IAFP's European Symposium on Food Safety
Munich, 4-6 May 2022

EU monitoring of foodborne outbreaks and foodborne diseases in 2020 and impact of COVID-19 pandemic

Giusi Amore

European Food Safety Authority

Trusted science for safe food

Outline

- Monitoring of foodborne outbreaks and foodborne diseases in the EU
- Joint EFSA-ECDC 2020 EU One Health Zoonoses Report
- Impact of Covid-19 pandemic
  - Foodborne outbreaks
  - Foodborne diseases in humans

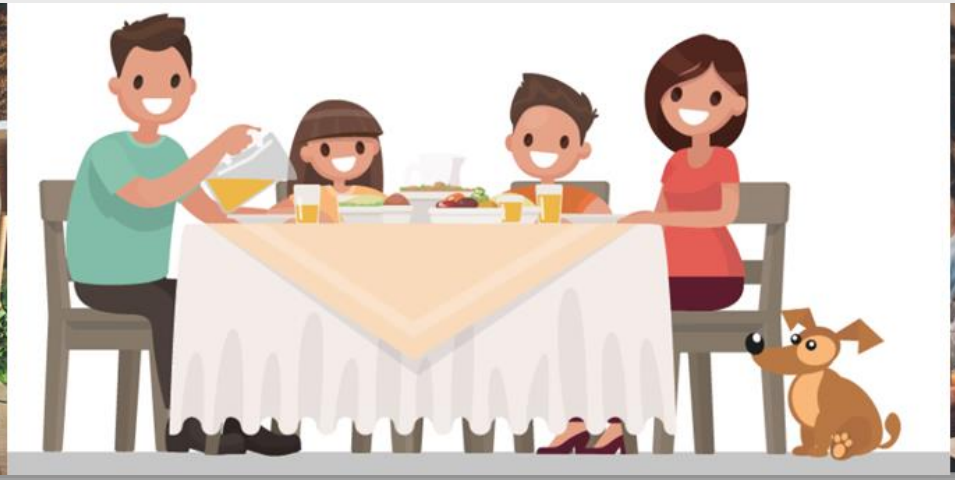
Monitoring of foodborne outbreaks and foodborne diseases in the EU

❑ Monitoring and reporting of foodborne outbreaks

- ➢ Mandatory according with **Directive 2003/99/EC** on monitoring of zoonoses and zoonotic agents

❑ Surveillance, monitoring and reporting of human foodborne disease data

- ➢ In accordance with **Decision 1082/2013/EU** on serious cross-border threats to health


EU One Health Zoonoses report

EU Member States and other reporting countries

Animal, food, and feed monitoring

Foodborne outbreaks

Data Collection Framework (DCF)

Scientific Network for Zoonoses Monitoring Data

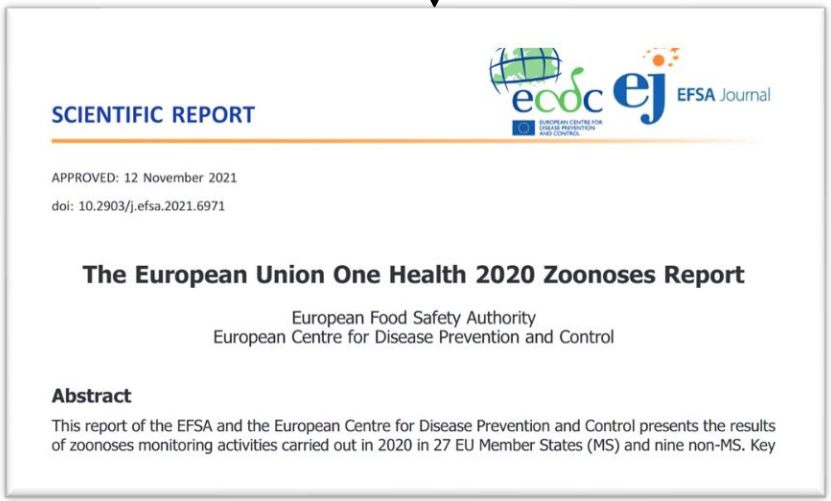
efsa European Food Safety Authority

Communicable human diseases

The European Surveillance System (TESSy)

ecdc EUROPEAN CENTRE FOR DISEASE PREVENTION AND CONTROL

*FWD, EVD and TB Networks**



SCIENTIFIC REPORT

EFSA Journal

APPROVED: 12 November 2021

doi: 10.2903/j.efsa.2021.6971

The European Union One Health 2020 Zoonoses Report

European Food Safety Authority
European Centre for Disease Prevention and Control

Abstract

This report of the EFSA and the European Centre for Disease Prevention and Control presents the results of zoonoses monitoring activities carried out in 2020 in 27 EU Member States (MS) and nine non-MS. Key

Annual joint EFSA-ECDC report

https://efsa.onlinelibrary.wiley.com/doi/epdf/10.2903/j.efsa.2021.6971

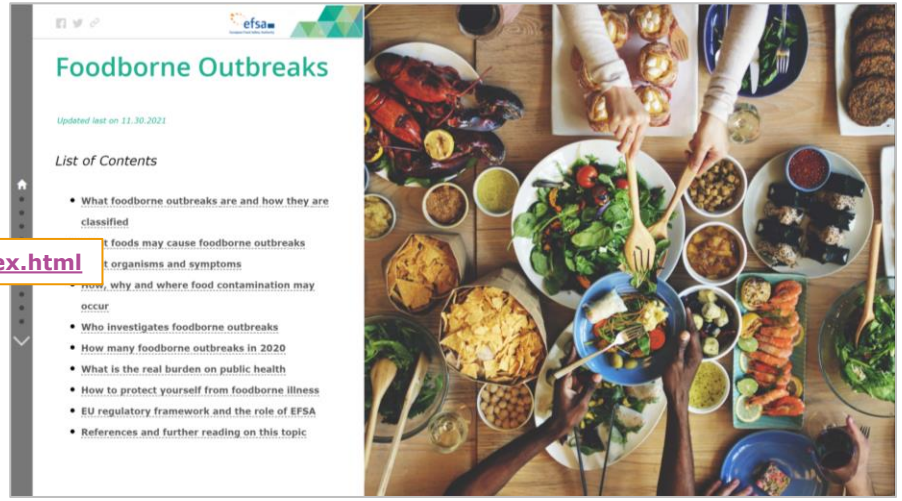
*FWD Network: European Food and Waterborne Diseases and Zoonoses Network; EVD Network: European Emerging and Vector-borne Disease Network; TB Network: European Tuberculosis Surveillance Network

