

Communicable disease threats to public health in the European Union

Annual Epidemiological Report for 2020

Introduction

This report covers the events and threats detected by the ECDC epidemic intelligence (EI) team in 2020 and the actions taken in relation to these findings. The objective of EI 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. This report is based on EI screening and data from 2020 extracted from the Epidemic Intelligence Information System (EPIS), the Early Warning and Response System (EWRS) and the ECDC threat tracking tool (TTT).

Table of contents

Introduction	1
Abbreviations	2
Methods	2
1. Threat detection in 2020	3
1.1 Events originating from epidemic intelligence screening Geographic distribution	3
1.2 Outbreaks and alerts reported through the Epidemic Intelligence Information System (EPIS)	4
1.3 Threats reported through EWRS	5
2. Threat monitoring in 2020	6
3. Response to threats in 2020	8
3.1 Rapid risk assessments and epidemiological updates	8
3.2 Deployment of experts in 2020	9
4. Threats of particular interest in 2020	9
4.1 Global pandemic of COVID-19	9
4.2 SARS-CoV-2 variants	9
5. Conclusions	10
References.....	11
Annex 1. ECDC risk assessments January–December 2020	12

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Abbreviations

AMR-HAI	Antimicrobial resistance and healthcare-associated infections
COVID-19	Coronavirus disease 2019
ECDC	European Centre for Disease Prevention and Control
EEA	European Economic Area
EFSA	European Food Safety Authority
EPIS	Epidemic Intelligence Information System
ELDSNet	European Legionnaires' disease surveillance network
EU	European Union
EVD	Emerging and vector-borne diseases
EWRS	Early Warning and Response System
FWD	Food and waterborne diseases
IHR	International Health Regulations
IRV	Influenza and other respiratory viruses
JNS	Joint Notification Summaries
LGV	<i>Lymphogranuloma venereum</i>
MERS-CoV	Middle East respiratory syndrome coronavirus
MSM	Men who have sex with men
PHE	Public Health Emergency
PHE	Public Health England
ROA	Rapid Outbreak Assessment
RRA	Rapid Risk Assessment
SARS-CoV-2	Severe acute respiratory syndrome coronavirus 2
STI	Sexually transmitted infections
TAB	Threat Assessment Brief
TALD	Travel-Associated Legionnaires' Disease
TTT	ECDC Threat Tracking Tool
UI	Urgent Inquiry
UK	United Kingdom
US CDC	Centers for Disease Control and Prevention in the United States of America
VPD	Vaccine-preventable diseases
VOC	Variant of Concern
WHO	World Health Organization.

Methods

This report describes the events and threats detected by ECDC through epidemic intelligence (EI) in 2020 and the actions undertaken in terms of published outputs and expert deployments. EI aims to rapidly detect, assess and communicate on public health events that can pose a risk to EU/EEA citizens, thus contributing to EU/EEA health security (Regulation (EC) No 853/2004 of the European Parliament and of the Council of 21 April 2004 establishing a European Centre for disease prevention and control). The information in this report is based on data extracted from the Epidemic Intelligence Information System (EPIS), the Early Warning and Response System (EWRS) and the ECDC threat tracking tool (TTT).

Rapid risk assessments (RRAs), Threat Assessment Briefs (TAB) and Rapid Outbreak Assessments (ROA) aim to support EU/EEA countries and the European Commission in their preparedness and response to public health threats. They provide a timely summary and risk assessment of a public health threat for EU/EEA countries in relation to a specific event and also include options for response. As outbreaks or public health events evolve, ECDC may update its risk assessments. During an outbreak, developments that do not affect the overall assessment will be covered by an epidemiological update.

