epidemic intelligence framework that encompasses all activities related to early identification of potential health hazards, their verification, assessment and investigation, in order to recommend public health control measures. Since June 2005, about 900 threats have been monitored by ECDC. Several threats made it necessary to develop formal risk assessments or to dispatch ECDC experts to outbreak areas. Examples of recent events, identified through the epidemic intelligence activity, are presented to illustrate the course of action from threat detection through risk management in Europe.

7.1 Introduction

During the last decades public health scientists have been confronted with the detection, assessment and management of a number of threats with increasing risk of spreading internationally. Globalization of food and product trade, as well as the steady increase of worldwide travel, contributes to an increasing awareness of global communicable disease threats and to the need for preparing the public health

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systems to respond to unexpected epidemics. The possibility of bioterrorist attacks in recent years has reinforced the rationale for a broader approach to public health security.

7.2 European Union Policies and Activities

The European Union (EU) and its 27 member states will continue facing considerable challenges regarding communicable disease in the years to come, including the threat of the release of man-made biological agents at a small or large scale.

Public health protection, according to the current EU legislation, is mostly a shared competence of the EU institutions and the member states. Countries in the EU are at different stages of preparedness to respond to major threats, including those originated by the intentional release of biological agents. The differences in completion of national plans to counter bioterrorism are partly due to the significant variance in the perception of threat in the EU member states [2] as well as to different levels of competence within the governmental structures in charge of security.

The risk of international spread of an infectious disease was considered a priority in the EU already in 1996. Provisions were developed to ensure open communication channels between the relevant authorities; a list of communicable diseases was agreed upon, which were to be under surveillance by all member states, and common case definitions for these diseases were developed [5].

After the September 11th terrorist aggression in the USA and the later anthrax attacks, it became clearer that public health and infectious diseases should be considered and treated as a strategic national priority. The EU responded to these challenges by creating the Health Security Committee (HSC) under the directorate for public health, with the mandate to coordinate and complement national measures in the area of health security. Strategic work plans were then developed to guide the actions of the committee [12]. The European Commission worked on the adopted relevant Health Security Programme of co-operation on preparedness and response against biological and chemical threats, creating also mechanisms of communication during health security crises [3, 23]. The appearance of a global threat, such as the emergence of SARS in 2002, and the need of scientific coordination of complex assessment of threats affecting more than one country, elicited the decision of the EU in 2004 to create the European Centre for Disease Prevention and Control (ECDC) with the mandate of strengthening the preparedness and response against health threats in the EU [21].

7.3 EU Crisis Response Mechanisms

The Treaty on the Functioning of the European Union [24], entered into force on 1 December 2009, contains several references to the role of institutions, their coordination with member states and international partners, and the sharing of resources,

all based on the principle of solidarity in response to major crises. Article 168 specifically deals with public health in stating that a "high level of human health protection shall be ensured in the definition and implementation of all Union policies and activities", and that "Community action shall be directed towards improving public health, preventing human illness and diseases, and obviating sources of danger to human health" by "encouraging cooperation between the member States" and "lending support to their action". Actions to fight against major health threats also include "monitoring, early warning of and combating of cross-border health threats".

The political coordination of crises of relevance to the EU is performed through the Emergency and Crisis Coordination Arrangements (CCA) of the Council and the European Commission [6]. Its functions are to support the political coordination, to exchange information among decision-makers, and to test procedures through regular simulation exercises (e.g. a 2010 exercise scenario of a bio-attack, testing arrangements to ensure quick and adequate crisis response/information flow and identify policy gaps). Other mechanisms, with legal and financial instruments, also exist. One is the Monitoring and Information Centre (MIC) for EU civil protection (DG ECHO) with the aim to pool and deploy immediate civil protection and medical assistance including the mobilisation of pre-registered CBRN modules, from member states to countries affected by major emergencies–inside and outside the EU [18].

In the public health area, the Health Security Committee (HSC), created by a Council decision in 2001, is a decision-making body supporting the EU Commission on preparedness planning and crisis response management in health emergencies. Its mandate is currently under review and since 2007 includes CBRN, generic preparedness, and pandemic influenza. The HSC is composed of high level representatives of the EU Health Ministers and the European Commission. A proposal for a decision of the European Parliament and of the Council [4] has been launched in 2011 with the aim to streamline and strengthen the EU capacities and structures for responding to serious cross-border threats to health, including the formalization of the HSC.

