

# Communicable disease threats to public health in the European Union

Annual Epidemiological Report for 2017

## Introduction

This report covers the events, threats and actions taken in 2017 related to the findings of routine activities carried out by the ECDC epidemic intelligence team. The objective of epidemic intelligence at ECDC is to rapidly detect and assess public health events of any origin to ensure EU health security as defined in ECDC's mandate.

## Methods

This report is based on data from 2017 retrieved from ECDC's Epidemic Intelligence Information System (EPIS), Early Warning Response System (EWRS) and Threat Tracking Tool (TTT) on 12 January 2018. The different applications are described in the report.

For a detailed description of methods used to produce this report, refer to the *Methods* chapter [1].

An overview of the national surveillance systems is available online [2].

A subset of the data used for this report is available through ECDC's online *Surveillance atlas of infectious diseases* [3].

## 1 Epidemic intelligence

### 1.1 Description of the epidemic intelligence framework

Epidemic intelligence (EI) is the process of detecting, verifying, analysing, assessing and investigating events that may represent a threat to public health. It encompasses activities related to early warning functions, integrating event and indicator-based surveillance as well as signal assessments and outbreak investigations. Providing early warning signals is the main objective of public health surveillance systems. EI is the systematic collection and collation of information from a variety of sources either by screening information or via notification from Member States through EPIS platforms and EWRS.

When communicable disease outbreak signals are detected, they are assessed and verified to ensure they correspond to actual public health events. The identified events are discussed at the daily ECDC round table (RT) meeting and an initial assessment on appropriate ECDC actions is carried out. The assessment is based on analysis

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Suggested citation: European Centre for Disease Prevention and Control. Communicable disease threats to public health in the European Union. In: ECDC. Annual epidemiological report for 2017. Stockholm: ECDC; 2018.

Stockholm, November 2018

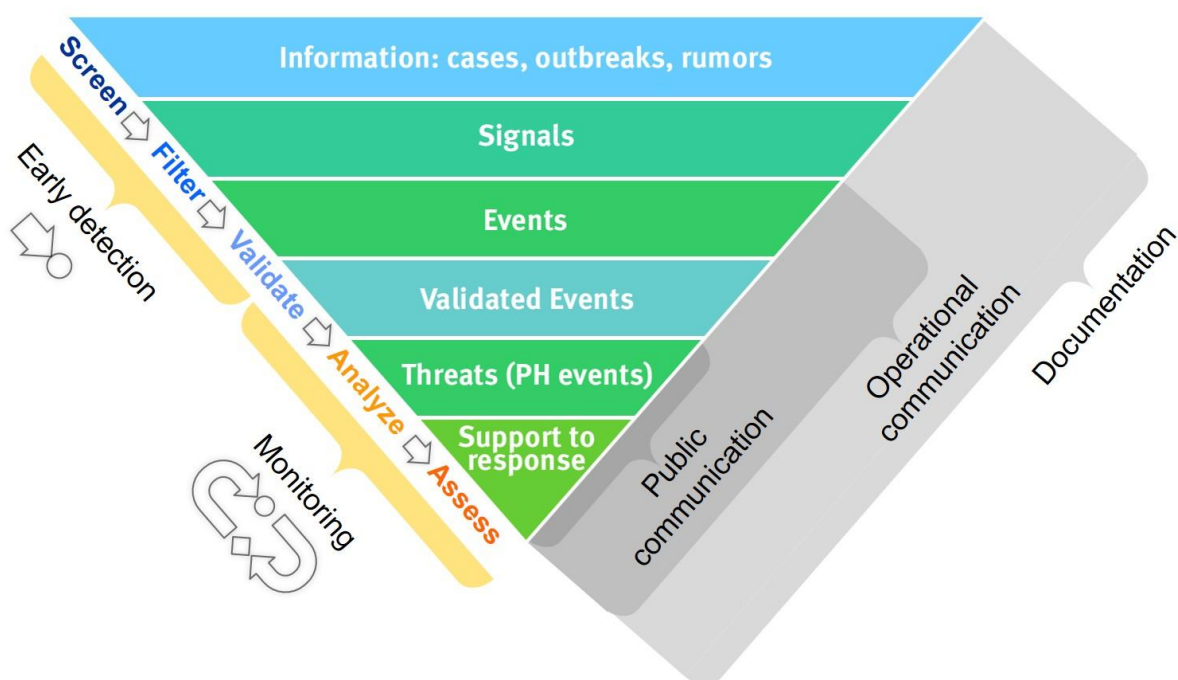
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made by the first-line duty officer using International Health Regulations (IHR) and EWRS criteria and expert opinions during the meeting. Possible actions include continued monitoring of the event, sharing information through the EPIS platform, launching an urgent inquiry (UI), preparing an epidemiological update (epi update), preparing or updating a rapid risk assessment (RRA), posting a news item on the ECDC website and offering technical assistance to affected Member States.

Early detection comprises six steps (Figure 1):

- Screening news, official reports and rumours through websites and social media relevant from a European perspective in order to distinguish the meaningful information signals by applying specified criteria
- Filtering signals to identify potential public health events of European interest
- Validating events that originate from unofficial sources by cross-checking with official and/or reliable media sources to ensure that the event detected is real
- A validated event is then analysed to capture the full information available about the event, including epidemiological data, facts related to exposure and contextual information.
- Based on analysis, an assessment is made to estimate the risk associated with the event.
- Communication and documentation of identified threats are an integral part of EI throughout the five steps above. Documentation consists of logging events and threats in a dedicated repository called Threat Tracking Tool (TTT).

**Figure 1. Process of epidemic intelligence**



Threats, also called public health events, are escalated and validated events that have an impact on public health. Monitoring previously identified threats refers to actively following up on all relevant information directly related to the concerned threat. This iterative process continues until the threat is considered to have subsided or all appropriate public health measures have been implemented.

## 1.2 Sources for epidemic intelligence

EI uses both indicator-based surveillance (IBS) and event-based surveillance (EBS) for the early detection of health threats.

- IBS data, which come from structured and well identified formal sources, can be found on health agency websites or distributed through newsletters to ECDC. ECDC hosts The European Surveillance System (TESSy), where EU/EEA countries report on over 50 communicable diseases based on agreed case definitions and set time intervals for reporting. For example, during West Nile fever monitoring season, EU Member States are asked to submit data each week by a set deadline so ECDC can produce an up-to-date West Nile fever map.
- Event-based surveillance refers mainly to media monitoring. There are moderated and unmoderated media aggregators to perform this activity. A good example of an unmoderated media aggregator is MediSys, which uses selected sources and keywords to capture outbreaks in over 50 languages. An example of a moderated system is ProMED.

For additional details, consult the ECDC Epidemic Intelligence tutorial [4].

## EU-specific sources for epidemic intelligence

To complement IBS and EBS as described above, two tools are operated by ECDC: EPIS and EWRS.

### EPIS

The system aims to ensure the transparent and timely sharing of information among participating public health authorities in order to detect public health threats at an early stage, coordinate response activities and facilitate reporting under Decision No 1082/2013/EU. There are five platforms in EPIS:

- **FWD (food and waterborne diseases):** EPIS-FWD facilitates the early detection and assessment of multi-country/multinational molecular typing clusters and outbreaks of FWDs. In 2017, the platform connected epidemiologists and microbiologists from 52 countries: 28 EU Member States, three European Economic Area (EEA) countries (Iceland, Norway and Liechtenstein) and 21 non-EU countries<sup>1</sup>. UIs are events launched by participating countries or ECDC to assess the multi-country dimension of events occurring at the national level.
- **STI (sexually transmitted infections):** EPIS-STI supports the rapid reporting and dissemination of unusual events related to STI transmission across the EU and assesses their EU relevance. The appointed contact points for STI surveillance in EU/EEA countries submit reports. All 31 EU/EEA Member States have access to EPIS-STI. Posting in EPIS-STI is voluntary and structured by infection and type of event. It is also possible to post 'null reports' (i.e. nothing of EU significance in a selected month).
- **ELDSNet (European Legionnaires' Disease Surveillance Network):** EPIS-ELDSNet is a communication tool where notifications of travel-associated Legionnaires' disease (TALD) cases are disseminated to ELDSNet and contact points outside the EU/EEA region. The focus is on detecting and following up on travel-associated clusters and investigating community outbreaks in an ad hoc forum with restricted access. This allows for risk assessment and timely communication to public health authorities in charge of risk management. In addition to EU/EEA Member States, 33 non-EU countries currently have access to EPIS-ELDSNet.
- **VPD (vaccine-preventable diseases):** EPIS-VPD facilitates the early detection and sharing of information on VPD outbreaks and adverse events following immunisation and allows for exchanging information on technical topics related to vaccination and vaccine-preventable disease control. The platform connects vaccination programme managers, vaccine experts, epidemiologists and microbiologists from EU/EEA Member States and the World Health Organization (WHO) Regional Office for Europe. Events of public health relevance are discussed through the UI or disease discussion functionalities of EPIS-VPD. Posts in EPIS-VPD are initiated by participating countries or ECDC to discuss and assess cross-border dimensions of events occurring at regional or national levels. EPIS-VPD is also used to share a weekly list of vaccine-related publications.
- **AMR (antimicrobial resistance) and HAI (healthcare-associated infections):** EPIS-AMR-HAI supports the rapid reporting and dissemination of information related to bacterial pathogens with previously unseen or emerging AMR and HAI that are or may become relevant for public health in the EU/EEA. All EU/EEA Member States have access to EPIS-AMR-HAI.