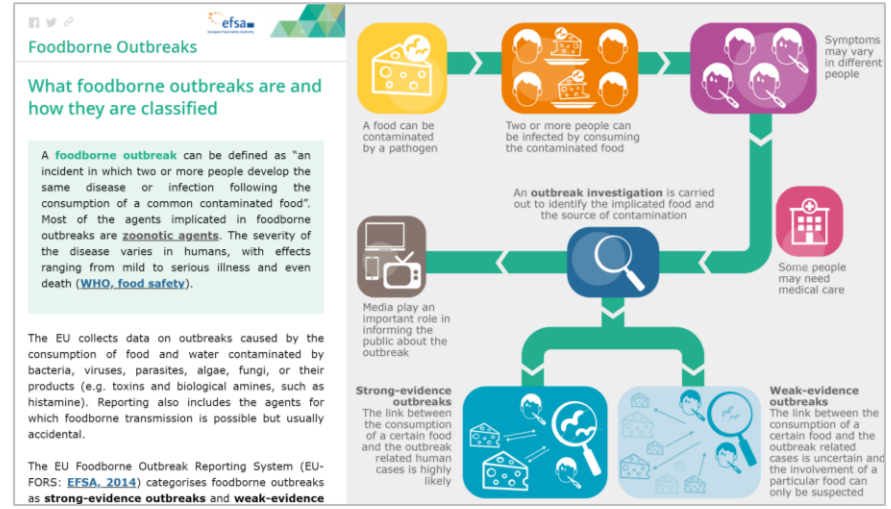
EU One Health Zoonoses report → new communication tools published in 2020

European Food Safety Authority

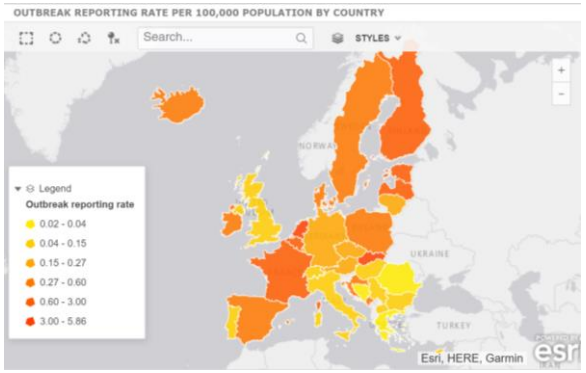
- **EFSA's story map on foodborne outbreaks**

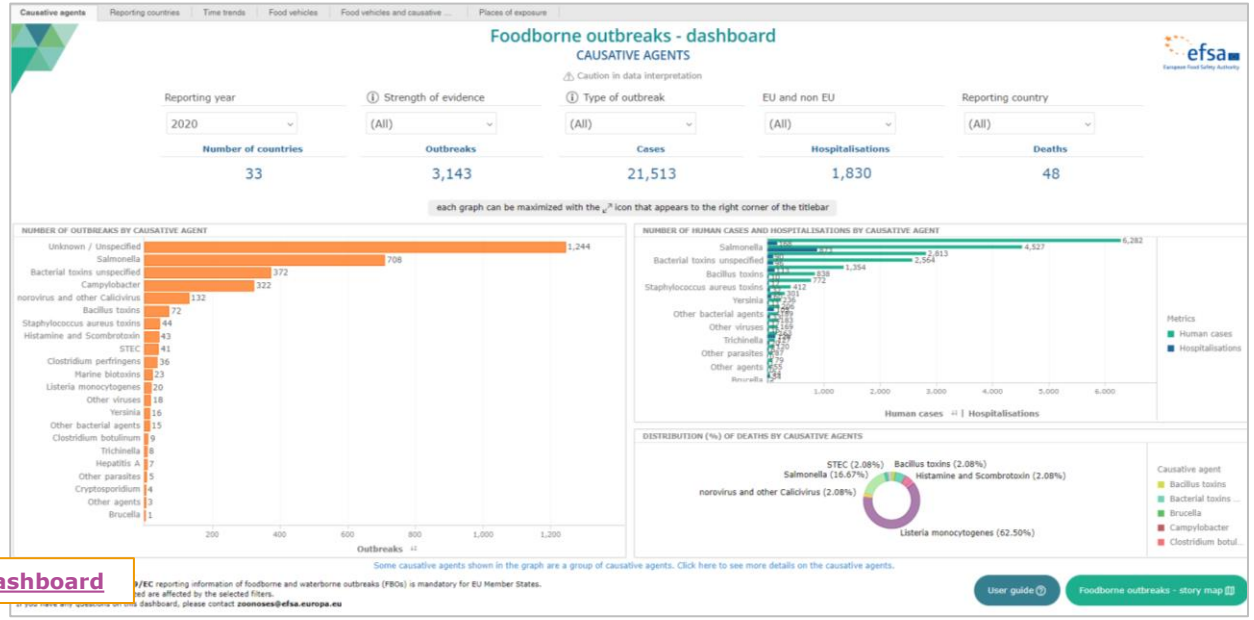
https://multimedia.efsa.europa.eu/fbo-storymaps/index.html

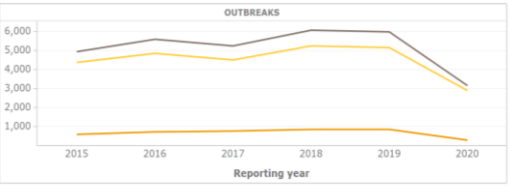


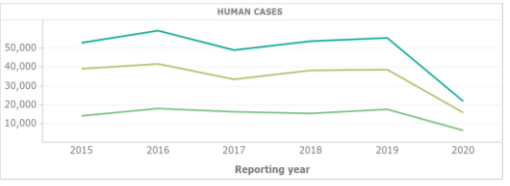


- **EFSA's dashboard on foodborne outbreaks**









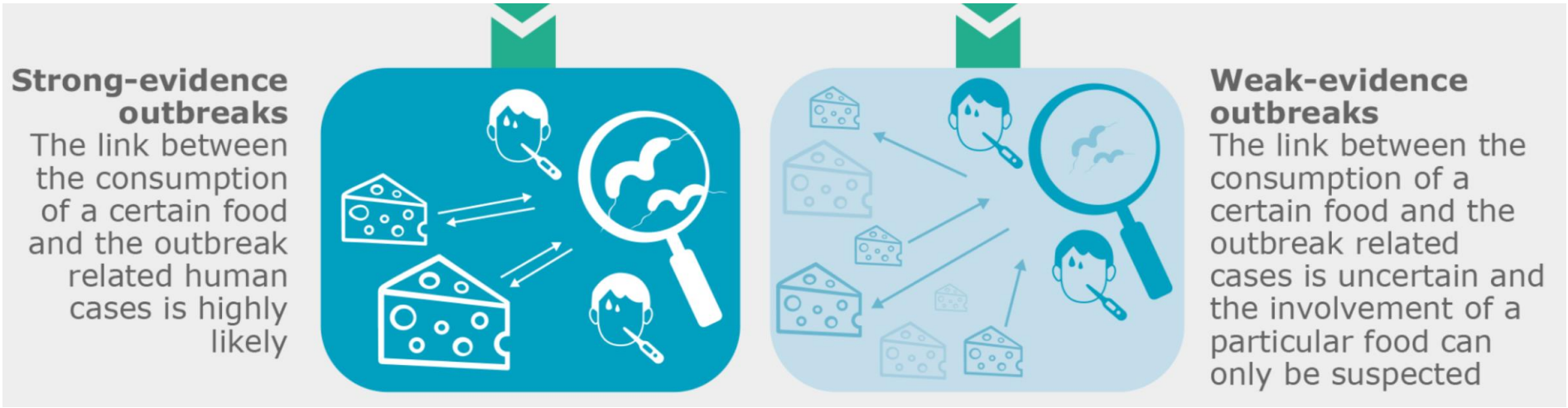
https://www.efsa.europa.eu/en/microstrategy/FBO-dashboard

