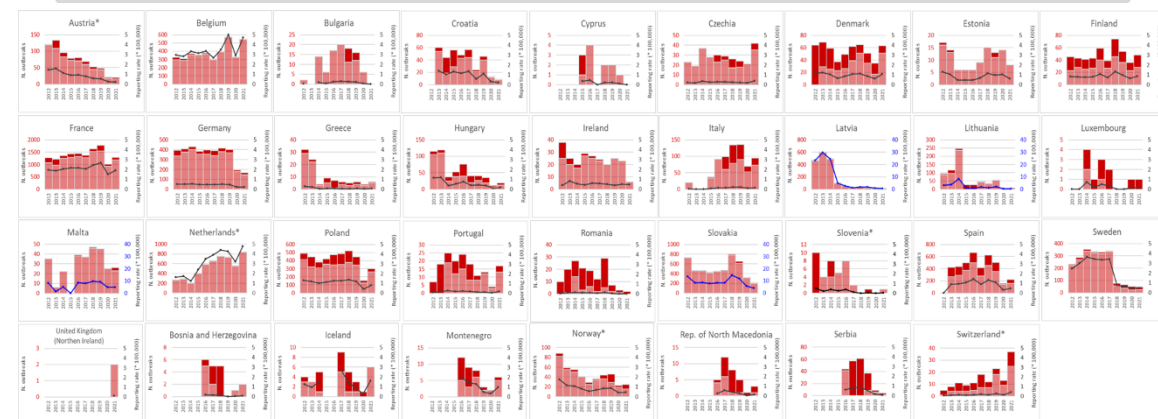
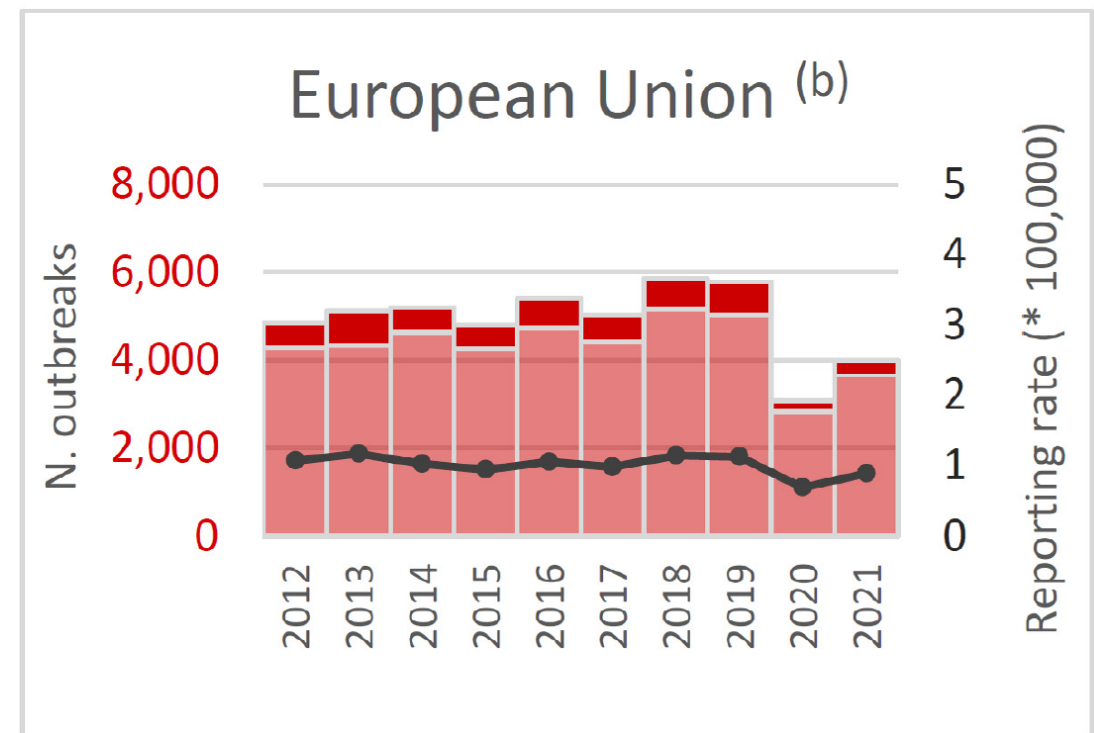