### EWRS

EWRS is used in the context of serious cross-border threats to health. The web-based system links the European Commission, ECDC and public health authorities in EU/EEA countries responsible for measures to control serious cross-border threats to health, including communicable diseases. Under Decision No 2119/98/EC of the European Parliament and of the Council and Decision No 2000/57/EC, Member States should inform about events likely to affect public health at the EU level. In 2013, Decision No 1082/2013/EU extended the scope of EWRS to all hazards. These decisions also regulate the procedure for reporting and functioning of the system. EWRS is frequently used for notifications on outbreaks, exchanging information and decisions about the coordination of measures among Member States. EWRS has been successfully deployed during a number of events, such as severe acute respiratory syndrome (SARS), Ebola virus disease, avian influenza in humans and other communicable diseases. ECDC is in charge of providing rapid risk assessments (RRAs) concerning messages received through EWRS. Since November 2007, ECDC has also supported the European Commission by operating the informatics of EWRS and providing technical input to the system.

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<sup>1</sup> Albania, Armenia, Australia, Bosnia and Herzegovina, Canada, Georgia, Israel, Japan, Kosovo (this designation is without prejudice to positions on status, and is in line with UNSCR 1244/1999 and the ICJ Opinion on the Kosovo declaration of independence), Moldova, Morocco, New Zealand, South Africa, Serbia, Switzerland, the former Yugoslav Republic of Macedonia, Montenegro, the United States, Tunisia, Turkey and Ukraine.

## Global sources of epidemic intelligence

On 15 June 2007, WHO implemented the International Health Regulations (IHR) (2005) in order to help the international community prevent, control and respond to public health threats. The scope of IHR (2005) is to provide a framework for the control of international outbreaks, strengthening international public health security and avoiding unnecessary traffic and trade limitations. In addition, IHR (2005) include operational concepts and procedures related to public health event notifications, risk assessment collaboration and international response coordination.

In order to manage epidemiological data, WHO developed an event management system (EMS) that allows for the timely exchange of information among countries and partners. EMS includes information such as EI data, risk assessment, critical decisions and actions taken by WHO, skills and availability of international experts for response teams and standardised information products for public health officials and the public.

### 1.3 ECDC response

All threats and relevant signals detected through EI screening are discussed at the daily RT meeting involving experts in several fields available at ECDC. The aim of this meeting is to properly assess threats or potential threats and decide on relevant actions.

To support the decision-making process during RT meetings, ECDC implements systematic analysis based on likely scenarios that include critical events, risk, immediate actions and preparedness planning. Once a threat is verified as a potential public health concern, an RRA is undertaken (usually within 72 hours) to evaluate the risks to human health as per ECDC operational guidance.

Typical events that can trigger the production of an RRA include:

- outbreaks or events related to communicable diseases extending to more than one Member State of the EU/EEA
- outbreaks or events related to communicable diseases where there is a risk of introduction to or propagation between Member States within the EU/EEA
- outbreaks or events related to communicable diseases that may require timely and coordinated EU action to contain
- outbreaks or events that may potentially have a high impact on public health or where EU assistance may be requested
- events where contact tracing across EU internal borders necessitates information exchange
- a communicable disease event with high public, media or political interest in the EU
- follow-up requests by EU Member State, European Commission (EC) or ECDC senior management teams (SMT)
- serious, unusual or unexpected public health events or outbreaks of unknown origin
- public health events that pose significant travel risks and trade restrictions; and
- public health incidents of non-natural origin and at least one of the previous criteria.

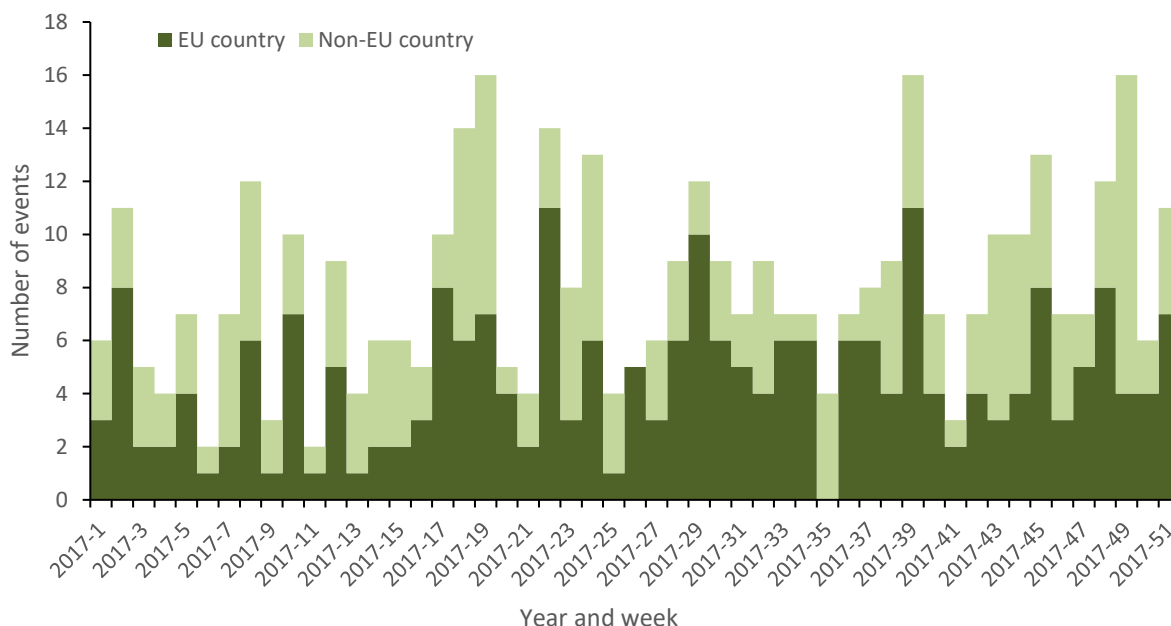
## 2 Threat detection in 2017

### 2.1 Sources of threat detection

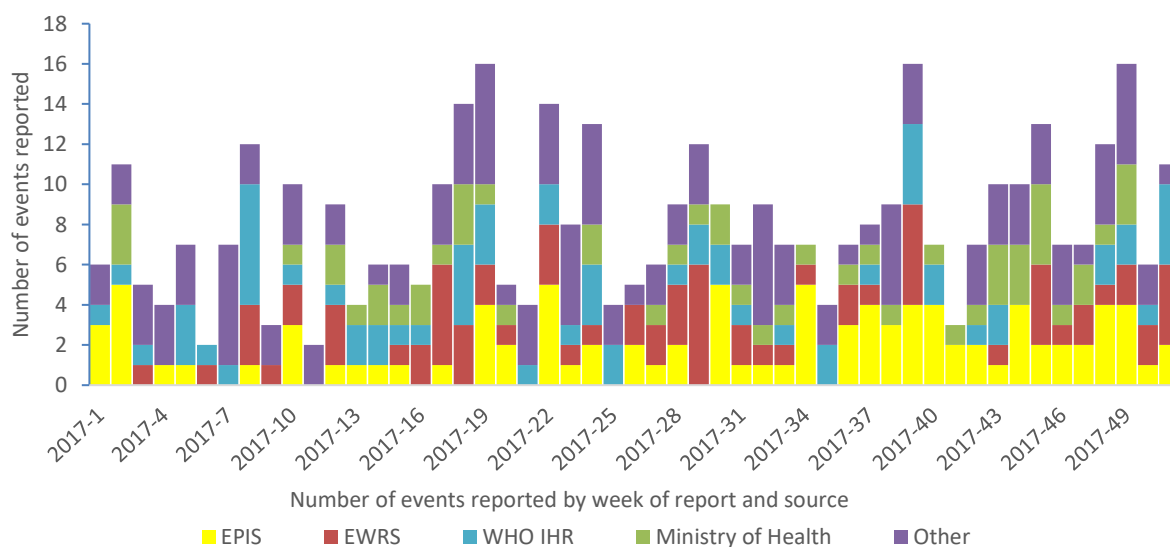
#### Events originating from epidemic intelligence screening

In 2017, 411 events were monitored and discussed at the daily round table meetings. Sixty-nine led to the opening and monitoring of a new threat. Of all events, 232 originated in the EU (56%; Figure 2) and the ECDC epidemic intelligence team reported an average of eight events per week. In comparison, in 2016, 371 events were monitored, of which 37 led to opening of a new threat. In 2016, 215 events (68%) originated in the EU.