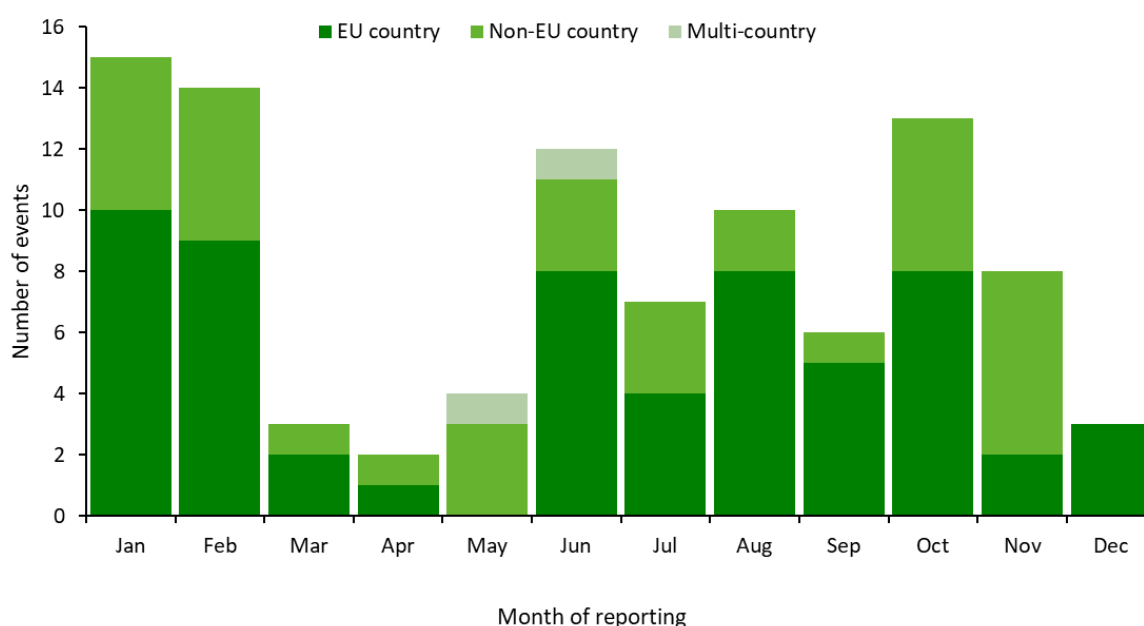
1. Threat detection in 2020

1.1 Events originating from epidemic intelligence screening

The year 2020 was characterised by the start of the COVID-19 pandemic. ECDC raised its Public Health Emergency (PHE) level to PHE level 2 and reorganised its resources to focus on COVID-19, ensuring the rapid collection, processing and dissemination of large volumes of data, information, rapid risk assessments and many other outputs. The pandemic affected social behaviour, travel patterns and volumes, and the epidemiology and surveillance of other diseases – both in the EU/EEA and globally - which resulted in fewer reported and detected signals and events other than those related to COVID-19.

In 2020, 97 new events were monitored and discussed at the daily round table meetings. Twenty-six (27%) of these events led to the opening of a new threat (19% in 2019). Of all events, 60 (62%) originated in the EU (Figure 1), 35 (36%) were related to countries outside of the EU and two events (2%) had a multi-country dimension (both related to falsified medicines in EU and non-EU countries).

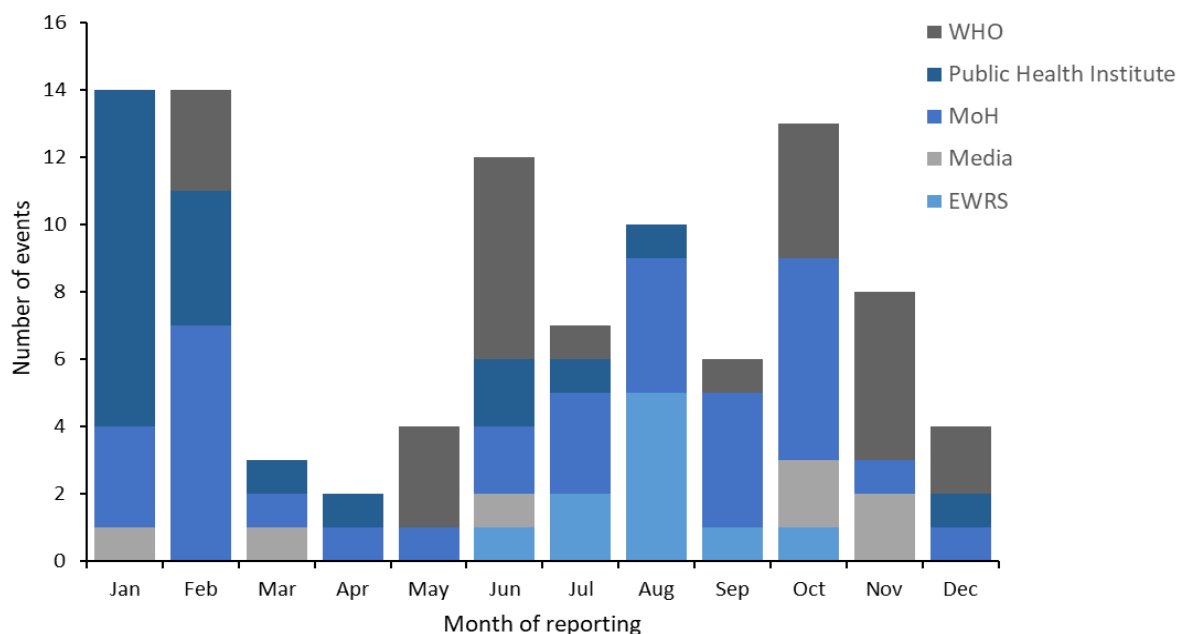
Figure 1. Distribution of new events detected through epidemic intelligence by month of reporting and geographical origin, 2020



Of the 97 events, 10 (10%) were reported through the Early Warning and Response System (EWRS) and 25 (26%) were based on information received from the World Health Organization (WHO) or the International Health Regulations (IHR) platform (Figure 2).

For 55 events (57%) the source of information was a public health institute (n=21, 22%) or a ministry of health (n=34, 35%). These events were most commonly detected through media and later verified with information from the official website for the country concerned. For the rest of the events the source was media (n=7, 7%), often quoting healthcare authorities.