Generally, the assessment and the management aspects of crises are distinct responsibilities. As far as public health is concerned, the national public health institute of a member state, where existent, is in charge of risk assessment, including disease surveillance activities and outbreak investigation. Management aspects are usually handled by the Ministry of Health, which is responsible for prevention and control measures. These two institutions work closely together. Even though this is the most common model, this structure may vary between countries. At EU level, the European Commission is responsible for all management aspects of infectious diseases, whereas the ECDC is in charge of the assessment of public health threats and the provision of technical expertise to member states. In the area of crisis management, the European Commission and the specialised agencies of the EU maintain and support a number of monitoring and alert systems for threat detection, risk assessment, rapid alert and risk management (Table 7.1) and platforms for crisis management, all of which provide means for information exchange and dissemination, as well as coordination with member states and international organizations (Table 7.2).

Table 7.1 EU rapid alert and notification systems for crisis management

Function	Rapid alert and notification system	Description of system	Legal basis
All crises	ARGUS	Internal communication network for concerned DG services during crisis situations	2005/662/EC
		Some Community rapid alert and notification systems feed into ARGUS	2006/25/EC
General civil protection	CECIS (Common Emergency Communication and Information System)	Web-based, 24/7, communication and information sharing between the Monitoring and Information Centre of DG ECHO (Civil Protection) and designated contact points in the EU member states	2001/792/EC
		Is used to: send and receive alerts, provide details of assistance required, to make offers to help, and to provide overview of ongoing emergency in an online logbook	2007/162/EC
Radiological emergencies and nuclear accidents	ECURIE (European Community Urgent Radiological Information Exchange)	Web-based, 24/7, radiological emergency notification and subsequent information (urgent messages) exchange system between contact points in the participating countries	87/600/Euratom
Food and feed emergencies	ADNS (Animal Disease Notification System)	Notification system on contagious animal disease outbreaks	2004/216/EC
Food and feed emergencies	RASFF (Rapid Alert System for Food and Feed)	Rapid alert system for food and feed to exchange information in cases where risk to human health is identified in food or feed products and measures have to be taken	2002/178/EC
Communicable diseases	EWRS (Early Warning and Response System)	Early warning and response system to alert public health authorities in the EU member states and the European Commission on outbreaks of communicable diseases (with restricted access)	2000/57/EC

Biological and chemical threats	RAS-BICHAT (Rapid Alert System on Biological and Chemical Agent Attack Taskforce)	Web-based rapid alert system used for exchanging information on health threats due to deliberate release of chemical, biological and radio-nuclear agents Used for notification of threats, exchange of information and coordination of measures among partners	1998/2119/EC
Chemical threats	RAS-CHEM (Rapid Alert System for Chemical Incidents)	Rapid alert system linking the various poison centres of the EU and the Ministries of Health for the exchange of information on incidents including chemical agents relevant to terrorism and other events leading to release of chemicals, and for the consultation and coordination of counter-measures	1998/2119/EC
Plant or plant product emergencies	EUROPHYT (European Network of Plant Health Information Systems) Phytosanitary network	Rapid exchange of intercepted information Provides database for relevant information on interceptions of harmful organisms or prohibited plants and plant products, originating in EU or 3rd countries Enables dissemination, analysis of information related to interceptions Notifies national plant protection organization of country of origin in cases of interceptions in 3rd countries	2000/29/EC
Non-food consumer emergencies	RAPEX (Rapid Alert System for Non-Food Consumer Products)	Provides rapid exchange of information on measures taken by national authorities and/or product distributers on non-food consumer products posing a serious risk to health and safety of consumers	2001/95/EC
Economic security/Protection of EU budget	AFIS (Anti Fraud Information System)	Rapid exchange of information on fraud between the European Commission and the competent authorities in the EU member states	Mutual Assistance Regulation (515/97)

(continued)

Table 7.1 (continued)