**Figure 2. Number of events detected through epidemic intelligence by week of reporting, 2017 (excluding already monitored and opened threats)**



**Figure 3. Number of events detected through epidemic intelligence by week of reporting, 2017 (excluding already monitored and opened threats)**



Of the 411 events, 95 were initially reported through EPIS, 73 through EWRS and 66 reports were received from WHO. The source of information was either ProMED, FluTrackers, media or other sources for 125 events.

For 52 events, the source of information was marked 'Ministry of Health'. These reports were most likely detected through other sources and later verified with information on the Ministry of Health websites (Figure 3).

## Events reported through EPIS

### Food and waterborne diseases and zoonoses (EPIS-FWD)

In 2017, 53 UIs were initiated by 16 participating countries (52) or ECDC (1). Most frequently, UIs were related to salmonellosis (26), followed by verotoxigenic *Escherichia coli* infection (9) and listeriosis (6), similar to previous years. In 2017, 15 UIs affected more than one country. On average, nine countries replied to a UI and 35 replied to at least one.

During the year, in relation to EPIS-FWD, ECDC notified the European Commission about 12 verified multi-country events, published 10 RRAs, seven epidemiological updates and three joint rapid outbreak assessments with the European Food Safety Authority (EFSA).

The number of UIs launched in 2017 remains high after a peak in 2015 (53 in 2016, 57 in 2015, 45 in 2014, 42 in 2013 and 49 in 2012). The number of countries that initiated UIs decreased in 2017 compared with 2016, but is similar to 2015 (24 in 2016 and 17 in 2015).

### Sexually transmitted infections (EPIS-STI)

In 2017, two STI alerts were posted by Lithuania and Malta. In addition, Latvia, Lithuania and Malta posted 34 monthly 'null reports'.

In November, Malta informed the network about a case of Lymphogranuloma venereum infection in a man who has sex with men (MSM) diagnosed one month after he had unprotected sex with multiple partners on an international gay cruise. Lithuania reported one case of congenital syphilis notified to national authorities in December.

In 2017, EPIS-STI was used to inform the network about the developments of the hepatitis A outbreak mostly affecting MSM in the EU/EEA.

### European Legionnaires' disease surveillance network (EPIS-ELDSNet)

Twenty-three EU/EEA and three non-EU/EEA countries reported 1 487 TALD cases with date of onset in 2017 to ELDSNet. In 2017, 178 new standard TALD clusters were detected in 39 countries (18 EU/EEA countries and 21 countries outside the EU/EEA) and onboard ships (two clusters). ELDSNet shared 47 summary reports of type 1 (non-EU/EEA clusters) with tour operators and 56 of type 2 (rapidly evolving clusters, i.e. three or more cases associated within three months). Control measures were implemented in all but 11 clusters, with ELDSNet receiving feedback from a first-risk assessment within two weeks and a final assessment within six weeks. Eleven accommodation site names were published on the ECDC website in 2017.

### Vaccine-preventable diseases (EPIS-VPD)

In 2017, 12 enquiries were posted on EPIS-VPD, generating 22 follow-up postings. Topics discussed included mainly measles, hepatitis A, invasive meningococcal disease and serogroup B meningococcal vaccine, human papillomavirus vaccine and programmatic issues such as vaccine distribution and shortages.

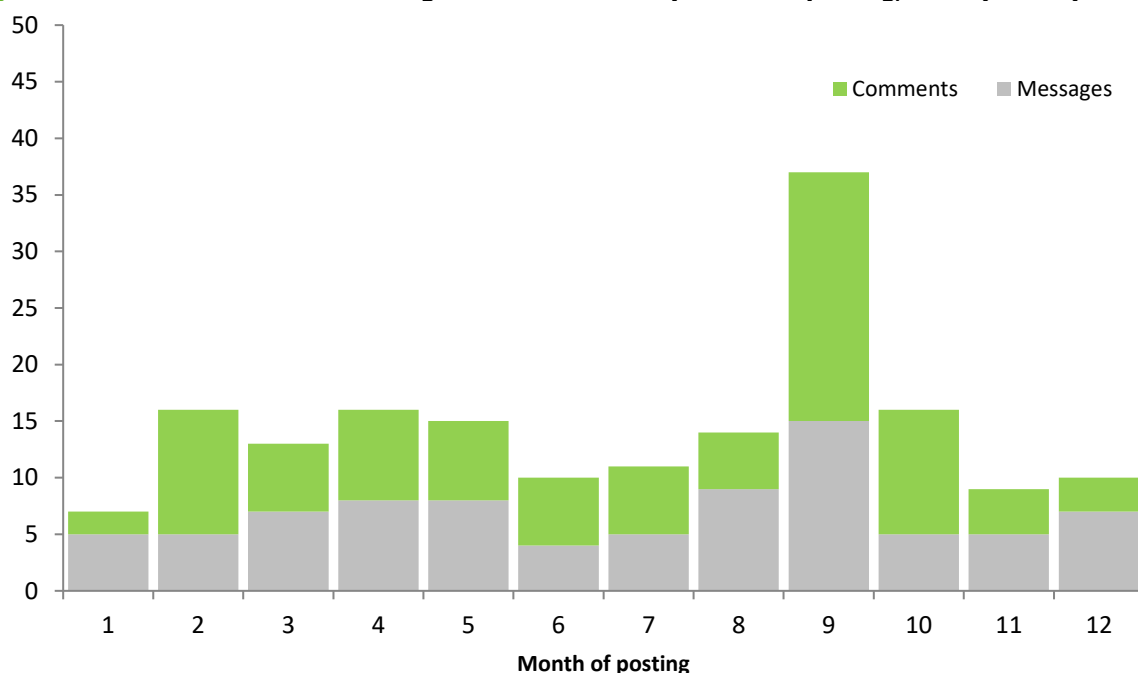
### Antimicrobial resistance and healthcare-associated infections (EPIS-AMR-HAI)

In 2017, there were no new urgent inquiries launched through EPIS-AMR-HAI.

## Threats reported through EWRS

In 2017, 83 EWRS messages and 91 comments were posted. Of the 83 messages, 52 were classified as alert notifications and 31 as other information (outside of the scope of Article 9 in Decision No 1082/2013/EU). Of the 83 EWRS messages, 12 resulted in opening a new threat, representing 18% of all threats opened in 2017. Of the 12 threats opened, eight resulted in RRAs.

The number of messages and comments posted on EWRS has been stable over the past 11 years except in 2009, when 1 400 postings were made in relation to pandemic influenza. From January 2005 until the end of 2017, 4 940 messages and comments were posted in EWRS, 174 of them in 2017 (Figure 3).

**Figure 4. Distribution of EWRS messages and comments by month of posting, 2017 (n=174)**

The increase in the number of messages and comments posted in September 2017 correlates to the cases of malaria (4 messages), chikungunya (2 messages, 3 comments) and typhoid fever (3 messages, 8 comments) reported and re-reported in Europe during that month.

## 2.1 Threats monitored

In 2017, ECDC opened and monitored 69 new threats in addition to the 18 carried over from previous years (Table 1), more than the average number of 40 yearly threats monitored over the past five years.

In 2017, emerging and vector borne diseases represented the disease group for which most of the new threats were opened (28), followed by FWDs (Table 2).

Twenty-eight rapidly evolving clusters were included in the TTT as separate threats. The proportion of FWD threats recorded in the TTT have diminished since the launch of EPIS FWD because they have mainly been followed through EPIS. EPIS FWD threats are discussed at the ECDC round table if a UI is launched in EPIS or there is a EWRS posting.