NUEVOS INSTRUMENTOS DE GESTION DE LOS BROTOS DE TOXIINFECCION ALIMENTARIOS

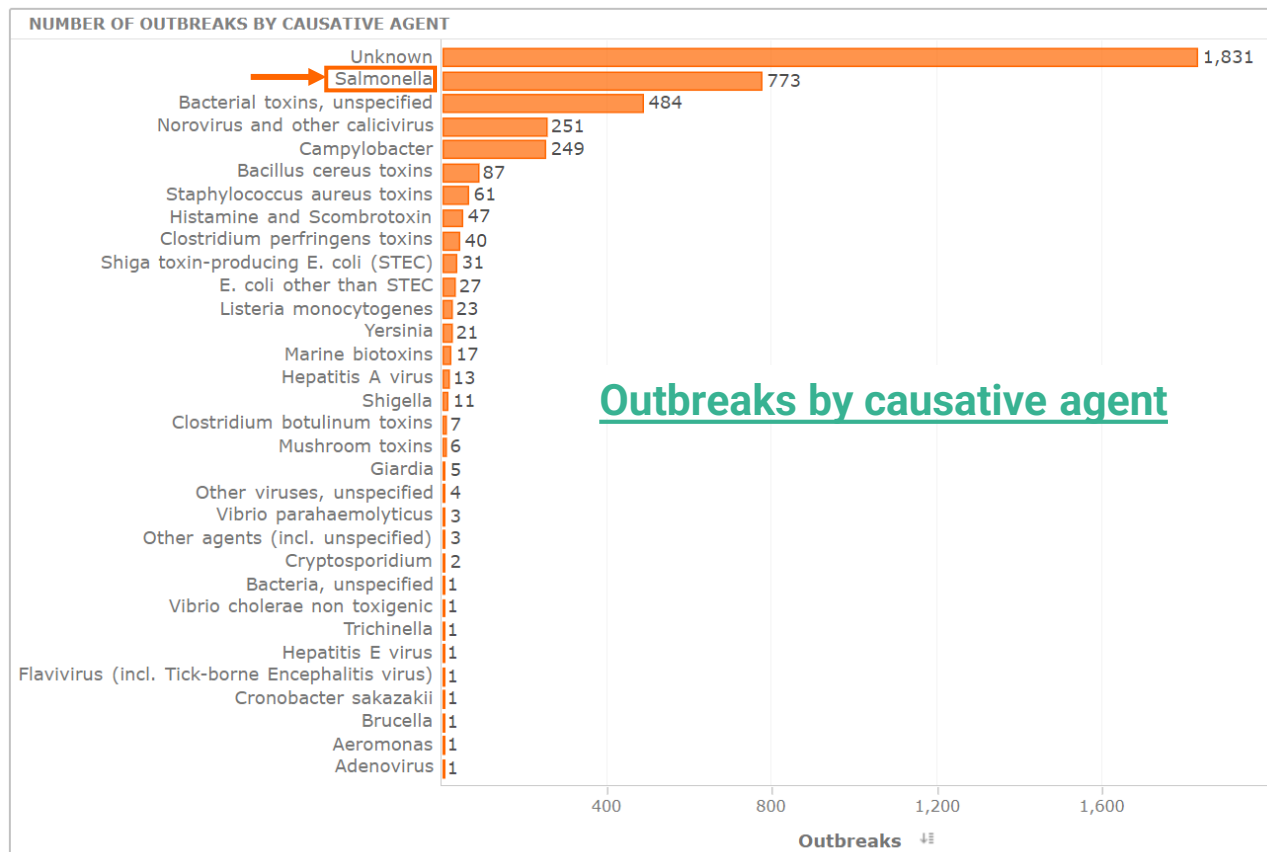
Dr Marta Hugas
Former Chief Scientist

BROTOS DE TOXIINFECCIONES EN LA UE EN 2021

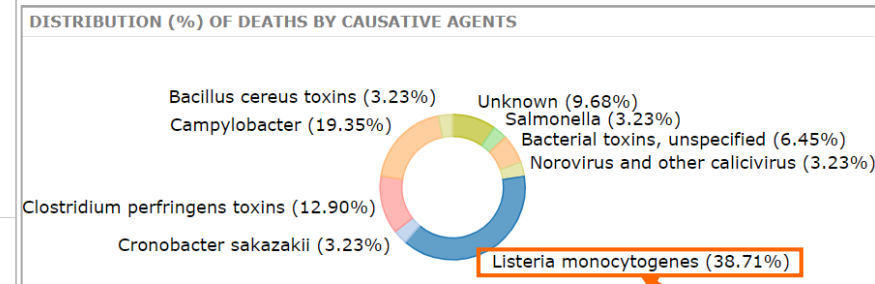
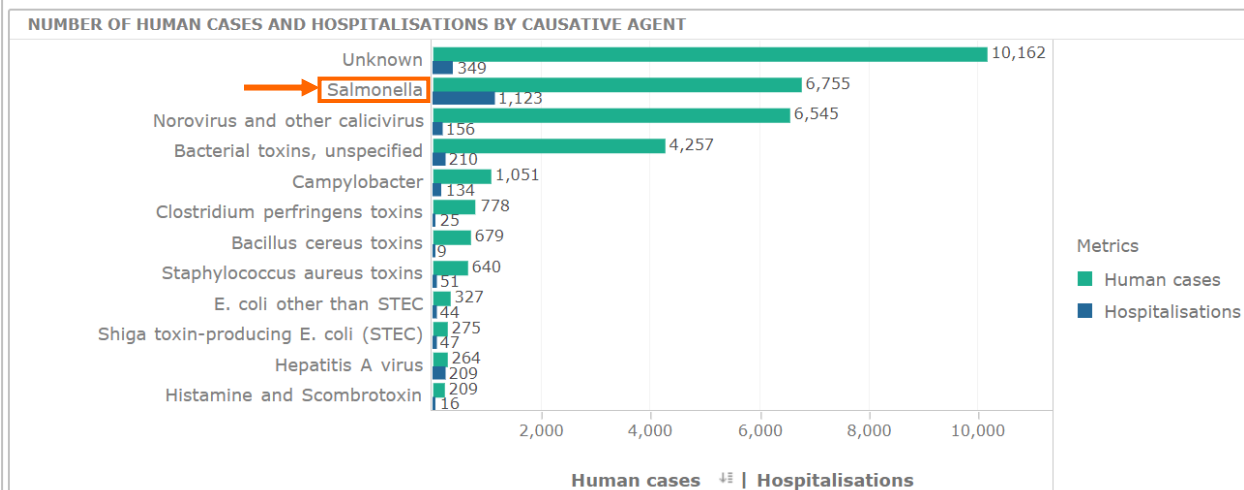
- In 2021, **27 MSs** and **United Kingdom (Northern Ireland)** reported a total of 4,005 FBOs (355 strong-evidence FBOs), 32,543 cases of illness, 2,495 hospitalisations and 31 deaths
- Among MSs, no foodborne outbreaks were detected in 2021 in Bulgaria and Cyprus
- Seven non-MSs** (Bosnia and Herzegovina, Iceland, Montenegro, Norway, Republic of North Macedonia, Serbia, Switzerland) reported 83 outbreaks, 1,270 cases of illness, 65 hospitalisations and 2 deaths