Function	Rapid alert and notification system	Description of system	Legal basis
Energy and transport security	CIWIN (Critical Infrastructure Warning Information Network)	Information exchange tool on critical infra-structure (energy and transport networks) through designated contact points in the EU; member states inform the European Commission about threats, risks and vulnerabilities in specific critical infrastructure sectors	COM (2008) 676
Socio-political conflicts/ Humanitarian natural disasters	TARÎQA	Rapid alert system for political and humanitarian crises, enabling the alerting of political and humanitarian crises which appear in the media	2006/1717/EC
	RELEX Crisis Platform	Open source intelligence platform developed by the European Commission's Directorate-General for External Relations. It is a heuristic tool – supported by a multimedia content database – that facilitates search, investigation, analysis and discovery	

Table 7.2 Commission information exchange/dissemination/coordination platforms for crisis management

Function	Coordination platform	Description of system	Legal basis
General civil protection	CECIS (Common Emergency and Information System)	Web-based, 24/7, Communication and information sharing between the MIC and designated contact points in the EU member states	2001/792/EC
		Is used to send and receive alerts, provide details of assistance required, to make offers to help, and to provide overview of ongoing emergency in an online logbook	2007/162/EC
Radiological emergencies and nuclear accidents	ECURIE (European Community Urgent Radiological Information Exchange)	24/7 web-based radiological emergency notification and subsequent information (urgent messages) exchange system between contact points in the participating countries	87/600/Euratom
	EURODEP (European Radiological Data Exchange Platform)	Network/platform for daily and emergency (hourly) exchange of automatic monitoring data from European radiological monitoring networks (4,500 stations)	87/600/Euratom
	ENSEMBLE (Platform for model evaluation and ensemble analysis of atmospheric chemistry transport and dispersion models)	Coordination platform to support emergency management and decision-making in relation to long range atmospheric dispersion modeling	87/600/Euratom
		Under emergency conditions, the system allows for immediate and direct comparison amongst atmospheric dispersion modeling results, and subsequently allows to determine the level of consensus in forecasting the evolution of the dispersing cloud	
		The ENSEMBLE network is composed of meteorological centres in 20 countries, mainly in Europe but also Canada, Japan and USA	

(continued)

Table 7.2 (continued)

Function	Coordination platform	Description of system	Legal basis
Diseases and health emergencies	HEDIS (Health Emergency and Diseases Information System)	For information exchange and awareness during infectious outbreaks and health emergencies and response phases Logbook of actions taken, document repository, database of models, maps of events	2000/57/EC
	TeSsy (The European Surveillance System) (ECDC)	Integrated European communicable disease surveillance system	851/2004/EC
	EPIS (Epidemic Intelligence System) (ECDC)	Epidemic intelligence portal for outbreak detection, risk assessment, outbreak investigation and control measures at EU level	851/2004/EC
Plant or plant product emergencies	EUROPHYT (Phytosanitary network)	Rapid exchange of intercepted information Provides database for relevant information on interceptions of harmful organisms or prohibited plants and plant products, originating in EU or third countries Enables dissemination, analysis of information related to interceptions Notifies national plant protection organization of country of origin in cases of interceptions in third countries	2000/29/EC
Socio-political conflicts/ Humanitarian disasters	KREIOS (Information exchange between Situation Centres)	24/7 web-based platform for unique information exchange during crisis and non-crisis times	2006/1717/EC
Border management	Information sharing and coordination systems platforms	Information sharing platform FIS (FRONTEX Information System) CRATE, a system for the management of the pooled technical equipment and members of the Rapid Pool	2007/2004/ (26.10.2004, OJ L 349/ 25.11.2004) EC

The role and mandate of the ECDC regarding health threats is limited to risk monitoring, assessment and communication. In situations where a health threat affects more than one member state and a multi-country response is needed, public health measures are taken with joint efforts by the European Commission and the national authorities. The implementation of public health measures is the responsibility of member states according to their jurisdictional organisation. The role of an EU agency, such as the ECDC, is to provide expertise and technical support to risk managers when called on to do so. This can include evidence-based risk assessment and "hands on" support in investigating outbreaks.

7.4 A Broader Public Health Stance

A common thread connects all preparedness and response processes and this is represented by an "all-hazards" outlook in the preparedness of the public health sector. A broad understanding of the problem makes it easier to focus on synergies instead of trade-offs between the partners and sectors involved. Currently the ECDC works following a matrix model which combines its four core vertical functions (surveillance, scientific advice, preparedness and response, and health communication) with programmes focused on priority areas of communicable diseases. This structure also facilitates the integration of the deliberate release perspective in the current ECDC work.