EU Foodborne Outbreak Reporting System

- **Current system for monitoring FBOs in the EU** known as **European Union Food-borne Outbreak Reporting System (EU-FORS)**, implemented **since 2010** and **updated in 2014**

Classification of foodborne outbreaks:

'**strong**'-/'**weak**'-**evidence outbreaks** *based on the strength of evidence implicating a suspected food vehicle as the cause of the outbreak*



Strength of evidence:

- qualitative measure of the level of uncertainty which affects the likelihood that a food item is the vehicle of the outbreak
- should be based on a carefully assessment of all available categories of evidence (epidemiological, microbiological, food-tracing investigation, etc.)

Caution in foodborne outbreak data interpretation

- Although the data reporting rules follow the same standard EFSA harmonized specifications*, **foodborne outbreak surveillance activities** are **not fully harmonized across the EU**

- **Differences in sensitivity and type of outbreaks under surveillance may exist**

  Difference in the numbers and types of reported outbreaks, as well as in the causative agents, etc. may not necessarily reflect the level of food safety among MS

Aggregated findings at EU level and direct comparison between reporting countries should be interpreted with caution

*EFSA, 2014 available online: https://efsa.onlinelibrary.wiley.com/doi/abs/10.2903/j.efsa.2014.3598

Monitoring of foodborne outbreaks and human foodborne diseases in 2020

2020

Withdrawal of the United Kingdom (UK) from the EU

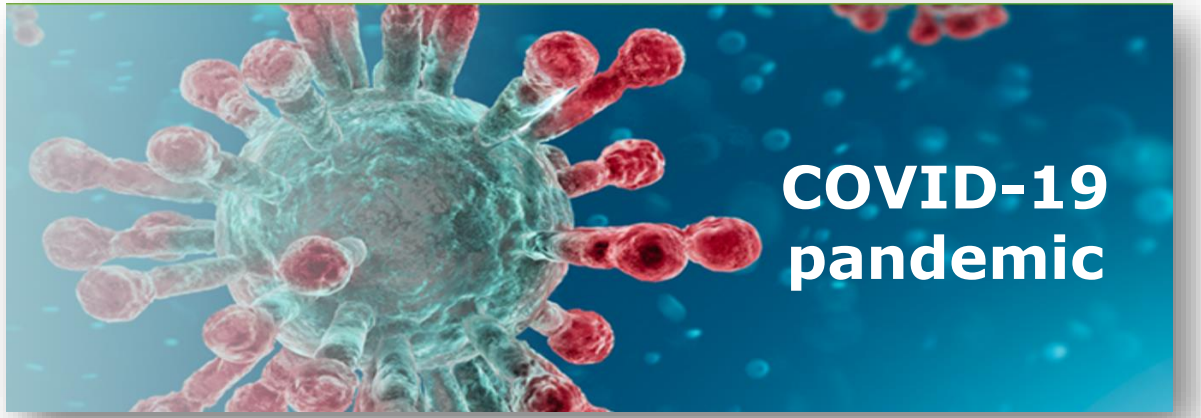
COVID-19 pandemic

Estimate impact of these two events

- **Monitoring of foodborne outbreaks**
  - The 2020 and 2019 relative variation in the total number of reported foodborne outbreaks (overall and for each causative agent) was also calculated based on EU 27 data only (i.e. excluding data reported by the United Kingdom for 2019)
- **Human data on foodborne diseases**
  - For each disease, the 2020/2019 relative difference in EU notification rates was also calculated based on EU 27 data only (i.e. excluding data reported by the United Kingdom for 2019)

The relative differences at the EU-27 level allowed for a more precise assessment of the impact of the COVID-19 pandemic on zoonoses in the EU, accounting for the withdrawal of the UK

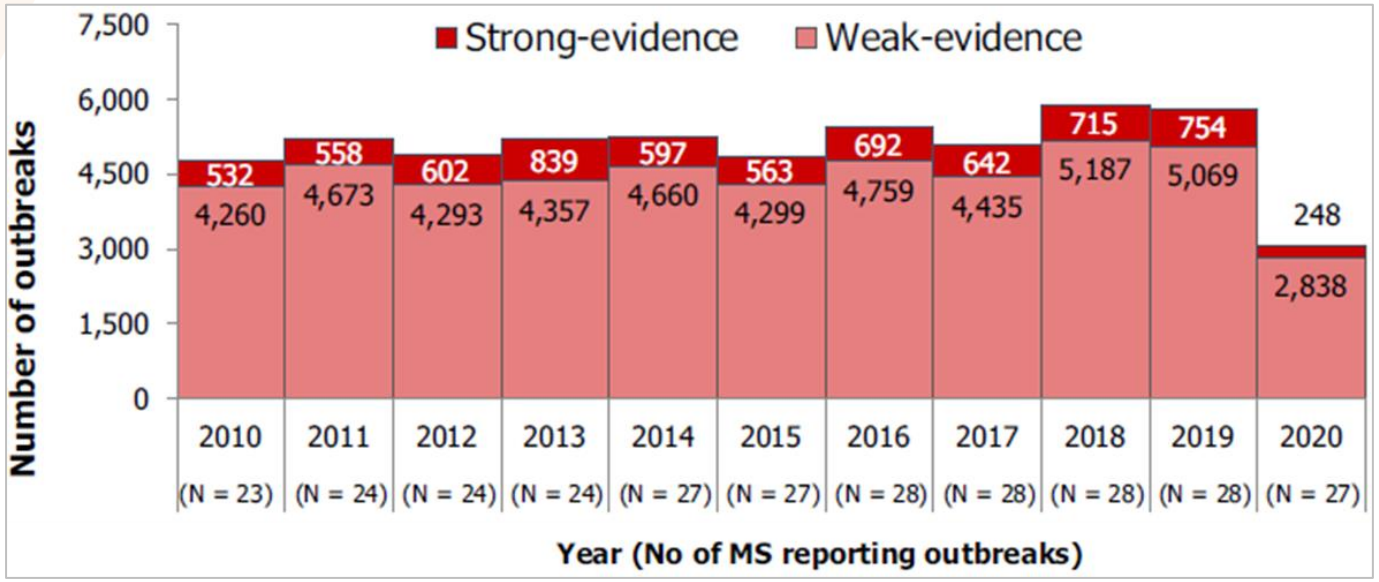
Monitoring of foodborne outbreaks and human foodborne diseases in 2020