**Table 1. Threats carried over from previous years**

Long-term threats	Creation date
Poliomyelitis–multistate (world) – monitoring global outbreaks	8 September 2005
Influenza A(H5N1) and other strains of avian flu–non EU/EEA countries	15 June 2005
Cholera – multistate (world) – monitoring global outbreaks	20 March 2006
Dengue–multistate (world) - monitoring global outbreaks	20 March 2006
Measles–multistate (EU) – monitoring European outbreaks	9 February 2011
Rubella–multistate (EU) – monitoring European outbreaks	7 March 2012
Middle East respiratory syndrome coronavirus (MERS-CoV) – multistate	24 September 2012
Influenza A(H7N9) – China – monitoring human cases	31 March 2013
Chikungunya- multistate (world) – monitoring global outbreaks	9 December 2013
Zika – multistate (world) – monitoring global outbreaks	16 November 2015
Travel-associated Legionnaires' disease – Dubai – 2016/2017	10 November 2016
Multidrug-resistant tuberculosis in migrants – multistate (Europe) – 2016–2017	18 November 2016
Type E botulism likely associated with fish consumption – Germany and Spain	29 November 2016
Hepatitis A outbreaks in the EU/EEA mostly affecting MSM – 2016–2017	12 December 2016
Seasonal monitoring	Creation date
West Nile virus – multistate (Europe) – monitoring season	2 September 2010
Monitoring environmental suitability of <i>Vibrio</i> growth in the Baltic Sea – summer 2017	6 July 2015
Yellow fever outbreak – multistate (world) – monitoring global outbreaks	17 March 2016

**Table 2. Distribution of threats by disease group or health issue and year, June 2005–December 2017**

Disease group	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Legionnaires' disease	6	36	44	83	91	28	6	14	5	13	9	7	28
Food- and waterborne diseases	37	56	31	52	24	7	17	9	8	3	4	9	11
Emerging and vector-borne diseases	23	27	23	27	18	13	12	9	5	15	9	8	16
Vaccine-preventable diseases	14	16	14	34	15	12	5	4	4	5	4	3	5
Influenza and other respiratory viruses	7	10	6	9	12	5	5	7	5	4	3	4	4
Sexually transmitted infections	1	2	2	1	1	2	1	0	0	0	1	0	0
Tuberculosis	2	3	15	11	8	0	0	3	0	0	1	2	1
Antimicrobial resistance	3	0	0	1	0	1	1	2	0	1	3	2	0
Mass gathering	1	2	0	2	3	8	1	8	1	3	1	2	2
Other	5	11	7	8	2	7	5	1	2	0	1	0	2



## 3 Response to threats

### 3.1 Rapid risk assessments and epidemiological updates

RRAs aim to support EU/EEA countries and the European Commission in their preparedness and response to a public health threat. They provide a timely summary and risk assessment of a public health threat for EU/EEA countries related to a specific event. They also include potential options for response. As outbreaks or public health events develop, ECDC may issue updated risk assessments. Developments in an outbreak that do not affect the overall assessment result in an epidemiological update.

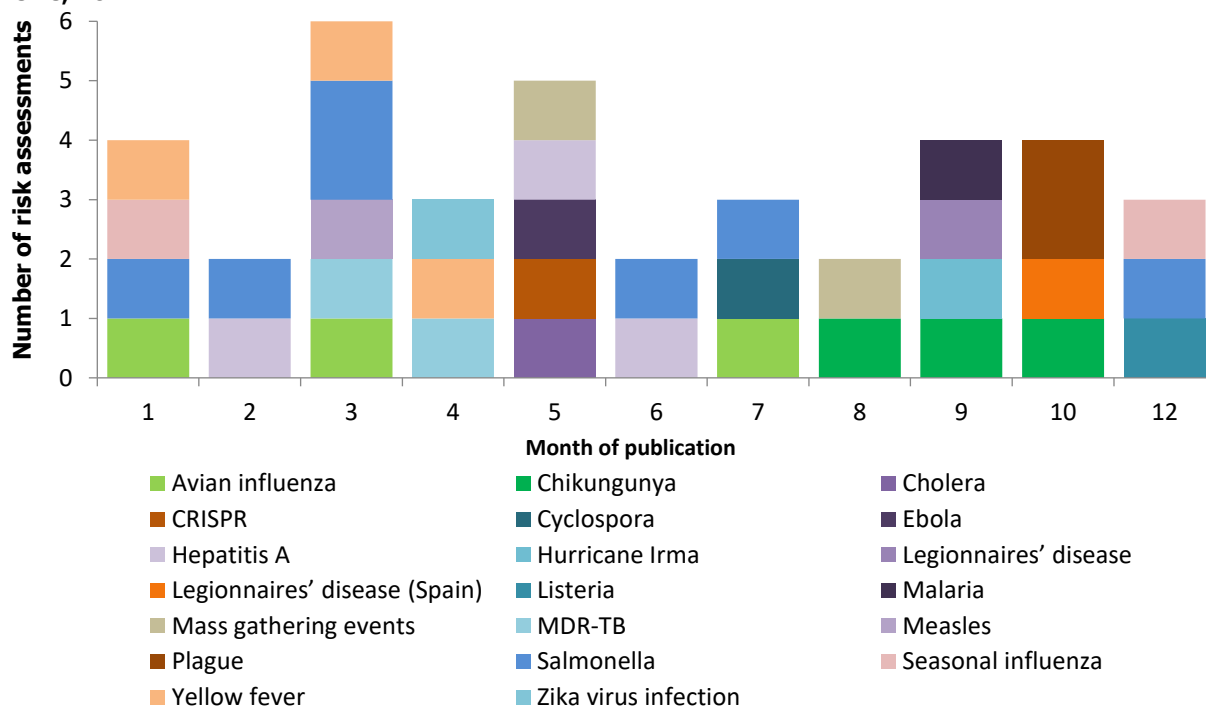
In 2017, ECDC published 38 RRAs (including 3 related to FWDs (Table 3, Figure 4 and Annex 1). Fourteen of the 38 risk assessments were updates. In addition, 3 were produced, but not published. In 2016, 38 risk assessments were produced.

Fifty-five epidemiological updates were produced in 2017, of which the majority were updates on measles outbreaks in Europe (22). In 2016, 45 epidemiological updates were produced, of which the majority were updates on Zika virus infection (39).

**Table 3. List of published ECDC epidemiological updates by subject and number of publications, January to December 2017**

Subject	Number of updates
Measles – monitoring European outbreaks	22
Yellow fever outbreak in Brazil	15
Legionnaires' disease among EU travellers returning from Dubai	6
Hepatitis A outbreak in the EU/EEA mostly affecting MSM	4
Chikungunya – Europe	3
Multi-country outbreak of <i>Salmonella</i> Enteritidis phage type 8, MLVA profile 2-9-7-3-2 and 2-9-6-3-2 infections	2
Plague in Madagascar	1
Botulism in Germany	1
Review of influenza season 2016–2017 in the EU/EEA	1

**Figure 5. Rapid risk assessments published in 2017 by month of publication and topic (n=38), ECDC, 2017**



*CRISPR (clustered regularly interspaced short palindromic repeats) relates to the risk related to the use of 'do-it-yourself' CRISPR-associated gene engineering kit contaminated with pathogenic bacteria.*

*Mass gathering events that took place in 2017 were WorldPride Madrid 2017 from 23 June–2 July 2017 [5] and the Hajj in Saudi Arabia from 30 August–4 September 2017 [6].*

RRAs are published on the ECDC website. Prior to publication, RRAs are circulated to the European Commission and Member States through EWRS as per requirement for prior notification stated in Article 10 of Decision No 1082/2013/EU.

## 3.2 Deployment of experts in 2017

ECDC provides technical support at the request of EU/EEA Member States or third countries involved in assessing or responding to a communicable disease threat.

In 2017, ECDC mobilised expertise on three occasions:

- In January 2017, ECDC responded to a request from the Global Outbreak Alert and Response Network (GOARN) for assistance in mobilising French-speaking epidemiologists in order to assist the WHO response to the outbreak of cholera in Haiti. ECDC provided logistical assistance and the epidemiologists deployed were Member States experts. Three experts were selected and deployed.
- During the outbreak of plague in Madagascar and under the request of WHO, ECDC deployed one EPIET trainee for 4 weeks in Madagascar in autumn 2017.
- In response to the increased importation of cases of TALD in Europe from Dubai, ECDC deployed one expert in Dubai and followed up with a mission to the WHO Regional Office for the Eastern Mediterranean headquarters in Cairo. The increase in imported cases was detected through the ECDC ELDSNet surveillance scheme on TALD.

## 4 Threats of particular interest in 2017

### 4.1 Malaria outbreaks in Europe

During 2017, four EU countries reported malaria cases acquired locally within the EU.

#### Italy

On 5 September 2017, Italy reported a fatal case of malaria in a four-year-old girl with no travel history to a malaria-endemic country prior to onset. The girl was admitted to a hospital in the Veneto region on 13 August 2017 and diagnosed with diabetes mellitus. After returning from the Veneto region, she was admitted to a Trento hospital for diabetes from 16 to 21 August 2017 and diagnosed with pharyngitis on 31 August 2017. On 2 September 2017, she was admitted and diagnosed with *Plasmodium falciparum* (*P. falciparum*) malaria and subsequently transferred to the tropical diseases reference centre in Brescia, where she died on 4 September 2017.