The most important differentiating factor in countering an incident of deliberate release as opposed to a naturally occurring epidemic is the need for collaboration with the security sector and the law enforcement authorities. In response to an incident of deliberate release, public health services continue to operate their surveillance systems and analyse case findings, investigate and test samples in diagnostic laboratories, give guidance for managing patients and propose public health measures for the control of the outbreak as in any other infectious disease emergency. In their relationship with security sector and law enforcement authorities, public health services stress the importance of keeping public health high on the agenda in cases of a deliberate release of biological agents. However, in response to a health crisis resulting from a deliberate release of a biological agent, EU coordination is faced with two contradicting forces in the communication with the member states: on the one hand some member states would be requesting urgent advice, guidance and possibly assistance, while on the other hand there will be marked reluctance by the security sector to discuss sensitive information.

Yet, public health systems can respond rapidly with effective containment measures only when the best evidence-based options are supported by early warnings and plausible information on the source of the outbreak, its characteristics, and the extent of its public health impact. Official notifications, as in routine surveillance, often are insufficient, belated and subject to a lengthy clearance, and are of little help when a rapid and effective response is necessary.

7.5 Early Detection of Disease Outbreaks

Modern technologies, mainly related to the development of information technology, with the internet being the backbone of it, are rapidly changing the way scientists and public health officials access health information. Online media, scientific fora and direct electronic communication are increasingly supplanting traditional reporting mechanisms through the various levels of public health administration. Health authorities are no longer in full control of an environment that puts journalists, politicians and the general public in direct contact with raw data.

This new information environment contributed to the revision of the International Health Regulations that was approved during the 2005 World Health Assembly. Member states of the World Health Organization (WHO) are legally bound to both notify cases on a preset list of diseases and all "public health events of international concern".

Institutions in charge of health security no longer rely solely on traditional disease reporting mechanisms such as mandatory notification of diseases. While these systems can ensure appropriate public health response to identified risks, they cannot recognise the emergence of new threats such as SARS, human cases of avian influenza, or potential deliberate outbreaks. In order to overcome the limitations of traditional surveillance for the detection of previously unknown threats, new approaches have been developed, including the monitoring of syndromes, death rates, health services admissions, or drug prescriptions [11]. These new approaches contribute to enhance the performance of traditional surveillance systems.

Meanwhile, the media and other informal sources of information are increasingly recognised as valuable sources of public health alerts. Epidemic intelligence provides a conceptual framework into which countries may complete their public health surveillance system to meet new challenges [13]. This approach represents a new paradigm aiming at complementing traditional surveillance systems.

The ECDC has in its founding regulation the task to identify and assess emerging threats to human health from communicable diseases. In order to fulfil its mandate, ECDC has developed methods of monitoring potential public health threats from a European perspective [20], under the principle of subsidiarity and building on the experience acquired by the health threat unit of the European Commission and WHO.

7.6 ECDC and Epidemic Intelligence

Since its foundation, the ECDC has developed a structure that combines the evolving methods to identify previously unknown or emerging health threats with traditional routine surveillance systems that include European-wide surveillance networks.

The epidemic intelligence function is one of the fundamental activities at ECDC. The objective is to produce timely and verified intelligence on events of public health interest to be acted upon by public health authorities or medical professionals.