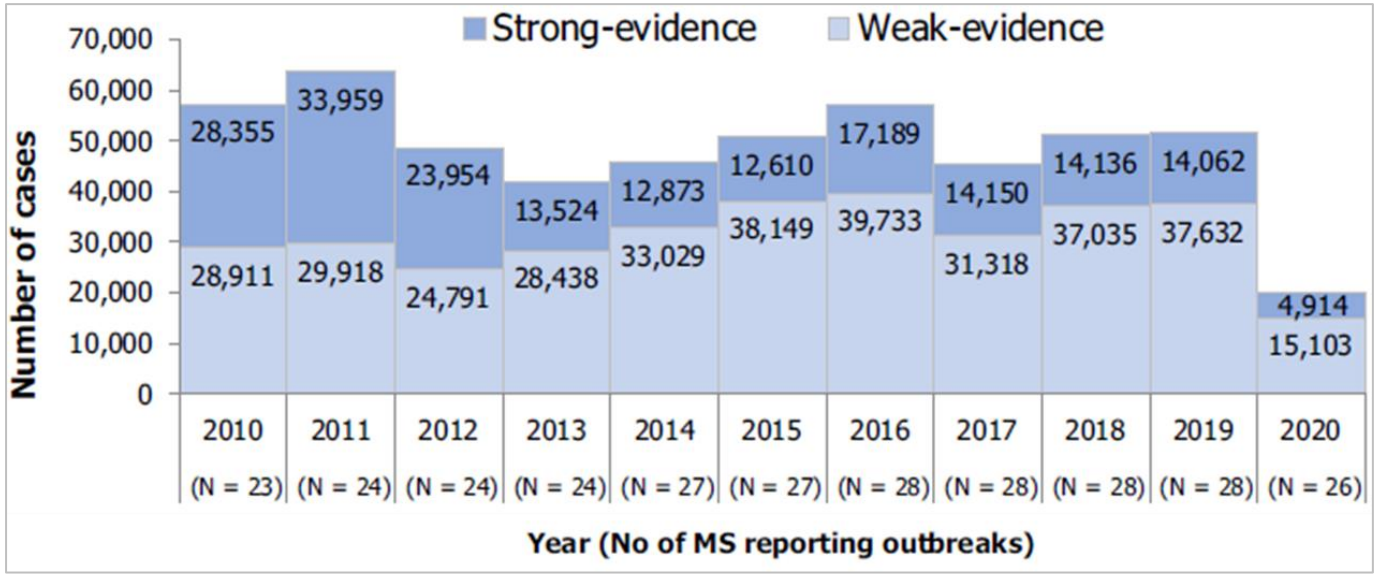


- To gather information on the possible impact of the COVID-19 pandemic on the surveillance activities and data collection, a **questionnaire** was submitted by EFSA and ECDC to the reporting countries

- The reporting countries were asked to:
  - *Evaluate whether the COVID-19 pandemic might have had an impact on the monitoring or surveillance and reporting of zoonoses and foodborne outbreaks in 2020*
  - *Inform whether, according to their experience, the collected 2020 data were comparable or not with the previous years' data*
- The answers received were used to **support the interpretation** of the 2020 monitoring and surveillance results included in the EU One Health Zoonoses Report 2020

Monitoring of foodborne outbreaks in EU, 2020





Note: the number of MS reporting outbreaks is shown at the bottom (N). Outbreaks and related cases involved in outbreaks reported by the United Kingdom are included for the years 2010–2019.

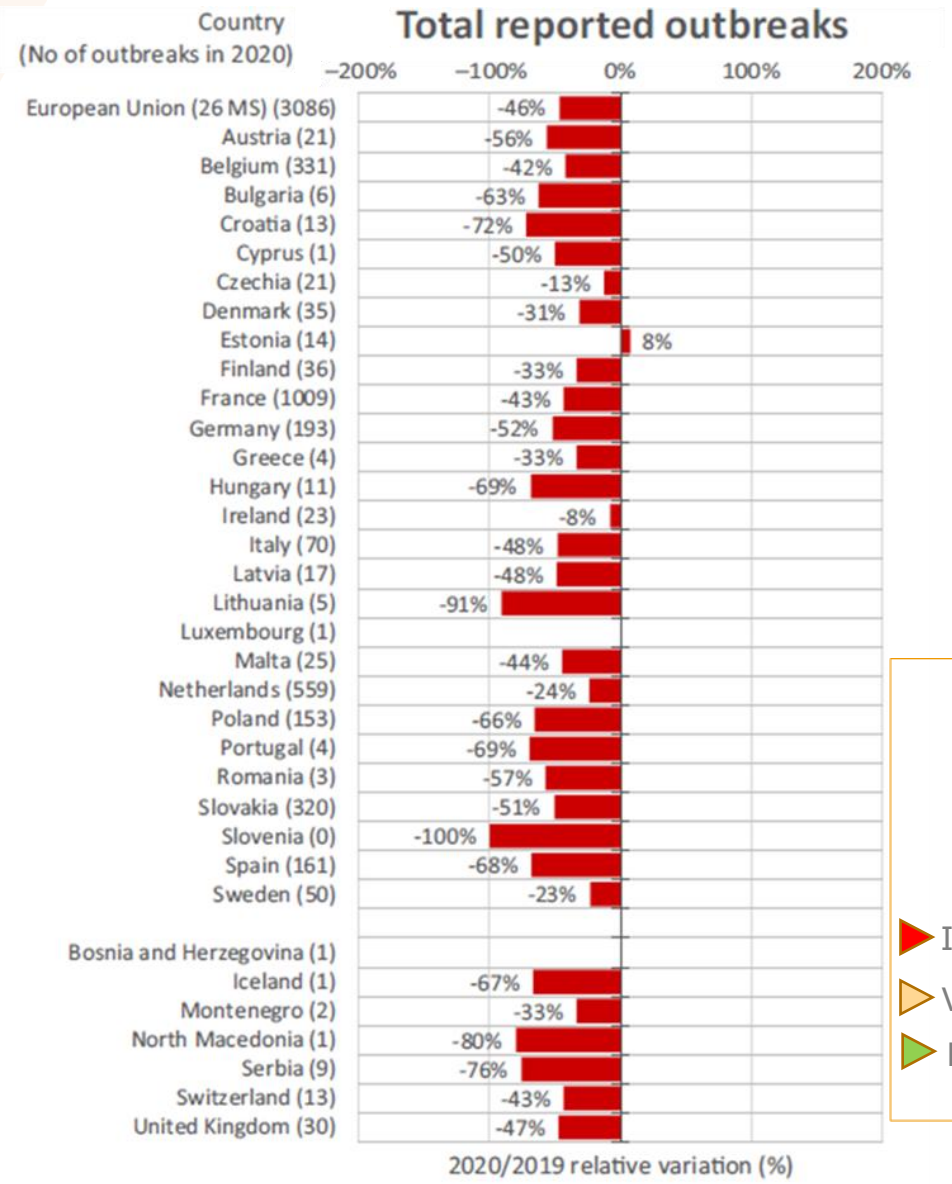
Number of foodborne outbreaks and related human cases by strength of evidence in EU, 2010–2020