OVERVIEW OF CAUSATIVE AGENTS IN EU, 2021



Cases & hospitalisations by causative agent

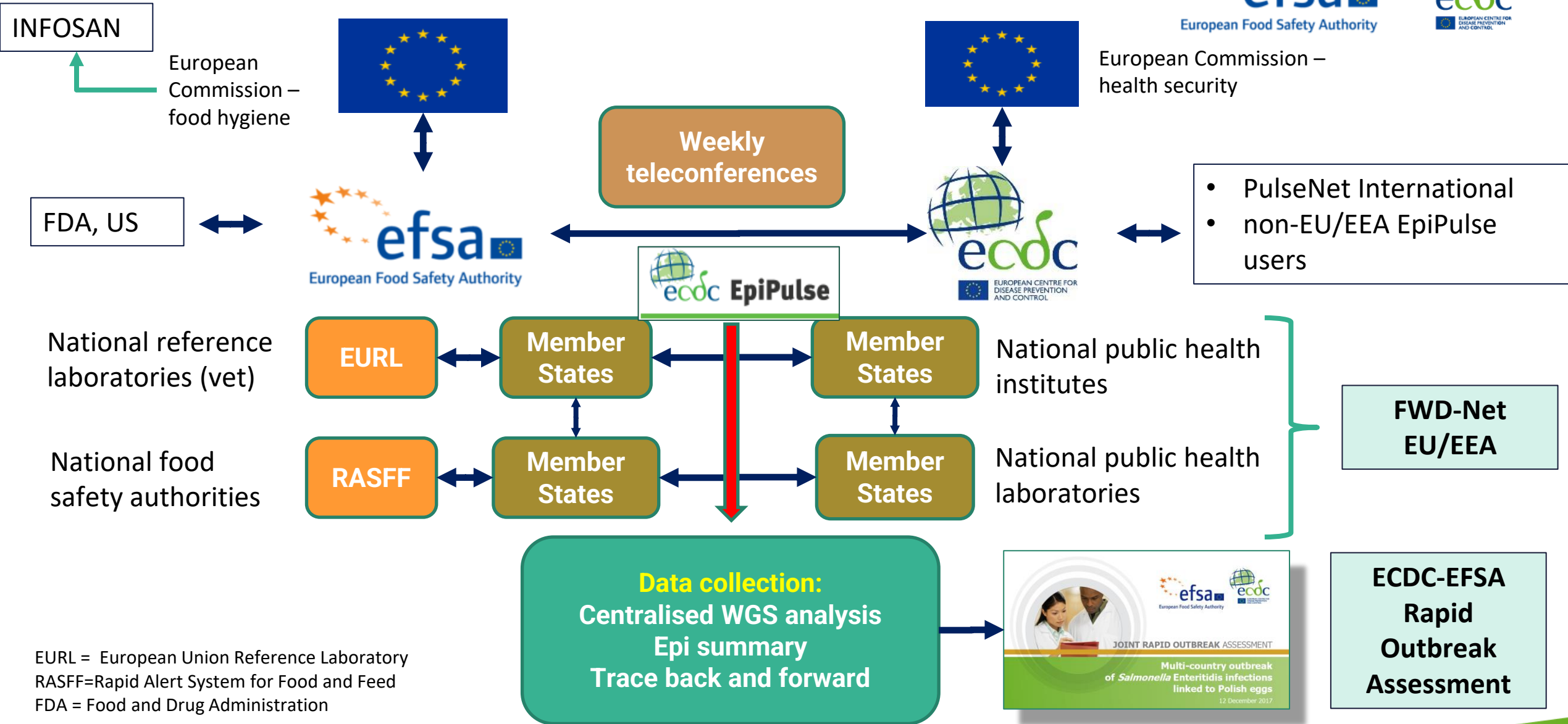


Deaths by causative agent

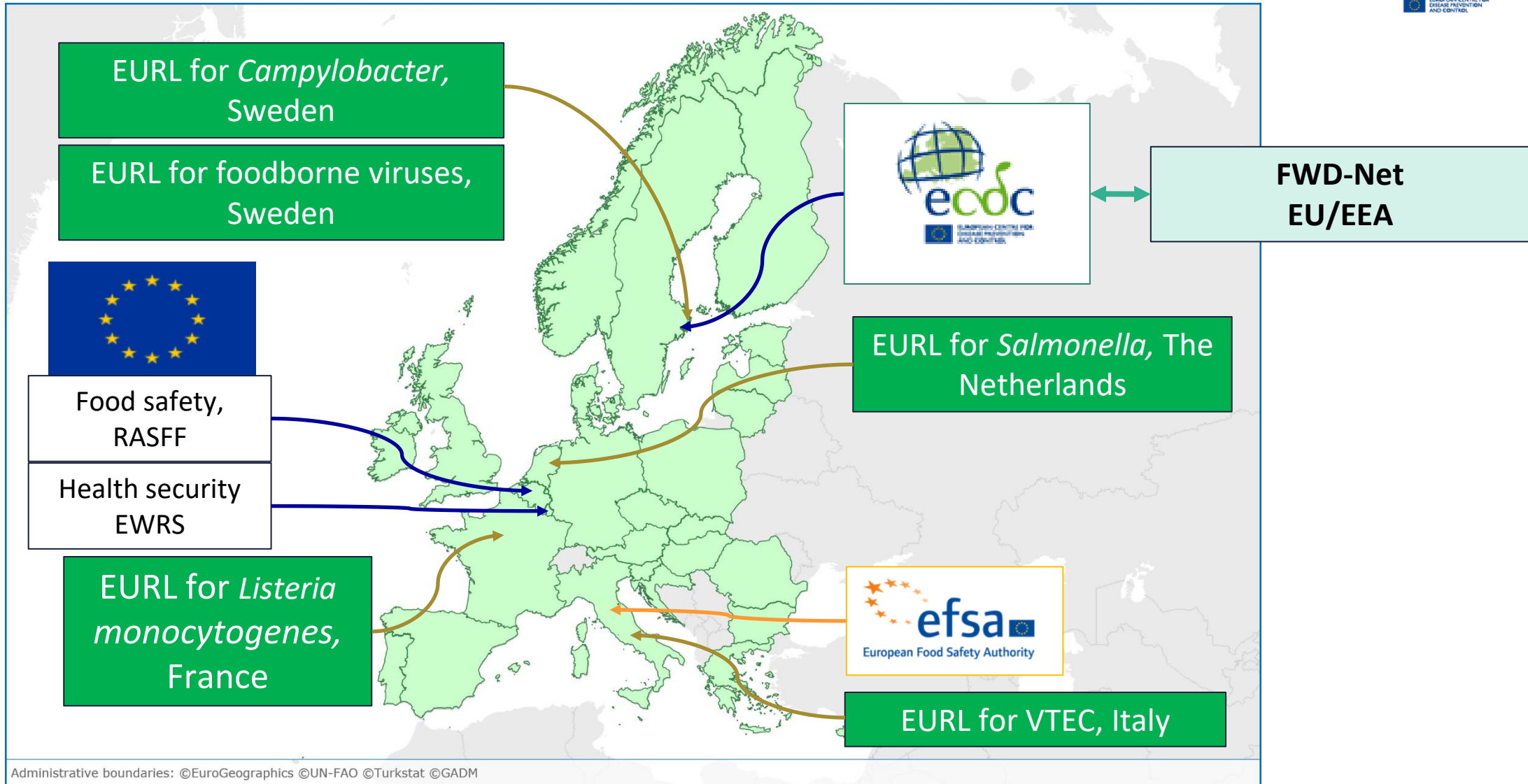
- FBOs of unknown etiology: 45.7% of all outbreaks
- Bacteria caused the highest number of outbreaks, human cases, hospitalisations and deaths
- Next to bacteria, the most frequently reported causative agents were **bacterial toxins** and **viruses**
- *Cronobacter sakazakii* & non-toxigenic *Vibrio cholerae* reported for the **first time** in 2021



ECDC-EFSA RAPID OUTBREAK ASSESSMENT



PUBLIC HEALTH AND FOOD SAFETY NETWORKS IN EU/EEA



TOWARDS WGS-BASED MOLECULAR TYPING DATA COLLECTION IN EFSA

- In 2017, EFSA and ECDC received a joint mandate for expanding the molecular typing data collection to **Whole Genome Sequencing (WGS)** data (**feasibility study**):
 - Requirements and constraints
 - Evaluate possible solutions
- EFSA and ECDC
 - published in May 2019 the **technical report**¹ comparing potential solutions
 - identified '**Strategic elements**' to guide the decision on the best scenario (WGS roadmap)

Strategic elements identified by EFSA



The IT architecture should allow to develop internal bioinformatic services addressing multiple needs for different risk assessment domains



Guarantee full transparency of the analytical procedures



Engage more with data providers for increasing the attractiveness of the system and therefore the submission of data related to non-human isolates

1. <https://www.efsa.europa.eu/en/supporting/pub/en-1337>

OBJECTIVES OF THE WGS SYSTEM:

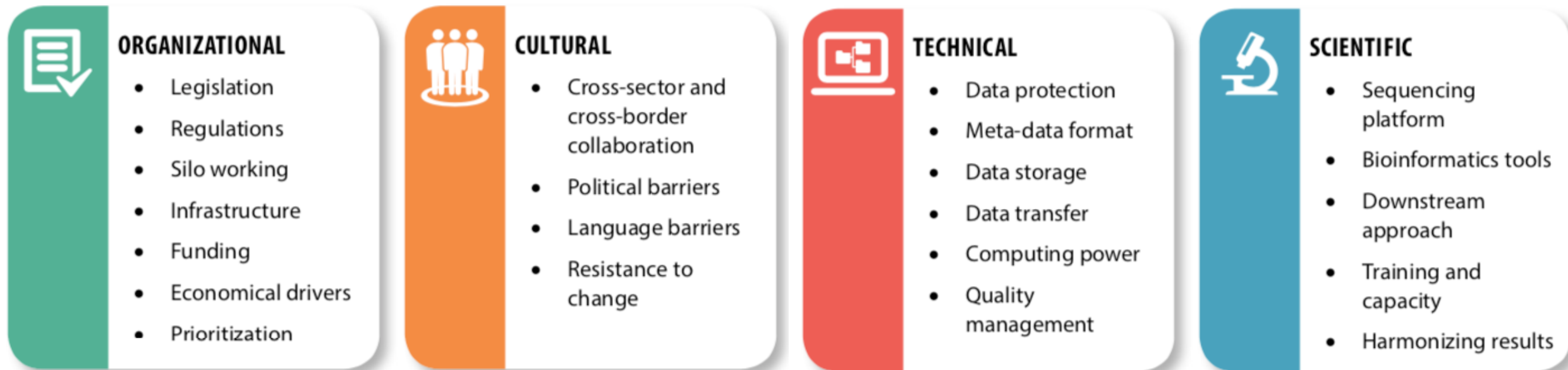
- TO COLLECT GENOMIC PROFILES OF FOODBORNE PATHOGENS AND ASSOCIATED EPIDEMIOLOGICAL DATA OF ISOLATES FROM FOOD, FEED, ANIMALS AND RELATED ENVIRONMENT.
- TO ALLOW ECDC TO QUERY THE EFSA DATABASE FOR FINDING POSSIBLE MATCHES BETWEEN HUMAN AND NON-HUMAN ISOLATES
- TO OFFER A SET OF SERVICES THROUGH A USER-FRIENDLY INTERFACE FOR THE ANALYSIS AND MANAGING OF THE SUBMITTED DATA
- AIMS OF THE SYSTEM:
 - Build a database of genomic profiles that can be queried in case of foodborne outbreaks
 - Support the real-time investigation of multi country foodborne outbreaks



STATE OF PLAY AND FUTURE PERSPECTIVES ON NGS

It is well known the great potential that WGS offers in the surveillance and monitoring of emerging health threats and in epidemiological investigations of foodborne outbreaks, BUT.....

we are still facing many challenges



Source. Whole genome sequencing for foodborne disease surveillance. Landscape paper. WHO, 2018

MULTI-COUNTRY OUTBREAK OF L. MONOCYTOGENES ST6 LINKED TO FROZEN CORN AND OTHER FROZEN VEGETABLES

November 2017

SUN	MON	TUE	WED	THU	FRI	SAT
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

3/11/2017: Finland launched an UI. Four MS reported matching human isolates.

20/11/2017: EURL Lm launched an inquiry to NRLs network

30/11/2017: MSs reported isolates matching with PFGE. WGS not yet performed.

December 2017

SUN	MON	TUE	WED	THU	FRI	SAT
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

JANUARY 2018

SUN	MON	TUE	WED	THU	FRI	SAT
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

05/01/2018: EURL reported isolates matching with WGS → 2 from food and 1 from environment

29/01/2018: sequences of the food isolates sent to EFSA

FEBRUARY 2018

SUN	MON	TUE	WED	THU	FRI	SAT
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28			

05/02/2018: the relevant MS shared information on the food type of the matching isolates