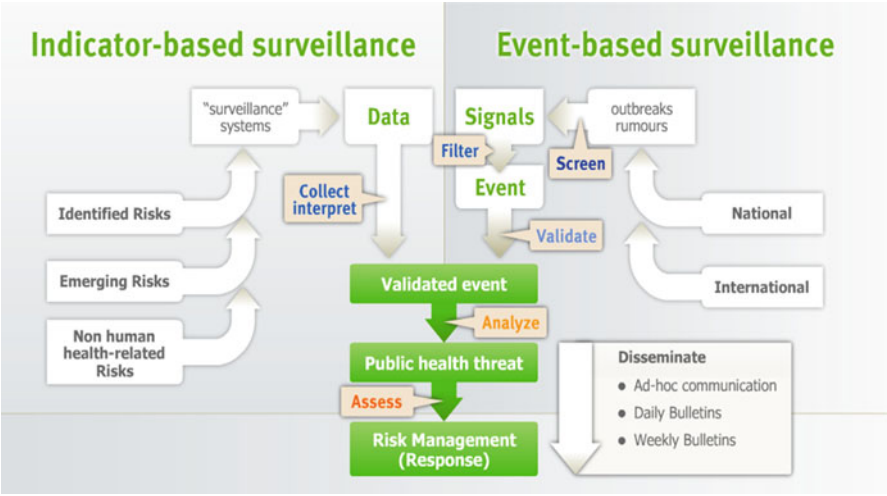

Fig. 7.1 ECDC threat detection framework

The process of epidemic intelligence implies, among other things, the screening of unstructured information (including web, official authorities and media reports). Filtering the relevant events and validating among these unverified information, is part of the process. Epidemic intelligence needs to be understood both as a linear and as a repetitive process. At each repetition the level of information available will change and a new assessment may be needed.

The epidemic intelligence process includes two components: Indicator-based surveillance (IBS) and Event-based surveillance (EBS) [20]. Both components' purpose is to identify public health events. While IBS deals with data that have been previously validated, EBS focuses on media articles, rumours, and other unverified information, that therefore requires validation. The graph in Fig. 7.1 shows the process described, from the IBS/EBS perspective.

When the ECDC became operational in 2005, it began to "gather and analyse data and information on emerging public health threats" (Article 9 of the Founding Regulations of the Centre). According to Article 2(e), health threat "shall mean a condition, agent or incident which may cause, directly or indirectly, ill health". The Founding Regulations further state that ECDC's mission is to "identify, assess and communicate current and emerging threats to human health from communicable diseases" (Article 3(1)). Article 8 states that the ECDC shall "assist the Commission by operating the early warning and response system" and "analyse the content of messages received by it".

The epidemic intelligence process considers emerging threats that are either directly reported to the ECDC through member state notifications on the Early Warning and Response System (EWRS) according to defined criteria [7] or found through active screening of various sources, including national epidemiological

bulletins, and international networks such as the Program for Monitoring Emerging Diseases (ProMED-mail), the Global Public Health Intelligence Network (GPHIN), media, and various additional sources, both formal and informal.

The EWRS is the main source of confirmed threats in the EU [9]. It is a dedicated restricted network within the EU for alerts and response, with a legal basis that divides the system into three operational components: an early warning and response system for reporting of specified threats to the public; the exchange of information between accredited structures and authorities of the member states relevant to public health; and specific networks on diseases selected for epidemiological surveillance in the EU member states. The system is hosted and maintained by the ECDC. The EWRS objective is to ensure a rapid and effective response by the EU to events (including emergencies) related to communicable diseases. Competent public health authorities of the member states have to communicate to the network any threat matching a set of defined criteria, by posting a new message. New messages are then followed by comments on the same threat, forming threads of messages. EWRS criteria are the following:

- Outbreaks of communicable diseases extending to more than one Member State of the Community.
- Spatial or temporal clustering of cases of a disease of a similar type if pathogenic agents are a possible cause and there is a risk of propagation between Member States within the Community.
- Spatial or temporal clustering of cases of disease of a similar type outside the Community if pathogenic agents are a possible cause and there is a risk of propagation to the Community.
- The appearance or resurgence of a communicable disease or an infectious agent which may require timely coordinated Community action to contain it.
- Any IHR notification has to be reported also through EWRS.
- Any event related to communicable diseases with a potential EU dimension necessitating contact tracing to identify infected persons or persons potentially in danger may involve the exchange of sensitive personal data of confirmed or suspected cases between concerned Member States.

From January 2005 until the end of 2010, 1,023 new message threads were posted in the EWRS, of which 982 were related to disease threats. In 2010, the number of message threads was similar to previous years excluding the ones related to influenza (Fig. 7.2).

The number of comments – 1,911 – posted as reply to messages in 2010 was also similar to other years, excluding the year 2009, when messages and comments were significantly higher due to the influenza H1N1 pandemic (Fig. 7.3).

An analysis of a 276-week series of new threats, posted in EWRS between 2004 and 2009, shows a positive trend of EWRS use by the member states over the 6-year period. Two outlying data sets emerge: a cluster of events in 2006 attributable to avian influenza (H5N1) and an increase attributable to the H1N1 pandemic in 2009. The average number of new message threads posted per week during the H1N1 pandemic 2009 was 19.16 versus 1.92 during the preceding 5 years, indicating an unprecedented ten-fold increase in reporting during the pandemic period (Fig. 7.4).