EU data comparison 2020 vs 2019

- **Outbreaks dropped by 47%** (by 46% excluding UK from 2019 EU)
- **Human cases decreased by 61.3%**
- **Hospitalisations by 60.0%**
- **Deaths by 43.3%**

- Limited impact of the **withdrawal of the UK** from the EU
  - *Between 2015 and 2019, the UK reported between 0.8% and 1.1% of the overall number of foodborne outbreake reported annually by EU MS*

Monitoring of foodborne outbreaks in EU, 2020



Yearly relative variation (%)* of foodborne outbreaks reported in 2020 vs 2019 in EU-MS and non-MS

- The fall in foodborne outbreaks was observed for all the countries reporting data to EFSA for 2020 (except Estonia), albeit with considerable variations
- Likely indirect **impact of the COVID-19 pandemic** on both the true occurrence of foodborne outbreaks in the population and the reduced capacity to detect, investigate and report foodborne outbreaks

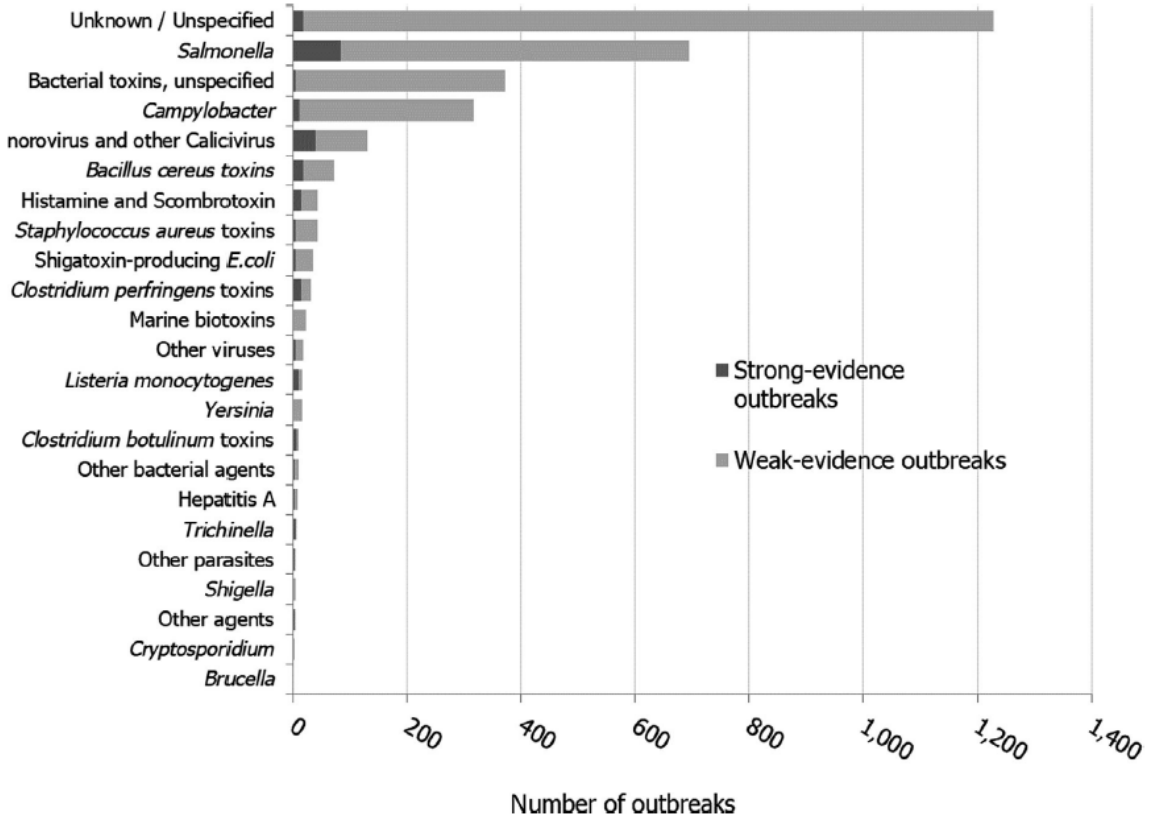
Survey results

Countries	Feedback received	Feedback on foodborne outbreaks
EU Member States	20/27	14/20
Non-EU Member States	4/7	1/4

- Impact of Covid-19 pandemic on monitoring foodborne outbreaks + low data comparability: 6 MS
- Variable/unknown impact + variable/unknown data comparability: 3 MS
- Low/No impact + data comparability: 5 MS +1 non-MS