Figure 2. Distribution of new events detected through epidemic intelligence by month of reporting and source, 2020 (excluding previously-opened threats)



MoH= Ministry of Health

EWRS= Early Warning and Response System

WHO= World Health Organization.

1.2 Outbreaks and alerts reported through the Epidemic Intelligence Information System (EPIS)

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

In 2020, 72 urgent inquiries (UIs) were initiated by 16 participating countries (from a total of 51 network countries) or ECDC (one UI). Most frequently, UIs were related to salmonellosis (46%), followed by listeriosis (18%), Shiga toxin-producing *Escherichia coli* (STEC) infection (14%) and hepatitis A (7%). On average, 11 countries replied to each UI and 16 replied to at least one.

In 2020, ECDC and the European Food Safety Authority (EFSA) produced two joint Rapid Outbreak Assessments (ROAs), four Joint Notification Summaries (JNS) and one JNS update.

Participation in EPIS FWD decreased compared to the peak observed in 2019, which was the highest observed since the platform was launched (88 UIs). However, in 2020 the number of UIs remained higher than the annual average number of UIs posted in the past five years. In previous years, the annual mean number of UIs published on the platform was 66.

Sexually transmitted infections (EPIS-STI)

In 2020, the EPIS-STI General Forum was used to communicate on two topics:

- Public Health England (PHE) in the United Kingdom (UK), reported an overall increase in *Lymphogranuloma venereum* (LGV) diagnoses among men who have sex with men (MSM) (2019 data compared with 2018) and an increase in LGV diagnoses among HIV-negative MSM (increasing to around 50% of LGV diagnoses in MSM in 2019). PHE set out their main hypothesis that increased sexual mixing between HIV-positive and HIV-negative MSM was the cause of the rise in diagnoses. It also gave notification of its intention to set up enhanced surveillance to identify determinants of the epidemic. PHE also asked if similar increases had been observed in other countries.
- An urgent inquiry launched in EPIS-FWD by the US Centers for Disease Control and Prevention was shared for awareness with the EPIS-STI Network in relation to cases of Shigella infection, with an extensively drug resistant (XDR) strain, among participants in a gay cruise in January 2020 involving EU citizens

European Legionnaires' disease surveillance network (EPIS-ELDSNet)

Seventeen EU/EEA and two non-EU/EEA countries reported 552 travel-associated Legionnaires' disease (TALD) cases with date of onset in 2020. In total, 72 new standard TALD clusters were detected in 20 countries (11 EU/EEA countries and 9 countries outside of the EU/EEA) and on board a ship (one cluster). ELDSNet shared 28 summary reports of type 1 (non-EU/EEA clusters) and 7 of type 2 (rapidly evolving clusters - i.e. three or more cases associated with the same accommodation within three months) with tour operators. Control measures were implemented in all but three clusters, with ELDSNet receiving feedback from an initial risk assessment within two weeks and a final assessment within six weeks. Three affected accommodation site names were published on the ECDC website in 2020.

Vaccine-preventable diseases (EPIS-VPD)

In 2020, one inquiry was posted on EPIS-VPD, generating six follow-up postings. The inquiry was related to an invasive pneumococcal disease outbreak. Follow-up postings discussed the existence and content of national recommendations for pneumococcal vaccination.

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

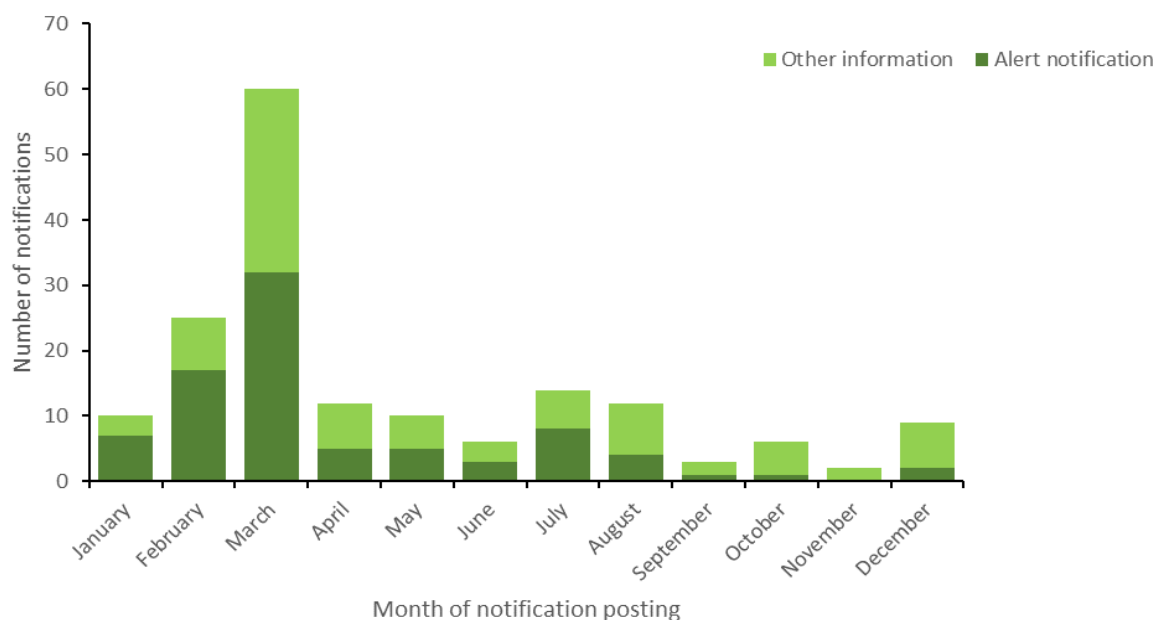
In 2020, four new UIs were launched through EPIS AMR-HAI. Most of them were related to the emergence of healthcare-associated and/or multidrug-resistant pathogens: a cluster of ST38 *Escherichia coli* isolates harbouring the bla_{OXA-244} allele in Norway; an outbreak of *Burkholderia aenigmatica* in the UK; an increase in scabies cases with treatment failure after use of permethrin in Norway; and an increase in hypervirulent *Klebsiella pneumoniae* ST23 isolates in Ireland.