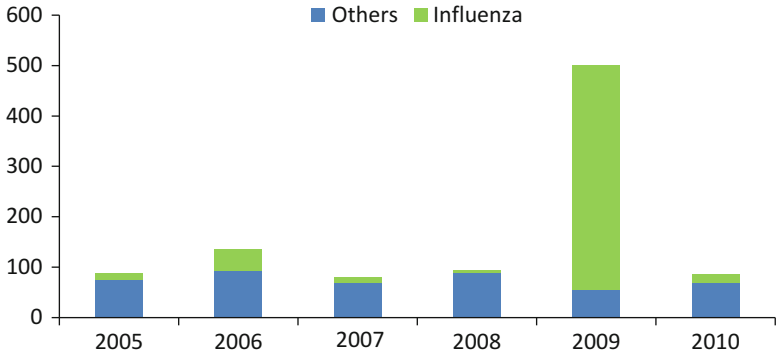

Fig. 7.2 EWRS – Distribution of message threads related to influenza and other pathogens by year of posting

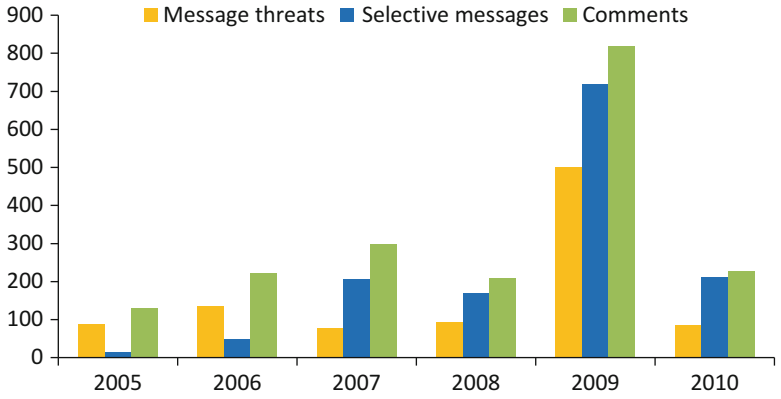

Fig. 7.3 Distribution of EWRS messages by year of posting

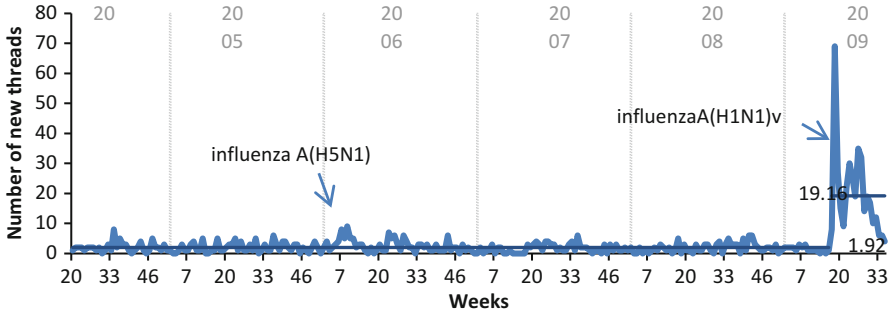

Fig. 7.4 Number of new message threads posted per week in EWRS from week 20/2004 to week 35/2009

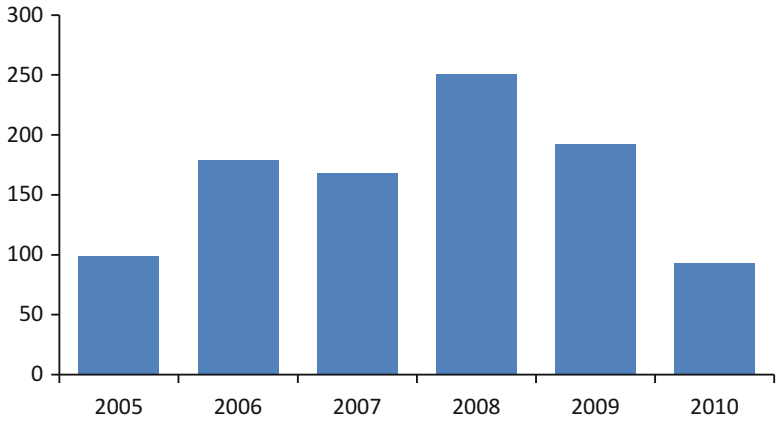

Fig. 7.5 Number of monitored threats by ECDC event-based epidemic intelligence, 2005–2010

The EWRS platform is increasingly used by the EU member states to share information on communicable disease events and facilitate the cross-border coordination of public health measures.