Epidemiological investigations identified two patients infected with *P. falciparum* who were hospitalised in the same ward during her stay in the Trento hospital from 16 to 21 August 2017. Both cases were imported. The investigation at the Trento hospital did not identify breaches in medical procedures that could have resulted in iatrogenic transmission. Entomological investigations in the Trento area did not reveal the presence of *Anopheles* mosquitoes. Molecular sequencing of the *Plasmodium* strain from the girl and the two other concomitantly hospitalised children was carried out to assess the link between the cases [7].

On 4 October 2017, four *P. falciparum* malaria cases were reported from the Apulia region. The cases were African men aged 21–37 years working in agriculture in Ginosa and Castellaneta. The cases had onset of symptoms between 20 and 27 September 2017 and had been in Italy for more than three months prior to onset of symptoms. Malaria vectors such as *Anopheles labranchiae* and *Anopheles superpictus* are present in Italy [8].

#### Greece

In 2017, Greece reported five autochthonous cases of *Plasmodium vivax* (*P. vivax*) malaria acquired via vector-borne transmission following likely exposure in the regions of Dytiki Ellada in Western Greece (4 cases) and Sterea Ellada in Central Greece (1). These cases resulted from local transmission following recent introduction of *P. vivax* in the area (introduced cases). The onset of symptoms in the cases ranged from 2 May–22 July 2017. In addition, Greece reported one locally acquired case of *P. falciparum* in the region of Epirus in north-west Greece with date of onset of symptoms from 17–23 July 2017. The case, who has no travel history to a malaria-endemic area, was hospitalised for a non-infectious medical condition in a ward where another patient was treated for *P. falciparum* malaria. The most likely place of exposure for this particular case was a healthcare facility, but it was not possible to determine the exact mode of transmission (mosquito vector or of iatrogenic origin). The investigation excluded transmission through blood transfusion, but instead suggested nosocomial transmission, either mosquito-borne within the healthcare facility or of iatrogenic origin [7]. No locally acquired malaria cases were reported in the area.

#### France

On 7 September 2017, France reported two locally acquired malaria cases in the department of Allier in the Auvergne-Rhône-Alpes region in central France. Both cases attended a wedding that took place from 11–16 August 2017 in Moulins, Allier department, France. On 30 August 2017, the first case was diagnosed after admission to hospital in the southwest of France for fever, chills and sweats evolving since 26 August 2017. The patient had not travelled abroad and had no risk factors for induced malaria. The only recent trip was to Moulins and its surroundings to attend the wedding.

On 1 September 2017, a second case who attended the same wedding was diagnosed upon returning home. The case had onset of symptoms on 26 August 2017 and neither exposure to induced malaria nor recent travel history to a malaria-endemic area. The Regional Health Agency of Auvergne-Rhône-Alpes implemented active case finding in neighbouring laboratories and hospitals. None of the wedding attendees reported recent travel history to a malaria-endemic country or symptoms compatible with malaria. However, an imported case of *P. falciparum* malaria from Burkina Faso was identified as having stayed in Moulins and its surroundings for several days within the two weeks before the wedding. Entomological investigations conducted in the areas visited by the imported case and autochthonous cases did not find evidence of the presence of *Anopheles plumbeus*, a potential competent vector.

## United Kingdom (northern part of Cyprus)

On 8 September 2017, the United Kingdom reported through EWRS three cases of *P. vivax* malaria in travellers returning from Esentepe in the northern part of Cyprus. Two of the cases were siblings aged 12 years who travelled independently from the third case. The three cases stayed in the northern part of Cyprus for two to three weeks in August and developed symptoms on 29 August 2017. They were laboratory-confirmed upon returning to the UK.

**Table 4. Number of locally acquired cases of malaria in the EU by country of report, May–October 2017**

Country	No.	<i>Plasmodium</i> species	Date of onset	Suspected mode of transmission Place of infection	Date of report
France	2	<i>P. falciparum</i>	26 August 2017	Mosquito-borne, Allier, France	7 September 2017
Greece	5	<i>P. vivax</i>	2 May–22 July 2017	Mosquito-borne, regions of Dytiki Ellada and Sterea Ellada, Greece	18 May/21 July/ 17 August 2017
	1	<i>P. falciparum</i>	17–23 July 2017	Mosquito-borne or nosocomial, region of Ipeiros, Greece	17 August 2017
Italy	1	<i>P. falciparum</i>	29 August 2017	Mosquito-borne or nosocomial, Trento I, Italy	5 September 2017
United Kingdom	3	<i>P. vivax</i>	29 August 2017	Mosquito-borne, northern part of Cyprus	8 September 2017
Italy	4	<i>P. falciparum</i>	20–27 September 2017	Mosquito-borne, Apulia region, Italy	4 October 2017

## 4.2 Chikungunya outbreaks in France and Italy

Between August and November 2017, both France (Var department) and Italy (Lazio and Calabria regions) reported autochthonous transmission of chikungunya virus. The two events were distinct as they involved strains of different origins.

### France

On 11 August 2017, France notified of an outbreak of autochthonous chikungunya virus infection in Var department (Provence-Alpes-Côte d'Azur region) of south-east France through EWRS. The index case developed symptoms on 2 August 2017 and was confirmed by RT-PCR. During the outbreak, which lasted from July to September 2017, two clusters were detected. The first cluster in Le Cannet-des-Maures included nine confirmed and two probable cases. The second cluster in Taradeau included six confirmed cases. Taradeau commune is 13 kilometres away from Le Cannet-des-Maures. There is an epidemiological link between the cases in Taradeau and Le Cannet-des-Maures, indicating that the two clusters are related.

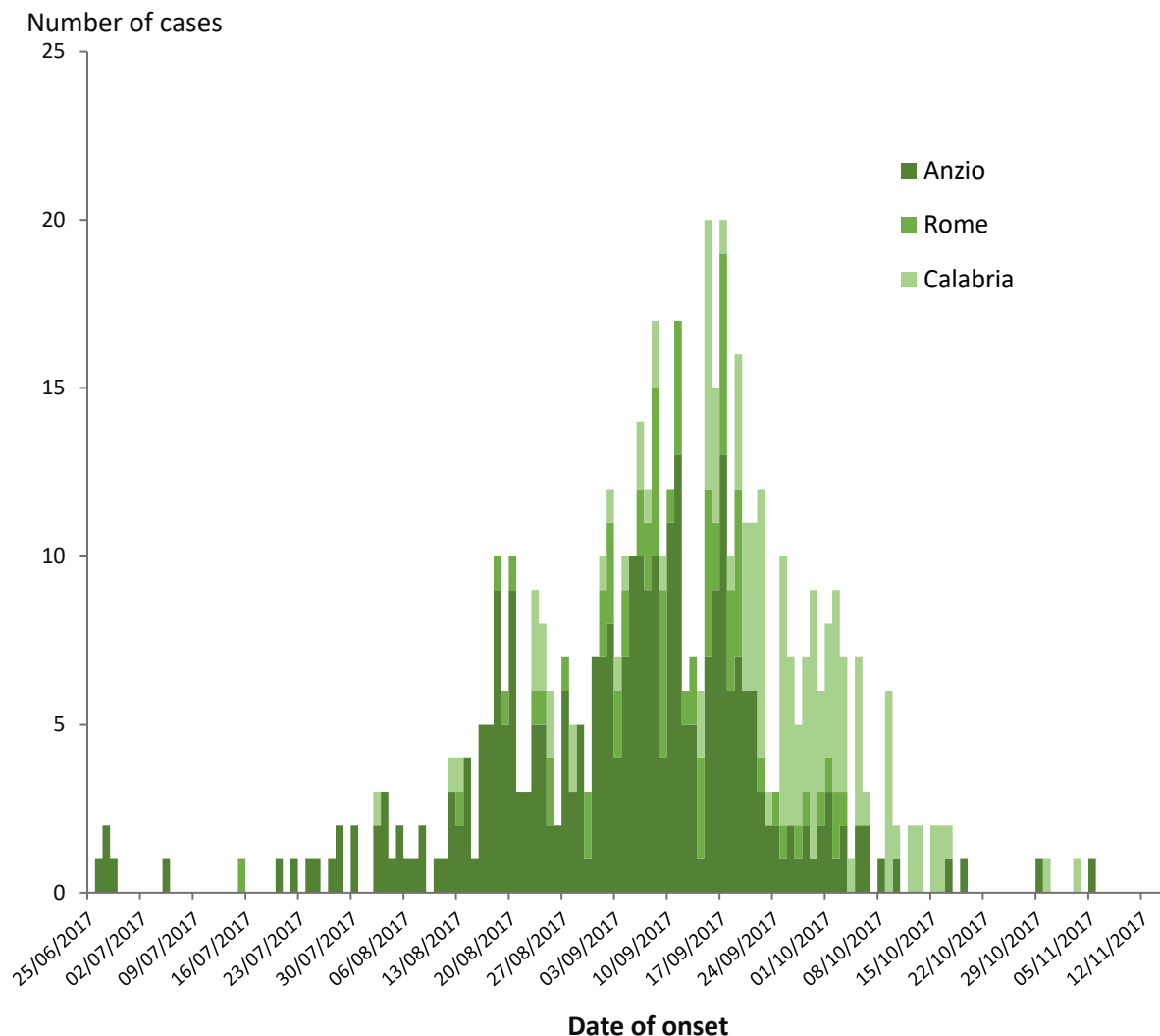
According to a study published in the Eurosurveillance on 28 September 2017, the virus circulating in France belongs to an East Central South African sub-lineage that includes isolates from central Africa (Gabon and Republic of the Congo) [9]. The virus isolated from the index patient carries the E1-A226V mutation. More information about the outbreak is available in ECDC's RRA 'Cluster of autochthonous chikungunya cases in France – 23 August 2017' published on 24 August 2017 [10], and ECDC's factsheet about chikungunya [11].