1.3 Threats reported through EWRS

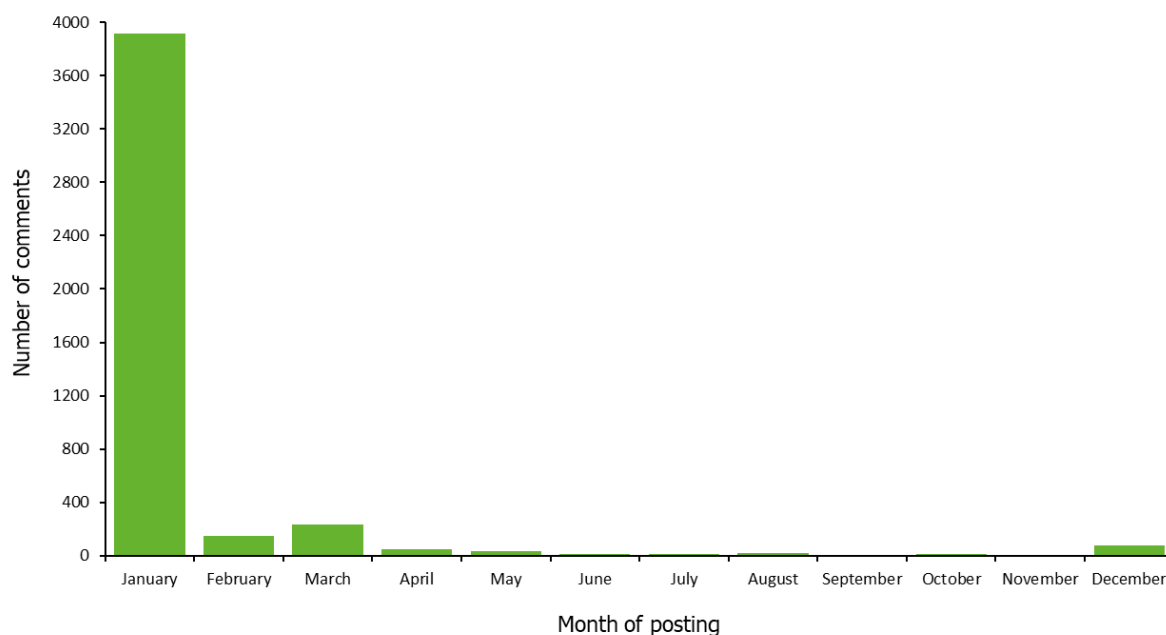
In 2020, 169 notifications and 4 527 comments were posted in EWRS. Eighty-five EWRS notifications were classified as 'alert notifications' (notifications fulfilling all three criteria mentioned in Article 9 of Decision No. 1082/2013/EU), and 84 as 'other information' (outside the scope of Article 9). Of the total EWRS notifications 81 'alert notifications' and 63 'other information' notifications were related to COVID-19. Ten of the notifications resulted in ECDC opening a new threat in the Threat Tracking Tool (TTT).

In 2020, there were 4 696 messages and comments¹ posted on EWRS, which by far exceeded the number of messages posted annually in the past 16 years (range 234–481 messages and comments per year, except 2009 when there were 1 400 postings in relation to the influenza pandemic) (Figure 3 and 4). The vast majority of the comments – 3 751, 82.9% – were posted under one COVID-19 EWRS 'alert notification' in January 2020 (Figure 4). This was suggested as a temporary solution for countries in order to provide daily COVID-19 count reports until other surveillance tools became available. From January 2005 until the end of 2020, overall 10 078 messages and comments were posted in the EWRS platform.

Figure 3. Distribution of EWRS notifications by type and month of posting, 2020 (n=169)



¹ EWRS comment: a reply to an initial notification message, allowing Member States or the Commission to communicate available relevant information for coordination purposes, pursuant to Article 9(3) of Decision No. 1082/2013/EU.