Complementarily, since June 2005, the event-based monitoring of ECDC has recorded about 900 threats, ranging yearly between 93 in 2010 and 251 in 2008 (Fig. 7.5).

Disease-specific surveillance networks, EWRS or information sent to the ECDC by the EU member states or WHO are all considered confidential sources with restricted access. Public sources, on the contrary, are sources accessible on the internet. The main source of new threats is the European Legionnaires' Disease Surveillance Network (ELDSNet). It accounts for nearly a third of newly monitored threats, while EWRS constitutes one fifth of threats monitored by ECDC. The proportion of newly monitored threats originating from confidential sources ranged from 70 to 80% between 2006 and 2010 (Table 7.3).

Some examples of recent threats monitored by ECDC can help understand the added value of a European focus of epidemic intelligence in identifying clustering of cases, assessing their importance to public health, and supporting a multi-country response.

7.6.1 Dengue in Croatia and France

On 13 September 2010, the French Ministry of Health reported the first autochthonous case of dengue fever in metropolitan France. The case was detected through the enhanced routine surveillance system in place from May to October 2010 in areas infested by *Aedes albopictus* in South Eastern France [17]. The information

Table 7.3 Sources of information for newly opened threats at ECDC, by year (EU countries and countries of the European Economic Area)

	Percentage of new threats monitored per year						
Source	2005	2006	2007	2008	2009	2010	Total
Confidential sources							
EPIS for food and water borne diseases						2	0
EWGLI/ELDSNET	2	18	28	34	49	30	29
EWRS	23	32	30	32	24	19	28
WHO	17	9	4	1	2	6	5
Information from member states	1	3	1	3	1	5	2
European disease surveillance networks	9	7	6	2	3	2	4
Other confidential sources		1	3	4	2	11	3
Total percentage	**53**	**70**	**71**	**77**	**80**	**76**	**72**
Public sources							
PROMED	36	9	14	4	3	1	10
MedISYS	2	3			4		2
GPHIN	4	12	3		2		4
Eurosurveillance	0	1	1				0
Public reports available on the Internet	5	6	8	7	5	8	7
Other public sources			2	11	6	14	6
Total percentage	**47**	**30**	**29**	**23**	**20**	**24**	**27**
Total number of threats	**99**	**163**	**142**	**228**	**174**	**83**	**889**

was made available on the public website of the Ministry of Health and through the EWRS on the same day.

The case, residing in Nice (district of Alpes Maritimes) developed symptoms on 23 August 2010 and fully recovered after hospitalisation. Laboratory tests performed in early September confirmed the infection. The case had no history of recent international travel and no blood transfusion.

A second case from the same neighbourhood, presenting onset of symptoms at the beginning of September, was laboratory confirmed on 17 September 2010. These two autochthonous cases of dengue fever were clustered in space and time suggesting an on-going local transmission of dengue. In response to this event, the French authorities have strengthened entomological surveillance in the infested regions and vector control activities in the areas where the cases were reported. Active case finding was implemented in the neighbourhood where cases resided. Communication campaigns for the general public and health professionals also took place [14].

On 30 September 2010, the German health authorities notified through EWRS a laboratory confirmed case of dengue fever in a German citizen returning from Croatia. The patient spent 2 weeks in the beginning of August in Podobuce/Orebić

on the Pelješac peninsula, 60 km northwest from Dubrovnik, in the southern part of the country. Considering the onset of symptoms and the incubation period of the disease, the patient was most likely infected during his stay in Croatia [22]. The national health authorities of Croatia took adequate control measures, including raising awareness among health professionals, strengthening human and vector surveillance, implementation of control measures, and communication of personal protective measures to the public. On 22 October 2010 one more case with febrile illness was identified through active case finding in the same village where the infected tourist resided. In addition, 9 of 14 blood samples of healthy individuals living in close proximity suggested recent infection with dengue virus. Further evidence of autochthonous transmission was suggested following a sero-prevalence survey using a random sample of the population living in the area. Five per cent of tested individuals had laboratory indication of recent infection [8, 10].