Hypothesis about



GUIDING PRINCIPLES

■ Requirements



Interoperability



IT architecture



Transparency



Engagement

■ Additional requirements

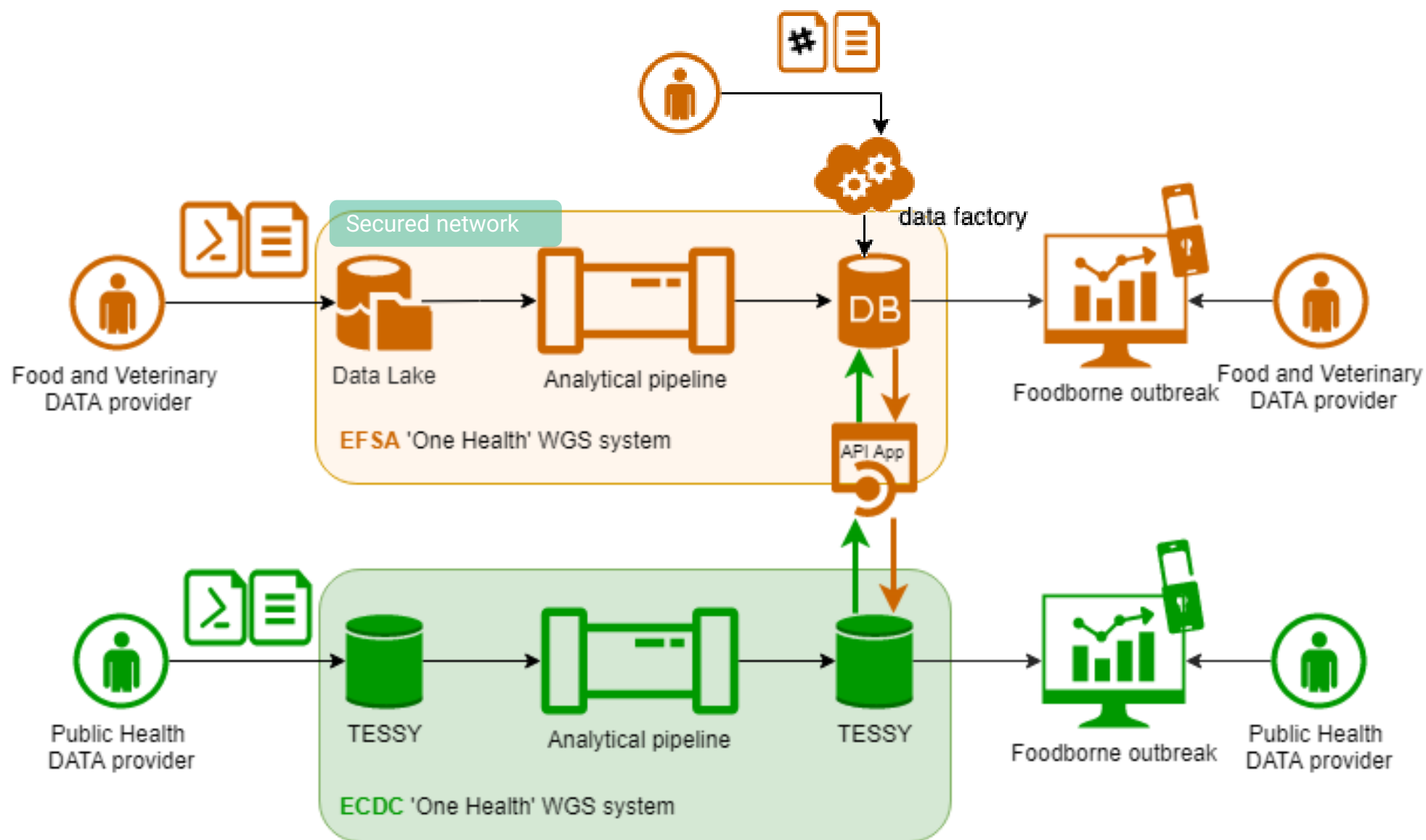


EFSA is not the owner of these data. **Data ownership** should be respected.



The system should be able to guarantee the **data confidentiality**.

THE FORESEEN 'ONE HEALTH' SYSTEM



CONCLUSIONES

- Es necesaria una recolección de datos de WGS centralizada para resolver rápidamente la investigación de brotes de toxiinfecciones con origen en múltiples estados miembros.
- En el diseño de la colección y análisis de datos centralizada hay que considerar muchos factores clave manteniendo el equilibrio entre:
 - Apertura/ Transparencia
versus
 - Propiedad de los Datos/ Confidencialidad/ Engagement
- Diálogo con todas las partes interesadas es crucial

AGRADECIMIENTOS A EFSA, EN ESPECIAL: A V. RIZZI, F. BOELAERT Y M. ROSSI