Figure 4. Distribution of EWRS comments by month of posting of notification, 2020 (n=4 527)

2. Threat monitoring in 2020

In 2020, ECDC opened and monitored 26 new threats in the threat tracking tool (TTT), in addition to the 13 carried over from previous years (Table 1, Table 2). This is less than half the number of threats monitored in 2019 (58), mainly due to the pandemic affecting both the epidemiology of other diseases and reporting practices.

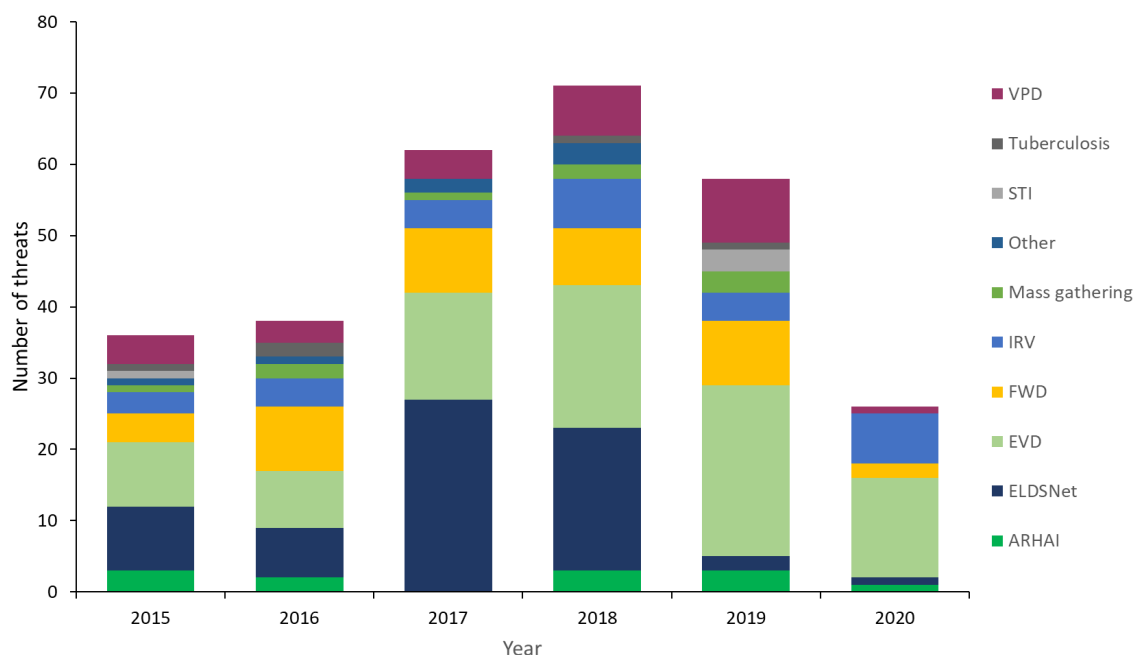
Table 1. Distribution of new threats by disease group and by year of a threat opening, 2015–2020

Disease group	2015	2016	2017	2018	2019	2020
Legionnaires' disease	9	7	28	20	2	1
Food- and waterborne diseases	4	9	11	8	9	2
Emerging and vector-borne diseases	9	8	16	20	24	14
Vaccine-preventable diseases	4	3	5	7	9	1
Influenza and other respiratory viruses (including COVID-19 from 2020)	3	4	4	7	4	7
Sexually transmitted infections	1	0	0	0	3	0
Tuberculosis	1	2	1	1	1	0
Antimicrobial resistance and healthcare-associated infections	3	2	0	3	3	1
Mass gatherings	1	2	1	2	3	0
Other	1	1	2	3	0	0
TOTAL	36	38	62	71	58	26

In 2020, emerging and vector-borne diseases represented half of the new threats (54%), followed by influenza and other respiratory viruses (15%) and vaccine-preventable diseases (15%) (Figure 5).

The EI team has been monitoring measles since 2011. Following a large outbreak in EU/EEA countries between 2016 and 2019, a sharp decrease in the number of cases was observed in 2020. The decrease occurred for several reasons, including lockdowns and other COVID-19 related non-pharmaceutical measures implemented by almost all EU/EEA countries and the UK [1]. However, reduced healthcare capacity also temporarily disrupted national childhood immunisation programmes in several countries and this may have an impact on measles epidemiology over the next few years.

Figure 5. Distribution of threats by disease group and year, 2015–2020



VPD= Vaccine-preventable diseases
 STI= Sexually-transmitted infections
 IRV= Influenza and other respiratory viruses
 FWD= Food and waterborne diseases
 EVD= Emerging and vector-borne diseases
 ELDSNet= European Legionnaires' disease surveillance network
 ARHAI= Antimicrobial resistance and healthcare-associated infections.