**EU-level relative 2020/2010 variation (%) accounting for the withdrawal of the UK from the EU*

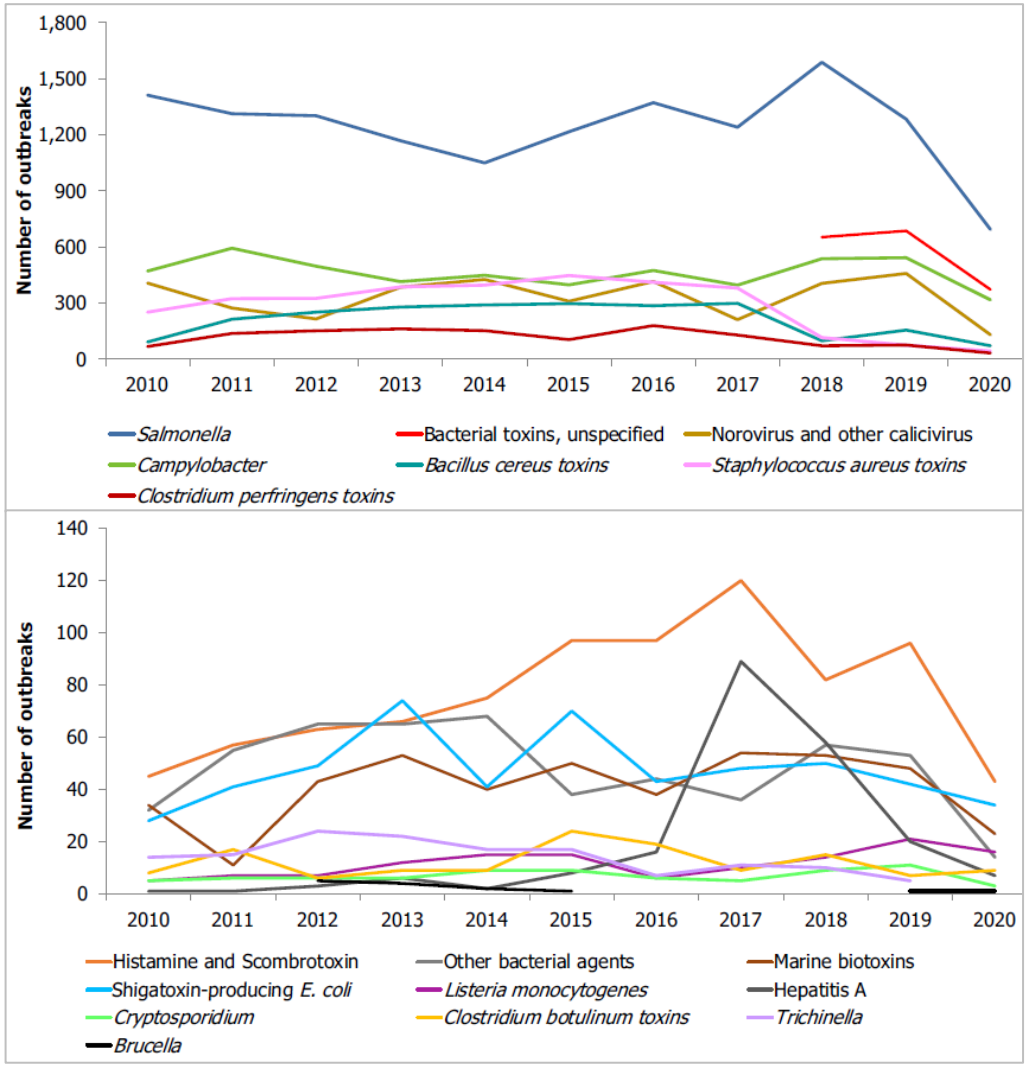
Monitoring of foodborne outbreaks in EU, 2020



Distribution of strong- & weak-evidence foodborne outbreaks, per causative agent, in EU, 2020

Note: Only FBO reported by EU Member States are shown in the figure. Marine biotoxins includes ciguatoxin and other unspecified marine toxins. Other viruses includes Tick-borne encephalitis virus (TBE), Hepatitis E and other unspecified viruses. Other bacterial agents includes Vibrio parahaemolyticus, Enteropathogenic Escherichia coli (EPEC) and other unspecified bacteria. Other parasites includes Anisakis, Giardia and Enterocytozoon bieneusi. Other causative agents includes lectin.

➢ The fall in foodborne outbreaks did not affect all causative agents equally



Monitoring of foodborne outbreaks in EU, 2020

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Foodborne outbreaks reported in 2020, by country and by causative agent and % of difference compared with 2019, in EU MS and non-MS

Country	*Salmonella*		*Campylobacter*		*Listeria monocytogenes*		Shiga toxin-producing *E.coli*		*Yersinia*		*Bacillus* toxins		*Clostridium perfringens* toxins		*Clostridium botulinum* toxins		*Staphylococcus aureus* toxins		Bacterial toxins, unspecified		Norovirus and other Calicivirus		Hepatitis A	
	N	variation (%)	N	variation (%)	N	variation (%)	N	variation (%)	N	variation (%)	N	variation (%)	N	variation (%)	N	variation (%)	N	variation (%)	N	variation (%)	N	variation (%)	N	variation (%)
European Union	694	-45%	317	-41%	16	-11%	34	-6%	16	-30%	71	-54%	32	-53%	9	29%	43	-42%	372	-46%	132	-72%	7	-65%
Austria	7	-59%	10	-55%	1	0%	1	-50%	0		0		0		0		0		0		0	-100%	0	
Belgium	1	-80%	3	200%	0	-100%	3	200%	0		2	100%	1	-50%	0		1		0		1	-67%	0	
Bulgaria	0		0		0		0		0		0		0		0		0		0		0		0	
Croatia	12	-57%	0	-100%	0		0		0		0		0	-100%	0		0	-100%	0		0	-100%	0	
Cyprus	0		0		0		0		0		0		0		0		0	-100%	0		0		0	
Czechia	7	-59%	0		0		0		0		0		0		0		0		0		7	133%	1	
Denmark	10	11%	3	-67%	3	200%	1	0%	2	100%	0		2	-80%	0		0		0		6	-68%	2	
Estonia	7	-22%	7	250%	0		0		0		0		0		0		0		0		0		0	
Finland	3	200%	4	100%	2	0%	1		0	-100%	1	0%	1		0		1	0%	2		11	-54%	0	
France	138	-24%	69	11%	1		6	-33%	4	33%	57	-54%	19	-34%	3	200%	32	-14%	370	-46%	57	-75%	0	
Germany	48	-62%	98	-41%	3	-40%	4	-43%	5	25%	6	100%	3	-50%	0		0	-100%	0		9	-31%	1	-89%
Greece	0	-100%	1		0		1		0		0		0	-100%	0		0		0		0	-100%	0	
Hungary	3	-79%	0	-100%	0		0		0		1	-83%	0	-100%	0		0	-100%	0		0	-100%	0	
Ireland	2	-50%	1	0%	0		16	45%	0		0		0		0		0		0		0	-100%	1	
Italy	32	78%	8	33%	3	200%	1	-50%	0		0	-100%	2	-33%	5	150%	1	-89%	0		1	-88%	0	-100%
Latvia	14	-26%	0	-100%	0		0		2		0		0		0		0		0		1	-88%	0	
Lithuania	5	-76%	0	-100%	0		0		0	-100%	0		0		0		0		0		0	-100%	0	
Luxembourg	1		0		0		0		0		0		0		0		0		0		0		0	
Malta	13	117%	5	-38%	0		0	-100%	0		0		0		0		0		0		4	300%	0	
Netherlands	5	-62%	8	14%	3	50%	0		0		1		0		0		0		0		3	-82%	0	
Poland	111	-57%	4		0		0		2		1	0%	0		0	-100%	0	-100%	0		8	-81%	1	-80%
Portugal	0		1		0		0		0		0	-100%	1	0%	0		0	-100%	0		0	-100%	0	
Romania	1	-67%	0		0		0		0		0		0		0	-100%	0	-100%	0		0		0	
Slovakia	216	-40%	88	-61%	0		0		1	-88%	0		0		0		0		0		0		0	
Slovenia	0	-100%	0		0		0		0		0		0		0		0		0		0		0	
Spain	56	-63%	4	-76%	0	-100%	0	-100%	0		2	-85%	3	-73%	1		7	-30%	0		7	-80%	0	-100%
Sweden	2	-67%	3	0%	0	-100%	0	-100%	0	-100%	0	-100%	0	-100%	0		1	0%	0		15	36%	1	0%
Bosnia Herzegovina	1		0		0		0		0		0		0		0		0		0		0		0	
Iceland	0		0		0		0	-100%	0		0		0	-100%	0		0		0		0		0	
Montenegro	2		0		0		0		0		0		0		0		0		0		0		0	
North Macedonia	0	-100%	0		0		0		0		0		0		0		1		0		0		0	-100%
Serbia	3	-89%	0	-100%	0		0		0		0		0		0		0	-100%	0		0		0	
Switzerland	1		1	0%	1		0		0		0		0		0		0		0		0	-100%	0	
United Kingdom	7	-53%	4	33%	3	0%	7	17%	0		1		4	-43%	0		0		0		2	-88%	0	

