



Trends and sources of STEC and of food-borne outbreaks due to STEC, in the EU

Frank Boelaert

OUTLINE

- **Annual monitoring of STEC in the EU**
- **EFSA activities for molecular typing data collection for food and animal isolates**
- **EFSA's activities on WGS (EC questionnaire on the availability of WGS)**



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MONITORING OF ZONOOSES, FBO AND AMR IN THE EU

- **Directive on the monitoring of zoonoses and zoonotic agents (2003/99/EC)**

- Publication of the annual EU Summary Report
- MSs have an **obligation** to report each year

- **Data collection mandatory for 8 zoonotic agents**

Salmonella (+ antimicrobial resistance (AMR))

Campylobacter (+ AMR)

Listeria monocytogenes

Brucella

Tuberculosis due to *Mycobacterium bovis*

Verotoxigenic *Escherichia coli*

Trichinella

Echinococcus

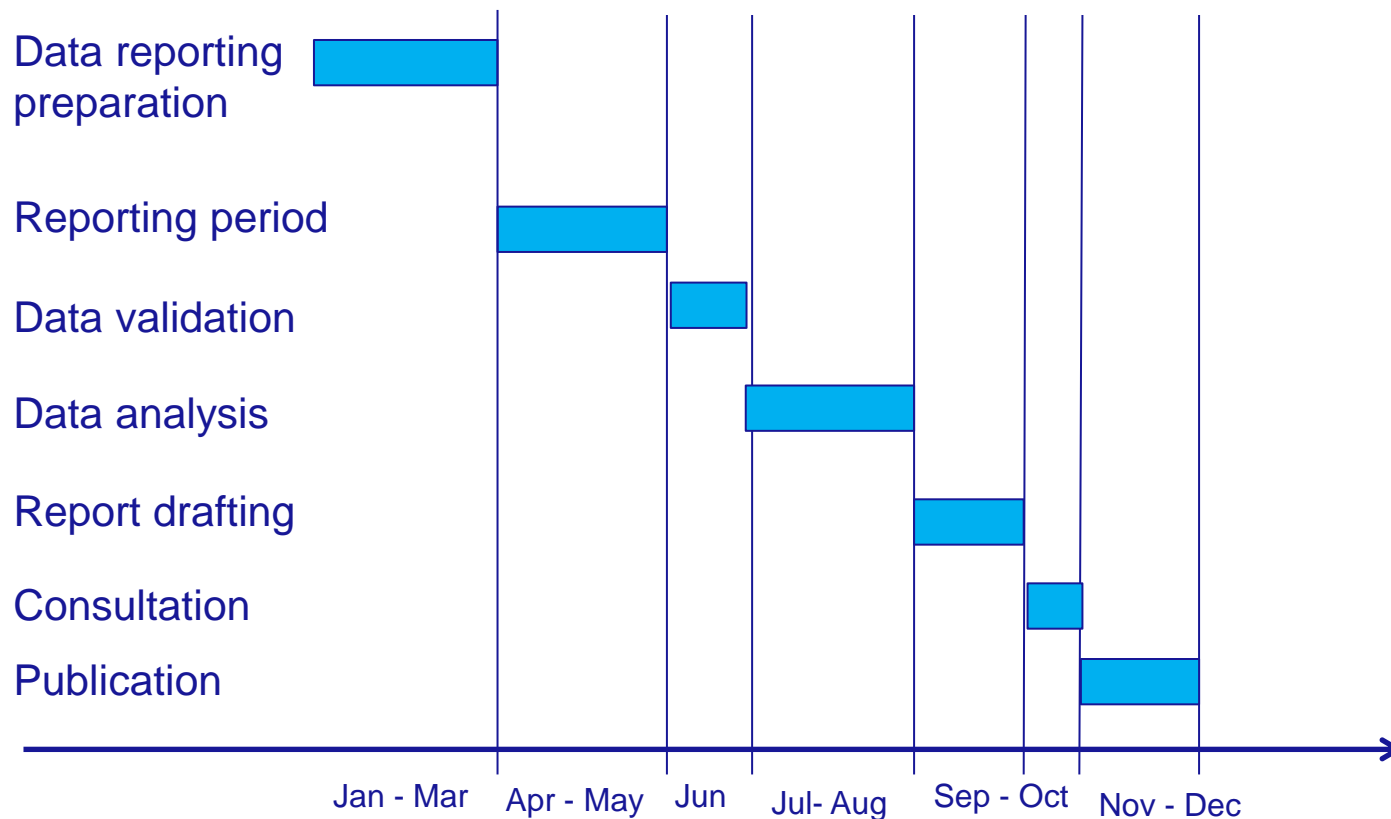
→ **and also for food-borne outbreaks (FBOs)**

→ **and susceptible animal populations**

In a number of cases, such as for Salmonella in poultry, more specific and harmonised requirements are laid down how to monitor and report these zoonoses.