Table 2. Threats carried over from previous years

Long-term threats	Creation date
Influenza A(H5N1) and other strains of avian influenza – Non EU/EEA countries	15 June 2005
Poliomyelitis – Multi-country (World) – Monitoring global outbreaks	8 September 2005
Cholera – Multi-country (World) – Monitoring global outbreaks	20 March 2006
Measles – Multi-country (World) – Monitoring European outbreaks	9 February 2011
Middle East respiratory syndrome coronavirus (MERS-CoV) – Multi-country	24 September 2012
Influenza A(H7N9) – China – Monitoring human cases	31 March 2013
Influenza A(H5N6) – China – Monitoring human cases	6 May 2014
Chikungunya and dengue – Multi-country (World) – Monitoring global outbreaks	27 January 2017
Ebola virus disease - tenth outbreak - Democratic Republic of the Congo - 2018–2020	1 August 2018
Influenza A(H9N2) - Multi-country (World) - Monitoring human cases	30 January 2019
Seasonal monitoring	
West Nile virus – Multi-country (Europe)	
Monitoring of environmental suitability of <i>Vibrio</i> growth in the Baltic Sea	
Influenza – Multi-country (Europe)	

3. Response to threats in 2020

3.1 Rapid risk assessments and epidemiological updates

In 2020, ECDC produced 28 risk assessments, including 21 RRAs, five TABs, and two ROAs, all of which were published on ECDC's website (Annex 1). Twenty RRAs and four TABs referred to the COVID-19 pandemic and were prepared by multidisciplinary teams at ECDC (referred as 'COVID-19' in Table 3), two RRAs concerned events related to antimicrobial resistance and healthcare-associated infections and two concerned food-and waterborne disease outbreaks (Table 3, Figure 5).

Table 3. ECDC rapid risk assessments, threat assessment briefs and rapid outbreak assessments, by disease programme/topic area, January–December 2020

Subject	Number of risk assessments
COVID-19	24
Antimicrobial resistance and Healthcare-Associated infections (ARHAI)	1
Food-and waterborne diseases	2
Influenza	1
TOTAL	28

Figure 6. Distribution of rapid risk assessments produced in 2020 by month and disease programme/topic area (n=28)

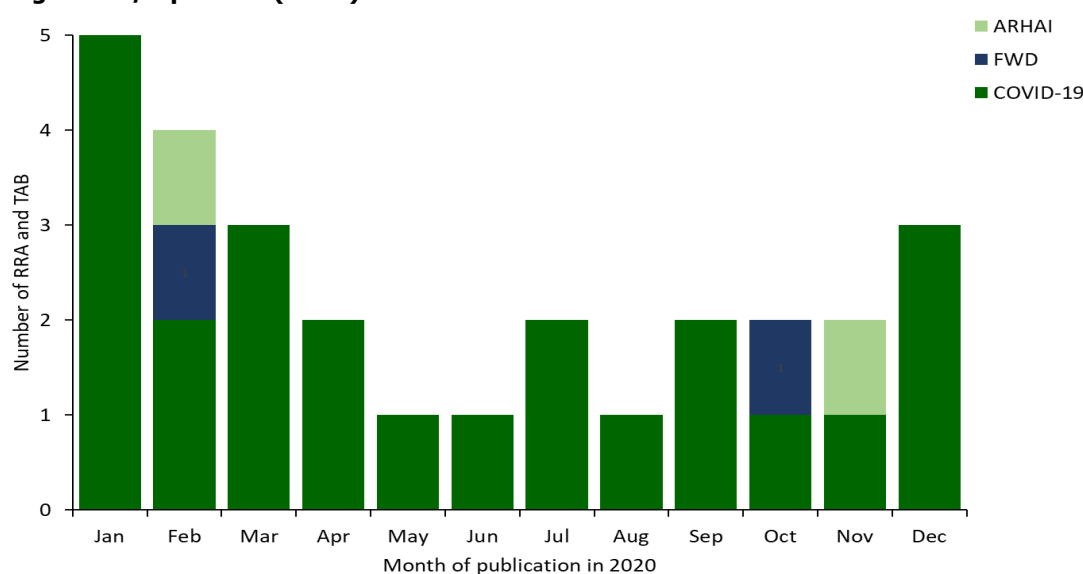
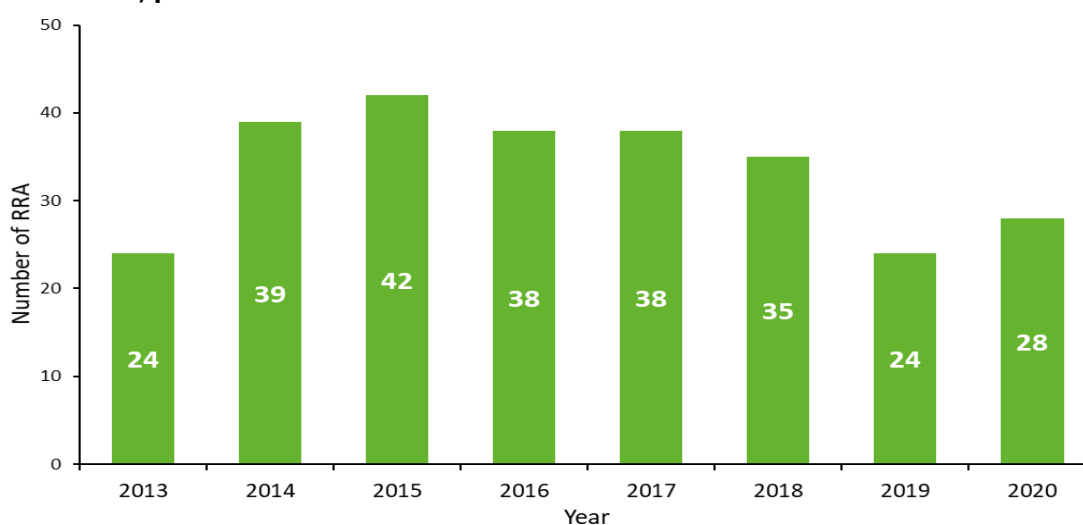