Monitoring of foodborne outbreaks in EU, 2020

Type of outbreaks

In 2020, at the EU level **general outbreaks** (N= 647) were more frequently reported than **household outbreaks** (N=286).

However, compared with 2019, **general outbreaks decreased more remarkably** (1,642 outbreaks in 2019; **60.6% decrease**) than household outbreaks (855 outbreaks; 54.9% decrease).

Places of exposure *(*only strong-evidence outbreaks considered)*

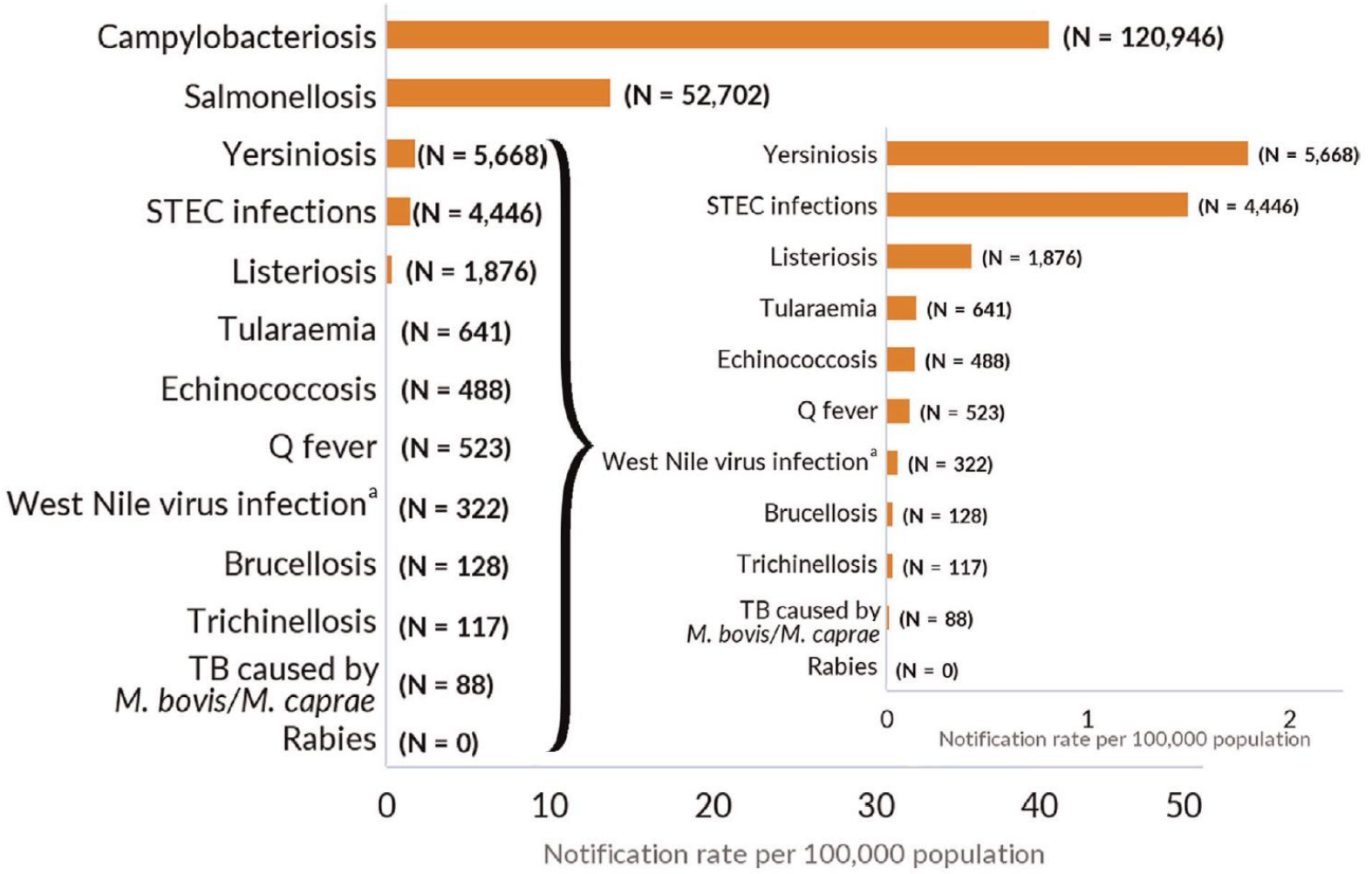
Remarkable decrease between 2020 and 2019 in the number of outbreaks occurred in:

- **DOMESTIC setting**: ***-70.0%*** *compared with 2019 (97 outbreaks in 2020 vs 323 in 2019)*
- **Restaurant, pub, street vendors, take away etc**: ***-70.6%*** *compared with 2019 (62 outbreaks in 2020 vs 211 in 2019)*
  - *Control measures to limit the spread of COVID-19 may have helped prevent the contamination of foodstuffs in domestic and public settings*
  - *The closure and suspension of activities during the COVID-19 pandemic was the main likely reason for the lower occurrence of FBO in restaurant/pub setting*

Impact of COVID-19 pandemic on monitoring foodborne outbreaks in EU, 2020

- In 2020, remarkable decrease in the number of foodborne outbreaks and related human cases and hospitalisation compared with 2019
  - Limited contribution of the withdrawal of the UK from the EU, some variations depending on causative agents
  - Probably mainly attributable to the impact of the COVID-19 pandemic in Europe
  - These findings should be interpreted with caution
  - The decrease in reported foodborne outbreaks could correspond to a true fall in the number of outbreaks at EU level or, alternatively, it could mirror a reduced sensitivity in MS surveillance systems, i.e. the ability to detect, investigate, collect and report outbreak data
- The decline in outbreaks in 2020 did not affect all causative agents equally
  - The number of outbreaks caused by agents associated with severe clinical conditions in humans (such as botulisms, listeriosis, trichinellosis and STEC infections) decreased less than those caused by other agents or did not even decrease at all
- The impact of the COVID-19 pandemic on surveillance and reporting of foodborne outbreaks will be evaluated retrospectively in the coming years

Human foodborne diseases in EU, 2020



Reported numbers of cases and notification rates of confirmed human zoonoses in EU, 2020

Note: The total number of confirmed cases is indicated in parentheses at the end of each bar.
(a): Regarding West Nile virus infection, the total number of cases was used (includes probable and confirmed cases).