### Italy

On 7 September 2017, Italy notified through EWRS a cluster of three chikungunya cases in the city of Anzio in Lazio region through EWRS. The cases had onset of symptoms on 5, 11 and 25 August 2017 and none of them reported travel to chikungunya-endemic countries two weeks prior to onset of the disease. On 14 September 2017, three additional cases with no history of travel abroad or to the city of Anzio were identified in a family in Rome, Lazio region. On 29 September 2017, Italy reported through EWRS the detection of two confirmed and two probable chikungunya cases in Guardavalle Marina, Calabria region.

Since 25 June 2017 and as of 21 December 2017, Italy reported 481 chikungunya cases from Lazio region (384) and Guardavalle Marina, Calabria region (97). An additional three confirmed cases with travel history to Anzio were reported in Emilia-Romagna (1), Marche (1) and France (1) and one confirmed case with travel history to Rome was reported in Germany. Three probable cases in Emilia-Romagna had travel history to Guardavalle Marina in Calabria and one to Rome.

ECDC published an RRA on this event on 14 September 2017 [12] and the first update on 9 October 2017 [13].

**Figure 6. Distribution of chikungunya cases in Italy by reporting region, 25 June–12 November 2017**

Data from Italian Ministry of Health:

[http://www.salute.gov.it/portale/temi/documenti/chikungunya/bollettino\\_chikungunya\\_ULTIMO.pdf](http://www.salute.gov.it/portale/temi/documenti/chikungunya/bollettino_chikungunya_ULTIMO.pdf)


### 4.3 Yellow fever outbreak in Brazil

In 2017, Brazil experienced the largest yellow fever outbreak ever recorded, with 796 confirmed human cases reported from nine states: Minas Gerais, Espírito Santo, Rio de Janeiro, São Paulo, Pará, Distrito Federal, Goiás, Mato Grosso and Tocantins. Most of the cases (94%) occurred in Minas Gerais (487) and Espírito Santo (260). The majority of the confirmed human cases (792) were reported between January and May, which concurs with yellow fever seasonality in Brazil. No urban cycle was detected. The outbreak was declared over in September 2017.


Brazilian health authorities conducted several vaccination campaigns. In April 2017, the authorities adopted single and fractionated doses for yellow fever vaccination.

**Figure 7. Distribution of confirmed yellow fever cases by municipality, Brazil, as of 16 January 2018**


Confirmed cases of locally-acquired yellow fever, as of 16 January 2018

 States with confirmed locally-acquired cases since 6 January 2017

 Area at risk for yellow fever transmission

 Area considered at no risk for yellow fever transmission

 Federal state

 State capital city



ECDC. Map produced on: 16 Jan 2018  
ECDC map maker: <https://emma.ecdc.europa.eu>

Between January and May 2017, ECDC produced 15 epidemiological updates on yellow fever in Brazil and weekly maps, showing the distribution of confirmed cases and the areas at risk in Brazil. In 2017, ECDC published three risk assessments about yellow fever in South America:

- Outbreak of yellow fever in Brazil, 25 January 2017 [15]
- Yellow fever among travellers returning from South America, 15 March 2017 [16]; and
- Outbreak of yellow fever in Brazil, 1st update, 13 April 2017 [17].

## 4.4 Plague outbreak in Madagascar

Madagascar is an endemic country for plague and for the past decade has been the most affected country in the world, with around 400 cases of mostly bubonic plague reported annually. In 2017, the country experienced a pneumonic plague outbreak that required international support and ECDC to raise the public health emergency level (PHE) to PHE1 acute alert phase.

On 23 August 2017, a 31-year-old male from Toamasina developed malaria-like symptoms while visiting the Ankazobe district in the central highlands of Madagascar [18]. On 27 August 2017, respiratory symptoms appeared while he travelled in a shared public taxi from Ankazobe district, a known plague-endemic area, to Toamasina via Antananarivo. His condition worsened and he died on 27 August 2017. He was buried in a village close to Toamasina without safety procedures. Subsequently, 31 people who were in contact with this case fell ill and four of them died. On 13 September 2017, the Ministry of Public Health of Madagascar informed WHO about an outbreak of pneumonic plague. WHO published an RRA on the following day and the ECDC epidemic intelligence

unit opened a threat on 15 September 2017 to better assess and monitor the ongoing situation. WHO supported the Ministry of Public Health in technical and operational support together with national and international partners involved in infection prevention and control of the plague outbreak. On 11 October 2017, due to the ongoing events in Madagascar and other potentially affected countries in the area, ECDC decided to raise the PHE level to PHE0 alert phase. Due to the same circumstances, this PHE level was raised to PHE1 acute phase between 13 to 18 October 2017 and PHE1 maintenance phase between 18 to 26 October 2017. During this period, ECDC compiled and distributed the following documentation regarding the plague outbreak in Madagascar.

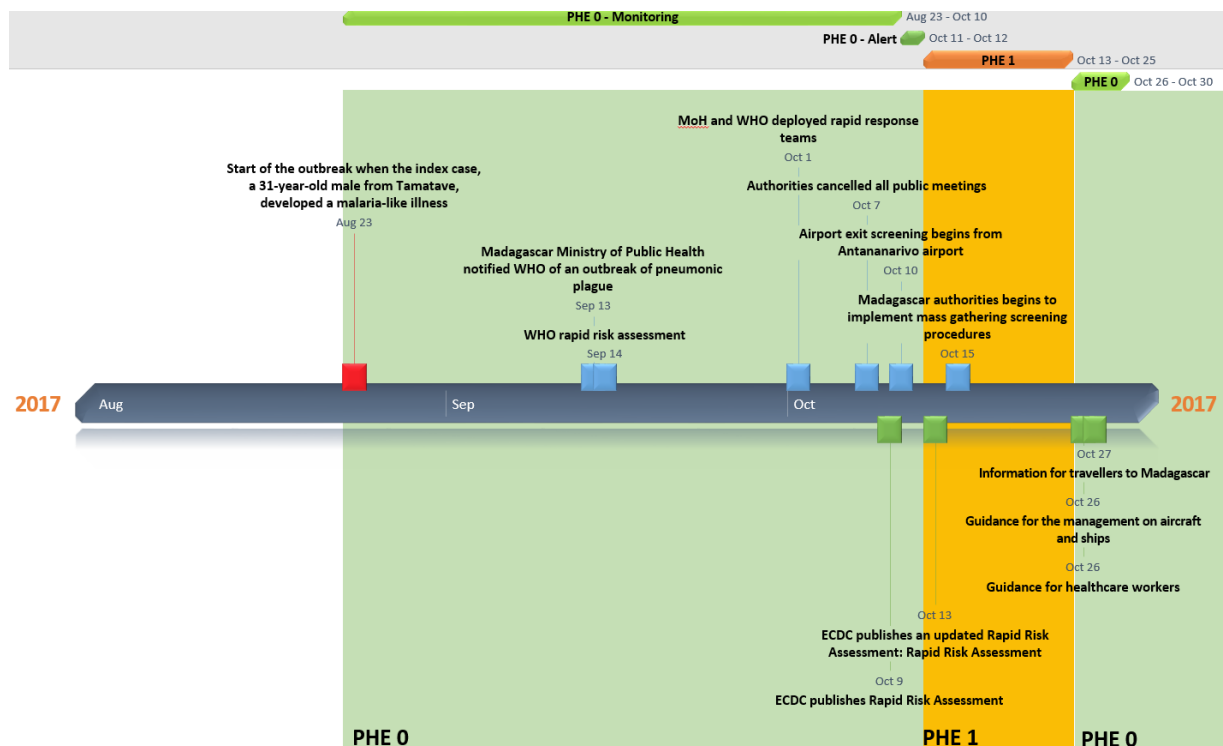
ECDC published an RRA on this event on 9 October 2017 [18] and an update on 13 October 2017 [17].