On 15 September 2010, the ECDC shared a threat assessment for the EU conducted in collaboration with national and disease specific experts of EU member states through the EWRS. The conclusion was that the detection of two autochthonous cases of dengue fever in France and the first autochthonous case in Croatia were significant public health events, but not unexpected. The described events have been the first locally acquired dengue cases reported in continental Europe since 1927–1928, when large dengue outbreaks occurred in Greece. All cases in 2010 occurred in areas known to be infested by *Aedes albopictus* mosquitoes. Previous events, including the chikungunya outbreak in Italy in 2007 [1], the occurrence of vector-borne diseases around airports and other ports of entry, and a previous risk assessment on dengue introduction in the EU [15] indicate that autochthonous transmission of dengue in continental Europe is possible, as confirmed by these events. At the end of the period of mosquito activity, usually in October/November, the risk of establishment of sustained transmission of dengue in south-eastern France and in southern Croatia and further spread in Europe during 2010 appeared very limited. These two events highlighted the need to further strengthen vector monitoring, active surveillance for imported and autochthonous human cases, awareness of health care providers, and laboratory capacities, in countries where *Aedes albopictus* is present, and increase the effectiveness of rapid exchange of information among countries to identify threats and support the response.

7.6.2 Anthrax in Injecting Drug Users

In December 2009, two fatal cases of anthrax in injecting drug users, who had developed symptoms in the first week of December, were reported from Glasgow, Scotland. The initial cluster of five cases in Scotland increased to 47 cases with 16 fatalities until the outbreak was declared over.

In January 2010, one fatal case of anthrax in an injecting drug user was reported from Germany. Even though the strains identified in Germany and Scotland were indistinguishable, no link to Scotland could be established. Two further cases were

subsequently identified in Germany. On 5 February 2010, cases started to be reported also in England, the first case coming from the London area. Since the beginning of the outbreak in December 2009, 55 cases of anthrax in injecting drug users have been reported (Scotland 47, England 5, Germany 3), 21 of them fatal (Scotland 16, England 4, Germany 1), resulting in a case fatality rate of 38 %. The last case was reported from Kent, United Kingdom, on 3 November 2010. On 23 December 2010, the outbreak was officially declared over.

In Scotland and England, information was sent out to hospitals, general practitioners, emergency departments, microbiologists and drug services, in order to raise awareness and to request that cases of severe soft tissue infection or sepsis affecting injecting drug users be reported to their local public health authority. Samples of heroin were tested in Scotland in order to identify a possible contaminated batch, but did not yield any positive results. Considering the complex international distribution chain of heroin and the laboratory confirmed link between strains of *Bacillus anthracis* in Scotland and Germany, the exposure to a contaminated batch of heroin distributed in several EU member states seemed probable. However, the source could not be identified and additional cases occurred over the course of the year from the three initially affected areas. Even though skin and soft tissue infections in injecting drug users are common, anthrax as the cause of such infection, especially when fatal, is rare, and very few cases have been described so far [16, 19].

Immediately after the first notifications through EWRS, the ECDC and the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) issued a joint threat assessment and alerted their networks to gather additional information and to strengthen surveillance to detect possible additional cases in Europe. The threat assessment was updated after the reports about additional cases from England, which suggested a potentially wider spread of the possible source. The European law enforcement agency EUROPOL was also informed and provided support to their law enforcement network in EU member states in attempts to identify a possible deliberate source of contamination.

7.7 Concluding Remarks

Even though information technology and open source intelligence plays an important role in the surveillance activities of the ECDC, the human factor is essential. The use of tools in assisting automated filtering of the vast amount of information available is not yet developed enough to replace expert validation of the information. The production of threat assessments of importance to public health authorities are of little help without properly understanding the context and the consequences of possible measures that can be implemented. Human expertise still makes the difference in making sense of raw information.

The added value of the ECDC in the detection and control of communicable disease threats has not only been proven by the number of threat assessments requested and used for public health decisions, the involvement in support missions

for outbreaks and the number of expert meetings organised, but also by the rapid distribution of relevant information through weekly bulletins and postings on the ECDC website and by the contribution to methodological developments in public health security.

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