Impact of COVID-19 pandemic on surveillance and reporting of human foodborne diseases in EU, 2020

Country	Impact on surveillance and reporting				Comparability of 2020 and 2019 data			
	Yes	No	Unknown	Variable*	Low	Medium	High	Variable*/Unknown
Austria		x						x
Belgium		x				x		
Czechia			X			x		
Denmark	x				x			
Estonia		x				x		
Finland			X		x			
France				x				x
Germany	x				x			
Greece	x							x
Hungary	x					x		
Ireland	x				x			
Italy		x				x		
Latvia	x					x		
Lithuania			X			x		
Luxembourg		x				x		
Malta		x					x	
Netherlands			X			x		
Romania	x				x			
Slovakia	x				x			
Slovenia	x						x	
Spain	x							x
Sweden		x					x	
Iceland		x					x	
Norway	x					x		

*: Varies according to the zoonosis.

Results of the survey

Impact of Covid-19

- 22 MS replied to the survey
- 10/22 MS: pandemic impacted their surveillance/monitoring systems
- 7/22 MS: no effects due to the pandemic
- 4/22 MS: unknown impact
- 1/22 MS: variable impact

Data comparability for 2020/2019

- Low-medium for 15 MS
- Only 3 MS considered the 2020 and 2019 data highly comparable

Foodborne diseases considered: brucellosis, campylobacteriosis, echinococcosis, listeriosis, salmonellosis, STEC infection, trichinellosis, congenital toxoplasmosis and yersiniosis

Impact of COVID-19 pandemic on surveillance and reporting of human foodborne diseases in EU, 2020

Zoonosis	EU level[a]	Cases (N)		Rate		
		2020	2020–2019 difference	2020	2020–2019 difference	
					Absolute difference (%)	Relative difference (%)
Campylobacteriosis	EU	120,946	–99,693	40.3	–20.3	–33.4
	EU-27		–40,975		–13.7	–25.4
Salmonellosis	EU	52,702	–35,206	13.7	–5.8	–29.7
	EU-27		–25,488		–6.7	–32.8
Yersiniosis	EU	5,668	–1,299	1.8	0.10	6.0
	EU-27		–1,136		–0.27	–13.4
STEC infections	EU	4,446	–3,355	1.5	–0.43	–22.4
	EU-27		–1,768		–0.33	–18.2
Listeriosis	EU	1,876	–745	0.42	–0.03	–7.1
	EU-27		–591		–0.07	–14.2
Tularaemia	EU	641	–639	0.15	–0.11	–42.5
	EU-27		–639		–0.15	–50.0
Q fever	EU	523	–428	0.12	–0.07	–36.7
	EU-27		–419		–0.10	–44.6
Echinococcosis	EU	488	–278	0.14	–0.03	–16.2
	EU-27		–275		–0.06	–28.4
West Nile virus[b]	EU	322	–68	0.07	–0.01	–12.9
	EU-27		–68		–0.02	–24.4
Brucellosis	EU	128	–182	0.03	–0.03	–52.6
	EU-27		–158		–0.04	–55.3
Trichinellosis	EU	117	20	0.03	0.01	39.1
	EU-27		20		< 0.01	20.4
Tuberculosis	EU	88	64	0.02	–0.01	–32.0
	EU-27		29		–0.01	–24.9

(a): In 2019, data from the United Kingdom were collected because the UK was an EU MS, but since 1 February 2020, it has become a third country. To calculate the 2020/2019 difference, data from the United Kingdom for 2019 were included in this 'EU' calculation, whereas human data from the UK were not collected by ECDC for 2020 ('EU-27').
(b): For West Nile virus infection, the total number of cases was used (includes probable and confirmed cases).

Data comparison for 2020/2019

- Covid-19
- Withdrawal of UK from the EU

Estimate impact of these two events

- Absolute and relative difference between the number of cases and the notification rate (*100,000 population) reported in the EU for 2020 compared with 2019 for each disease

Results

- Reduction in the notification rates 2020/2019 for all zoonoses (except trichinellosis & yersiniosis)

- Relative fall in notification rates in EU varied from -52.6% for brucellosis to -7.1% for listeriosis

  → *More precise assessment of the impact of the COVID-19 pandemic on zoonoses in the EU*

Impact of COVID-19 pandemic on surveillance and reporting of human foodborne diseases in EU, 2020

- COVID-19 pandemic might have caused a drop in reported human cases and notification rates for almost all zoonotic diseases
  - *Resulting of both underreporting and real reduction of cases (decreased exposure)*
- Various factors associated with COVID-19 pandemic, might have had an effect in reducing the number of reported human cases
  - *National health care resilience (health workforce, laboratory and diagnostic capability, access to hospitals and medical assistance)*
  - *Shutdown of domestic and international travel*
  - *Restrictions on sporting and recreational/social events*
  - *The closing of restaurants and catering facilities*
  - *Quarantine, lockdown*
  - *Non-pharmaceutical mitigation measures (face masking, hand washing/sanitisation, physical distancing, restricted movement and social gatherings)*
- Impact of the withdrawal of the UK from the EU
  - Little impact on salmonellosis and tuberculosis
  - Positive impact (EU notification rate reduction) for campylobacteriosis and STEC infection
  - Negative impact (EU notification rate increase) for the remaining diseases

Main conclusions

- **COVID-19 pandemic** has impacted both the surveillance and monitoring activities of both human foodborne diseases and foodborne outbreaks
- Drop in reported human cases and notification rates for almost all zoonotic diseases and drop of the reported foodborne outbreaks and related human cases and hospitalisations
- The **decline in outbreaks and human foodborne diseases** in 2020 did not affect all zoonotic agents equally
- The number of outbreaks and foodborne diseases caused by agents associated with **severe clinical conditions** in humans, such as listeriosis, **decreased less** than those caused by other agents
- Findings should be interpreted with **caution** since human foodborne diseases and outbreaks may have decreased in 2020 either as a result of reduced exposure to contaminated food and/or of the underdetection and underreporting
- Further investigations are needed to assess more in detail the impact of the COVID-19 pandemic
- Variable **impact of the withdrawal of the UK from the EU** on the number of human cases depending on the diseases. Limited impact on the overall reporting of foodborne outbreaks in 2020, with some variations depending on the causative agents

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