ECDC published the following technical documents on 26 and 27 October 2017 [19]:

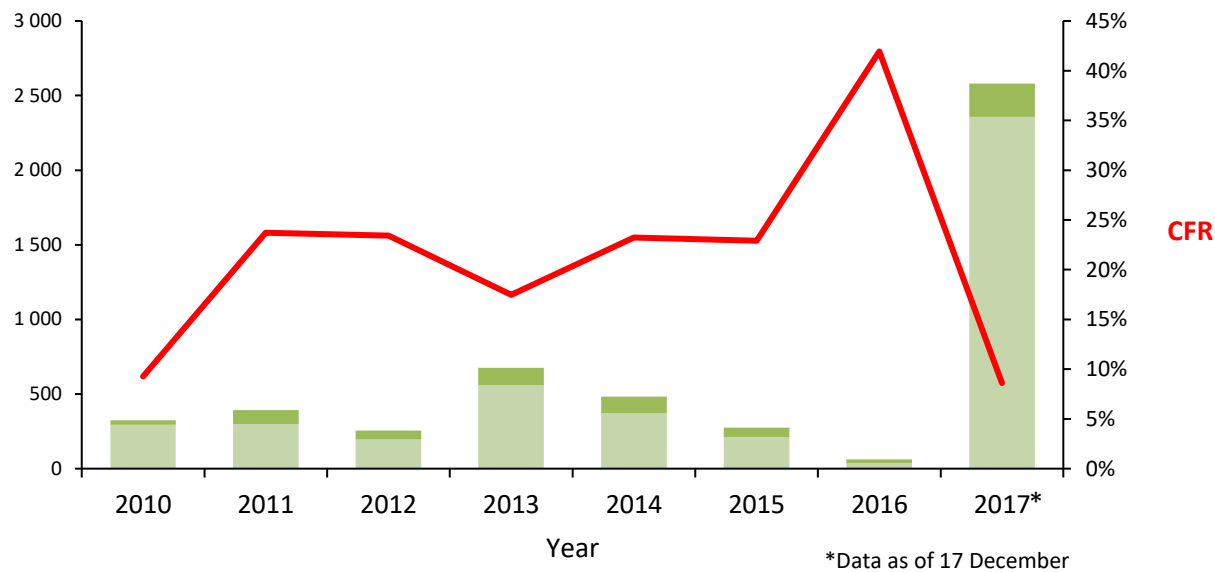
- Case definition for any case of plague, since 1 August 2017 and related to the outbreak of plague in Madagascar [20]
- Information for travellers to Madagascar [21]
- Guidance for healthcare workers on the use of personal protective equipment in the management of bubonic and pneumonic plague patients – 26 October 2017 [22]; and
- Guidance for the management of suspected pneumonic plague cases identified on aircraft and ships – 26 October 2017 [23].

According to the WHO Regional Office for Africa, in 2017, as of 17 December 2017, Madagascar reported 2 580 suspected plague cases, including 222 deaths (case fatality rate: 8.6%) [24]. A total of 1 989 cases were reported as pneumonic plague, 381 as bubonic plague, 1 as septicaemic plague and 209 as unspecified. Of the pneumonic plague cases, 395 were confirmed, 629 were considered probable and 965 remained as suspected. The acute phase of the outbreak was declared over by the local health authorities in late November 2017.

**Figure 8. Timeline of events during plague outbreak in Madagascar, 2017**



**Figure 9. Plague case distribution in Madagascar, 2010–2017**



CFR: case fatality rate.

ECDC deployed one EPIET fellow under the umbrella of GOARN to support response to the outbreak.



## 5 Conclusions

In 2017, ECDC assessed and monitored 69 health threats, of which 18 originated outside the EU. Of the 83 EWRS messages posted in 2017, 12 resulted in opening a new threat. In all, 38 RRAs (including rapid outbreak assessments) were produced and shared with Member States.

There were no increases in threats in any specific disease area compared with previous years. However, several vector-borne outbreaks, such as malaria and chikungunya, required special attention from public health authorities. There was also an increase in Legionnaires' disease clusters reported compared to previous years.

Among the threats detected in 2017, there were autochthonous cases of malaria and chikungunya reported in several EU countries. This is of concern, as autochthonous vector-borne disease outbreaks related to the above diseases are unusual in EU. Climate change to warmer weather will likely create favourable conditions for additional outbreaks of vector-borne diseases. In October 2017, ECDC activated its PHE level to PHE 1 over two weeks due to the plague outbreak in Madagascar and need to develop guidance and implement preparedness in the EU/EEA countries. Eventually, this outbreak was contained in Madagascar and no other countries reported autochthonous cases.

However, this outbreak, together with the yellow fever outbreak in Brazil represented a potential threat for EU due to the high number of population flow between EU and affected areas.

# Annex 1. ECDC risk assessments by subject and month of publication, January–December 2017

Risk assessment title	Publication date
Risk assessment update: seasonal influenza, EU/EEA, 2016–2017	25 January 2017
Outbreak of yellow fever in Brazil, 25 January 2017	26 January 2017
Rapid risk assessment - Increase in <i>Salmonella</i> Stourbridge infections in Germany during 2016 - 1st update, 27 January 2017	27 January 2017
Human infection with avian influenza A(H7N9) virus - 5th update, 27 January 2017	27 January 2017
Re-emerging multi-country WGS-defined outbreak of <i>Salmonella</i> Enteritidis, MLVA type 2-12-7-3-2 and 2-14-7-3-2, 6 February 2017	6 February 2017
Rapid risk assessment update: Hepatitis A outbreaks in the EU/EEA mostly affecting men who have sex with men - 1st update, 24 February 2017	24 February 2017
Ongoing outbreak of measles in Romania, risk of spread and epidemiological situation in EU/EEA countries, 3 March 2017	7 March 2017
Rapid outbreak assessment: multi-country outbreak of <i>Salmonella</i> Enteritidis phage type 8, MLVA profile 2-9-7-3-2 and 2-9-6-3-2 infections, 7 March 2017	7 March 2017
Genetic evolution of influenza A(H7N9) virus in China - implications for public health. Sixth update, 9 March 2017	10 March 2017
Yellow fever among travellers returning from South America, March 2017	15 March 2017
Cluster of new <i>Salmonella</i> serotype cases in four EU Member States, 20 March 2017	20 March 2017
Multidrug-resistant tuberculosis in migrants, multi-country cluster - 2nd update, 27 March 2017	27 March 2017
Zika virus disease epidemic. 10th update, 4 April 2017	5 April 2017
Multidrug-resistant tuberculosis in migrants, multi-country cluster - 3rd update, 13 April 2017	13 April 2017
Outbreak of yellow fever in Brazil - 1st update, 13 April 2017	14 April 2017
Risk related to the use of 'do-it-yourself' CRISPR-associated gene engineering kit contaminated with pathogenic bacteria	2 May 2017
Potential public health risks related to communicable diseases at the WorldPride festival in Madrid, 23 June–2 July 2017	08 May 2017
Outbreak of Ebola virus disease in Bas Uele province, Democratic Republic of the Congo; 8th update, 19 May 2017	19 May 2017
Hepatitis A outbreaks in the EU/EEA mostly affecting men who have sex with men, 2nd update, 19 May 2017	19 May 2017
Increase of cholera cases in the Horn of Africa and the Gulf of Aden – risk for EU/EEA citizens, 23 May 2017	23 May 2017
Rapid Outbreak Assessment: Multi-country outbreak of new <i>Salmonella</i> enterica 11:z41:e,n,z15 infections associated with sesame seeds, 14 June 2017	14 June 2017
Hepatitis A outbreak in the EU/EEA mostly affecting men who have sex with men, 3rd update, 28 June 2017	29 June 2017
Influenza A(H7N9) virus in China - implications for public health - 7th update, 3 July 2017	3 July 2017
Multi-country outbreak of <i>Salmonella</i> Enteritidis phage types 56 and 62, MLVA profile 2-11-3-3-2 and 2-12-3-3-2 infections, 20 July 2017	20 July 2017
Cyclospora infections in European travellers returning from Mexico - 21 July 2017	21 July 2017
Public health risks related to communicable diseases during the Hajj 2017, Saudi Arabia, 30 August – 4 September 2017	10 August 2017
Cluster of autochthonous chikungunya cases in France	24 August 2017
Hurricane Irma: risk of communicable diseases in the affected countries	11 September 2017
Clusters of autochthonous chikungunya cases in Italy	14 September 2017
Multiple reports of locally-acquired malaria infections in the EU	20 September 2017
Increase of Legionnaires' disease in EU travellers returning from Dubai since October 2016	21 September 2017
Clusters of autochthonous chikungunya cases in Italy, first update	9 October 2017
Outbreak of plague in Madagascar, 2017	9 October 2017
Outbreak of pneumonic plague in Madagascar: recent introduction in the Seychelles	13 October 2017
Outbreak of travel-associated Legionnaires' disease – Palmanova, Mallorca (Spain), September–October 2017	23 October 2017
Multi-country outbreak of <i>Listeria monocytogenes</i> PCR serogroup IVb, MLST ST6	8 December 2017
Multi-country outbreak of <i>Salmonella</i> Enteritidis infections linked to Polish eggs	12 December 2017
Risk assessment for seasonal influenza, EU/EEA, 2017–2018	20 December 2017