Figure 7. Distribution of rapid risk assessments, threat assessment briefs and rapid outbreak assessments, produced between 2013 and 2020



In 2020, the total number of risk assessments increased compared to the previous year but was still lower than the five-year average for the preceding period (35 risk assessments per year) (Figure 6). Since 2016, 163 RRAs have been produced: 38 in 2016, 38 in 2017, 35 in 2018, 24 in 2019 and 28 in 2020.

3.2 Deployment of experts in 2020

In 2020, six ECDC experts were deployed in the field.

From January to March 2020, two ECDC experts were deployed to the Democratic Republic of the Congo (DRC) to provide technical support in the context of the Ebola virus disease epidemic in North Kivu and Ituri. Both were deployed under the umbrella of the Directorate-General for European Civil Protection and Humanitarian Aid Operations (DG ECHO) to support WHO and the DRC Ministry of Health.

In February and March 2020, two ECDC experts were deployed to Rome, Italy and two to Athens, Greece to support countries with the early COVID-19 response.

4. Threats of particular interest in 2020

4.1 Global pandemic of COVID-19

The main global threat during 2020 was the start of the COVID-19 pandemic. ECDC's Epidemic Intelligence team first detected the event on 31 December 2019. Between 31 December 2019 and 5 January 2020, 59 pneumonia cases, possibly associated with a novel coronavirus, were reported in Wuhan, China with a common exposure link to Wuhan's South China Seafood City market. The cases showed symptoms such as fever, dyspnoea, and radiological features compatible with bilateral lung infiltrative lesions. Of the 59 cases, seven were severe. There were no deaths reported between 31 December 2019 and 5 January 2020 and no cases were reported outside of Wuhan. According to the Chinese authorities, no human-to-human transmission could be documented [2]. On 9 January 2020, the Chinese Center for Disease Control and Prevention reported a novel coronavirus (2019-nCoV), phylogenetically in the SARS-CoV clade, as the causative agent of the outbreak [3].

On 24 January 2020, the first imported cases (3) of 2019-nCoV were identified in the EU/EEA (France) and on 28 January, a cluster of four locally-acquired cases, with indirect links to Wuhan, was reported from Germany [4]. On 23 February 2020, Italy reported a rapid increase in cases of COVID-19 (79 cases), including two deaths, with clusters and single cases reported in four regions of northern Italy [5]. Transmission events occurred locally, as well as in hospitals, with COVID-19 cases identified among healthcare workers and patients. The Italian government was the first in the EU/EEA to implement a range of non-pharmaceutical interventions in affected areas, including a ban on leaving or entering affected areas; suspension of school education services; teleworking for some types of business; implemented quarantine and active surveillance for close contacts of infected people; access restrictions or suspension of transport services for cargo and passengers, etc. [5]. On 11 March 2020, the Director General of the World Health Organization declared COVID-19 a global pandemic. At the time, more than 118 000 cases of COVID-19 had been reported worldwide by 114 countries, including 4 291 deaths [6].

As case numbers increased in the EU/EEA, almost all Member States began implementing different non-pharmaceutical interventions such as lockdowns, partial lockdowns, use of face masks, movement restrictions, closure of public spaces, including schools, etc. At the start of the pandemic, COVID-19 incidence in the EU/EEA and UK rapidly increased before slowing down due to strict response measures, however it started to increase again towards the end of summer. The second COVID-19 wave rapidly increased in autumn 2020, before the roll-out of the first COVID-19 vaccines in the EU/EEA on Christmas Eve, 24 December 2020.

4.2 SARS-CoV-2 variants

In December 2020, two variants of potential concern emerged, VOC 202012/01 (lineage B.1.1.7, aka Alpha) discovered in the UK and another variant, 501.V2 (aka Beta) identified in South Africa. The rapid increase in COVID-19 cases overall was temporally associated with the emergence of a new variant SARS-CoV-2 VOC 202012/01 in November 2020. The first instance of VOC 202012/01 was retrospectively identified in a case from 20 September 2020 in the UK [7].