# References

1. European Centre for Disease Prevention and Control. Introduction to the Annual Epidemiological Report. In: ECDC. Annual epidemiological report for 2017 [Internet]. Stockholm: ECDC; 2017 [cited 12 January 2018]. Available from: <http://ecdc.europa.eu/en/annual-epidemiological-reports/methods>
2. European Centre for Disease Prevention and Control. Surveillance systems overview [Internet, downloadable spreadsheet]. Stockholm: ECDC; 2018 [cited 30 January 2018]. Available from: <http://ecdc.europa.eu/publications-data/surveillance-systems-overview-2016>
3. European Centre for Disease Prevention and Control. Surveillance atlas of infectious diseases [Internet]. Stockholm: ECDC; 2017 [cited 30 January 2018]. Available from: <http://atlas.ecdc.europa.eu>
4. European Centre for Disease Prevention and Control. Epidemic Intelligence tutorial. [Internet, tutorial]. Stockholm: ECDC; 2011 [cited 30 January 2018]. Available from: [http://external.ecdc.europa.eu/EI\\_Tutorial/course.htm](http://external.ecdc.europa.eu/EI_Tutorial/course.htm)
5. European Centre for Disease Prevention and Control. Rapid risk assessment: Potential public health risks related to communicable diseases at the WorldPride festival in Madrid, 23 June–2 July 2017, 5 May 2017. Stockholm: ECDC; 2017. Available from: <http://ecdc.europa.eu/rapid-risk-assessment-worldpride-festival-spain>
6. European Centre for Disease Prevention and Control. Rapid risk assessment: Public health risks related to communicable diseases during the Hajj 2017, Saudi Arabia, 30 August – 4 September 2017 – 10 August 2017. Stockholm: ECDC; 2017. Available from: <http://ecdc.europa.eu/publications-data/rapid-risk-assessment-public-health-risks-related-communicable-diseases-during>
7. European Centre for Disease Prevention and Control. Rapid risk assessment: Multiple reports of locally-acquired malaria infections in the EU – 20 September 2017. Stockholm: ECDC; 2017. Available from: <http://ecdc.europa.eu/publications-data/rapid-risk-assessment-multiple-reports-locally-acquired-malaria-infections-eu>
8. European Centre for Disease Prevention and Control. Epidemiological update - indigenous *Plasmodium falciparum* malaria cases in the Apulia region, Italy [Internet]. Stockholm: ECDC; 2017 [cited 30 January 2018]. Available from: <http://ecdc.europa.eu/news-events/epidemiological-update-indigenous-plasmodium-falciparum-malaria-cases-apulia-region>
9. Calba C, Guerbois-Galla M, Franke F, Jeannin C, Auzet-Caillaud M, Grard G, et al. Preliminary report of an autochthonous chikungunya outbreak in France, July to September 2017. Euro Surveill. 2017 Sep;22(39). Available from: <http://www.eurosurveillance.org/content/10.2807/1560-7917.ES.2017.22.39.17-00647>
10. European Centre for Disease Prevention and Control. Rapid risk assessment: Cluster of autochthonous chikungunya cases in France – 23 August 2017. Stockholm: ECDC; 2017. Available from: <http://ecdc.europa.eu/publications-data/rapid-risk-assessment-cluster-autochthonous-chikungunya-cases-france>
11. European Centre for Disease Prevention and Control. Factsheet about chikungunya [Internet]. Stockholm: ECDC; 2018 [cited 30 January 2018]. Available from: <http://ecdc.europa.eu/chikungunya/facts/factsheet>
12. European Centre for Disease Prevention and Control. Rapid risk assessment: Clusters of autochthonous chikungunya cases in Italy, 14 September 2017. Stockholm: ECDC; 2017. Available from: <http://ecdc.europa.eu/publications-data/rapid-risk-assessment-clusters-autochthonous-chikungunya-cases-italy>
13. European Centre for Disease Prevention and Control. Rapid risk assessment: Clusters of autochthonous chikungunya cases in Italy, first update – 9 October 2017. Stockholm: ECDC; 2017. Available from: <http://ecdc.europa.eu/publications-data/rapid-risk-assessment-clusters-autochthonous-chikungunya-cases-italy-first-update>
14. European Centre for Disease Prevention and Control. Rapid risk assessment: Outbreak of yellow fever in Brazil – 25 January 2017. Stockholm: ECDC; 2017. Available from: <http://ecdc.europa.eu/publications-data/rapid-risk-assessment-outbreak-yellow-fever-brazil-25-january-2017>
15. European Centre for Disease Prevention and Control. Rapid risk assessment: Yellow fever among travellers returning from South America – 14 March 2017. Stockholm: ECDC; 2017. Available from: <http://ecdc.europa.eu/publications-data/yellow-fever-among-travellers-returning-south-america-march-2017>

16. European Centre for Disease Prevention and Control. Rapid risk assessment: Outbreak of yellow fever in Brazil, First update – 13 April 2017. Stockholm: ECDC; 2017. Available from: <http://ecdc.europa.eu/en/publications-data/outbreak-yellow-fever-brazil-1st-update-13-april-2017>
17. European Centre for Disease Prevention and Control. Rapid risk assessment: Outbreak of pneumonic plague in Madagascar: recent introduction in the Seychelles. Stockholm: ECDC; 2017. Available from: <http://ecdc.europa.eu/publications-data/rapid-risk-assessment-outbreak-pneumonic-plague-madagascar-recent-introduction>
18. European Centre for Disease Prevention and Control. Rapid risk assessment: Outbreak of plague in Madagascar, 2017 – 9 October 2017. Stockholm: ECDC; 2017. Available from: <http://ecdc.europa.eu/publications-data/rapid-risk-assessment-outbreak-plague-madagascar-2017>
19. European Centre for Disease Prevention and Control. Plague [Internet]. Stockholm: ECDC; 2018 [cited 30 January 2018]. Available from: <http://ecdc.europa.eu/plague>
20. European Centre for Disease Prevention and Control. Case definition for any case of plague, since 1 August 2017 and related to the outbreak of plague in Madagascar. Stockholm: ECDC; 2017. Available from: <http://ecdc.europa.eu/infectious-diseases-public-health/plague/threats-and-outbreaks-plague/case-definition-any-case>
21. European Centre for Disease Prevention and Control. Information for travellers to Madagascar. Stockholm: ECDC; 2017. Available from: <http://ecdc.europa.eu/publications-data/information-travellers-madagascar>
22. European Centre for Disease Prevention and Control. Guidance for healthcare workers on the use of personal protective equipment in the management of bubonic and pneumonic plague patients – 26 October 2017. Stockholm: ECDC; 2017. Available from: <http://ecdc.europa.eu/publications-data/guidance-healthcare-workers-use-personal-protective-equipment-management-bubonic>
23. European Centre for Disease Prevention and Control. Guidance for the management of suspected pneumonic plague cases identified on aircraft and ships - 26 October 2017. Stockholm: ECDC; 2017. Available from: <http://ecdc.europa.eu/publications-data/guidance-management-suspected-pneumonic-plague-cases-identified-aircraft-and>
24. World Health Organization Regional Office for Africa. Weekly Bulletin on Outbreaks and Other Emergencies. Week 52: 23 - 29 December 2017. Data as reported by 17:00; 29 December 2017. Brazzaville: WHO Regional Office for Africa; 2017. Available from: <http://apps.who.int/iris/bitstream/handle/10665/259794/OEW52-2329122017.pdf>