On 18 December 2020, the South African government reported the emergence and rapid increase of a new variant designated 501.V2. The variant emerged during the second wave of the COVID-19 pandemic in South Africa that began around the end of November 2020. As of 19 December 2020, a total of 921 922 confirmed COVID-19 cases, including 24 691 deaths, had been reported in South Africa [7].

5. Conclusions

The year 2020 was characterised by the start of the COVID-19 pandemic. Apart from the human impact in terms of cases and deaths, the pandemic also had a significant effect within society. Changes in behaviour and implementation of non-pharmaceutical interventions led to changes in the epidemiology of many communicable diseases, as well as disruption of surveillance in the EU/EEA and globally, resulting in fewer reported and detected signals and events during the year.

In 2020, the EWRS was used more extensively due to reporting of COVID-19 cases, resulting in the highest annual number of notifications and comments posted in the past 16 years. The number of risk assessments produced remained similar to that for previous years, although most of them were related to COVID-19.

Epidemic intelligence played a crucial role in 2020, through the rapid and early detection of the initial COVID-19 cases in Wuhan and the continuous monitoring of the COVID-19 pandemic.

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Annex 1. ECDC risk assessments January–December 2020

Risk assessment	Publication date
Threat Assessment Brief: Pneumonia cases possibly associated with a novel coronavirus in Wuhan, China	9 January 2020
Rapid Risk Assessment: Cluster of pneumonia cases caused by a novel coronavirus, Wuhan, China, 2020	17 January 2020
Risk assessment: Outbreak of acute respiratory syndrome associated with a novel coronavirus, Wuhan, China; first update	22 January 2020
Risk assessment: outbreak of acute respiratory syndrome associated with a novel coronavirus, China; First cases imported in the EU/EEA; second update	26 January 2020
Risk assessment: Outbreak of acute respiratory syndrome associated with a novel coronavirus, China; first local transmission in the EU/EEA – third update	31 January 2020
Combined clonal and plasmid-mediated outbreak of carbapenemase-producing Enterobacterales, Lithuania, 2019–2020	3 February 2020
Rapid outbreak assessment: Multi-country outbreak of Salmonella Enteritidis infections linked to eggs - Third update	6 February 2020
Risk assessment: Outbreak of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2): increased transmission beyond China – fourth update	14 February 2020
Threat assessment brief: Outbreak of novel coronavirus disease 2019 (COVID-19): Situation in Italy	23 February 2020
Rapid risk assessment: Outbreak of novel coronavirus disease 2019 (COVID-19): increased transmission globally – fifth update	2 March 2020
Rapid risk assessment: Novel coronavirus disease 2019 (COVID-19) pandemic: increased transmission in the EU/EEA and the UK – sixth update	12 March 2020
Rapid risk assessment: Coronavirus disease 2019 (COVID-19) pandemic: increased transmission in the EU/EEA and the UK – seventh update	25 March 2020
Coronavirus disease 2019 (COVID-19) in the EU/EEA and the UK – eighth update	8 April 2020
Rapid Risk Assessment: Coronavirus disease 2019 (COVID-19) in the EU/EEA and the UK– ninth update	23 April 2020
Rapid risk assessment: Paediatric inflammatory multisystem syndrome and SARS -CoV-2 infection in children	15 May 2020
Rapid Risk Assessment: Coronavirus disease 2019 (COVID-19) in the EU/EEA and the UK – tenth update	11 June 2020
Rapid Risk Assessment: Resurgence of reported cases of COVID 19 in the EU/EEA, the UK and EU candidate and potential candidate countries	2 July 2020
Threat Assessment Brief: Eurasian avian-like A(H1N1) swine influenza viruses	13 July 2020
Rapid Risk Assessment: Coronavirus disease 2019 (COVID-19) in the EU/EEA and the UK – eleventh update: resurgence of cases	10 August 2020
Threat Assessment Brief: Reinfection with SARS-CoV-2: considerations for public health response	21 September 2020
Rapid risk assessment: Increased transmission of COVID-19 in the EU/EEA and the UK – twelfth update	24 September 2020
Rapid outbreak assessment: Multi-country outbreak of Salmonella Typhimurium and S. Anatum infections linked to Brazil nuts	21 October 2020
Rapid Risk Assessment: Increased transmission of COVID-19 in the EU/EEA and the UK – thirteenth update	23 October 2020
Rapid Risk Assessment: Detection of new SARS-CoV-2 variants related to mink	12 November 2020
Rapid Risk Assessment: Increase in fatal cases of COVID-19 among long-term care facility residents in the EU/EEA and the UK	19 November 2020
Rapid Risk Assessment: Risk of COVID-19 transmission related to the end-of-year festive season	4 December 2020
Threat Assessment Brief: Rapid increase of a SARS-CoV-2 variant with multiple spike protein mutations observed in the United Kingdom	20 December 2020
Risk Assessment: Risk related to spread of new SARS-CoV-2 variants of concern in the EU/EEA	29 December 2020