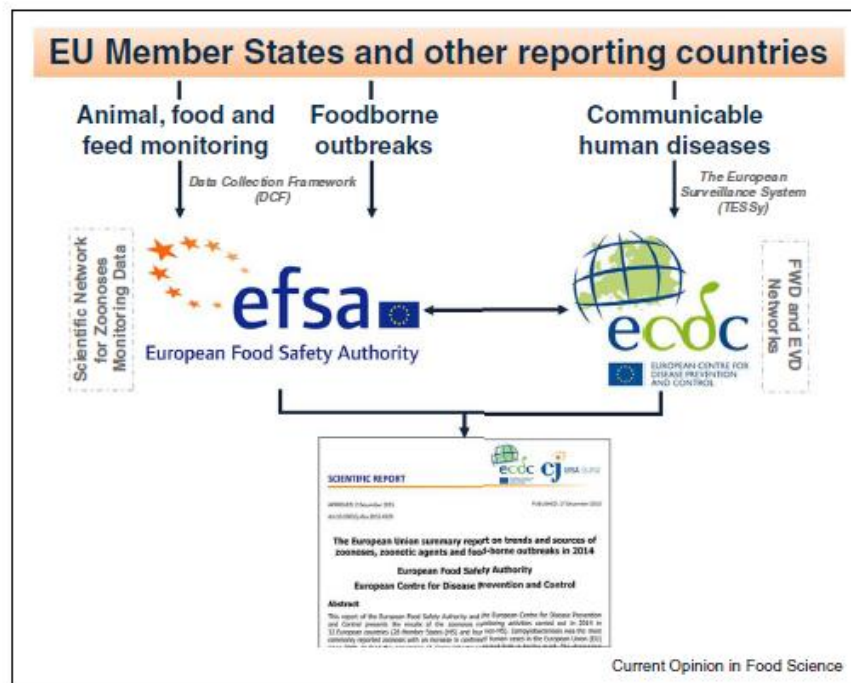
EUSR, ANNUAL PRODUCTION CYCLE



Resources : staff (EFSA, ECDC) , (BIOMO, DATA, AHAW, Risk Comm), contractors



DATA FLOW AND EFSA'S INTEGRATED APPROACH FOR THE PRODUCTION OF THE JOINT EFSA-ECDC EU SUMMARY REPORTS (EUSRS)



Data flow and EFSA's integrated approach for the production of the joint EFSA-ECDC EU Summary Report on zoonoses and food-borne outbreaks in the EU. Note: FWD Network: European Food and Waterborne Diseases and Zoonoses Network; EVD Network: European Emerging and Vector-borne Diseases Network.

~ monitoring of trends and sources of zoonoses and FBO, in EU

EUSR ZOOZOSES-FBO 2015 ON WILEY PLATFORM

The European Union summary report on trends and sources of zoonoses, zoonotic agents and food-borne outbreaks in 2015

European Food Safety Authority, European Centre for Disease Prevention and Control



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Scientific Report

The European Union summary report on trends and sources of zoonoses, zoonotic agents and food-borne outbreaks in 2015

European Food Safety Authority, European Centre for Disease Prevention and Control

First published: 16 December 2016 Full publication history

DOI: 10.2903/j.efsa.2016.4634 View/save citation

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Requestor: European Commission
Question number: EFSA-Q-2015-00656

Acknowledgements: EFSA and the ECDC wish to thank the members of the Scientific Network for Zoonoses Monitoring Data and the Food and Waterborne Diseases and Zoonoses Network, who provided the data and reviewed the report; the members of the Scientific Network for Zoonoses Monitoring Data for their endorsement of this scientific report; the EFSA staff members (Frank Boelart, Guisì Amore, Yves Van der Stede, Kristina Nagy, Valentina Rizzi, Ivanova Mirena, Anca Stoicescu, Francesco Riolo, Andreea Gierweimyer), the ECDC staff members (Taina Niskanen, Ines Reuler, Joana Gomes Dias, Hervé Zeller, Laurence Marriama, Vahur Hollo and Csaba Ködörös), and the EFSA contractors: the Istituto Zooprofilattico Sperimentale delle Venete, Italy (and staff members: Antonia Ricci, Lisa Barco, Simone Belluco, Marzia Manon, Ilaria Patuzzi and Carmen Losasso), the Istituto Superiore di Sanità, Italy (and staff members: Stefano Morabito, Gaia Scavia, Ida Luzzi, Arnold Kruijn, Claudia Lucarelli, Edoardo Pozio and Adriano Casulli) and the School of Veterinary Medicine – Aristotle University of Thessaloniki, Greece (and staff members: Apostolos Angelidis) for the support provided to this scientific report.

Approved: 21 November 2016

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Abstract

This report of EFSA and the European Centre for Disease Prevention and Control presents the results of the zoonoses monitoring activities carried out in 2015 in 32 European countries (28 EU Member States and four non-EU). Campylobacteriosis was the most commonly reported zoonosis in the European Union (EU) trend for confirmed human cases since 2008 continued. In food, the occurrence of *Campylobacter* remained high in broiler meat. The

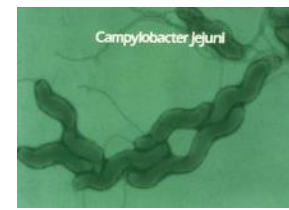
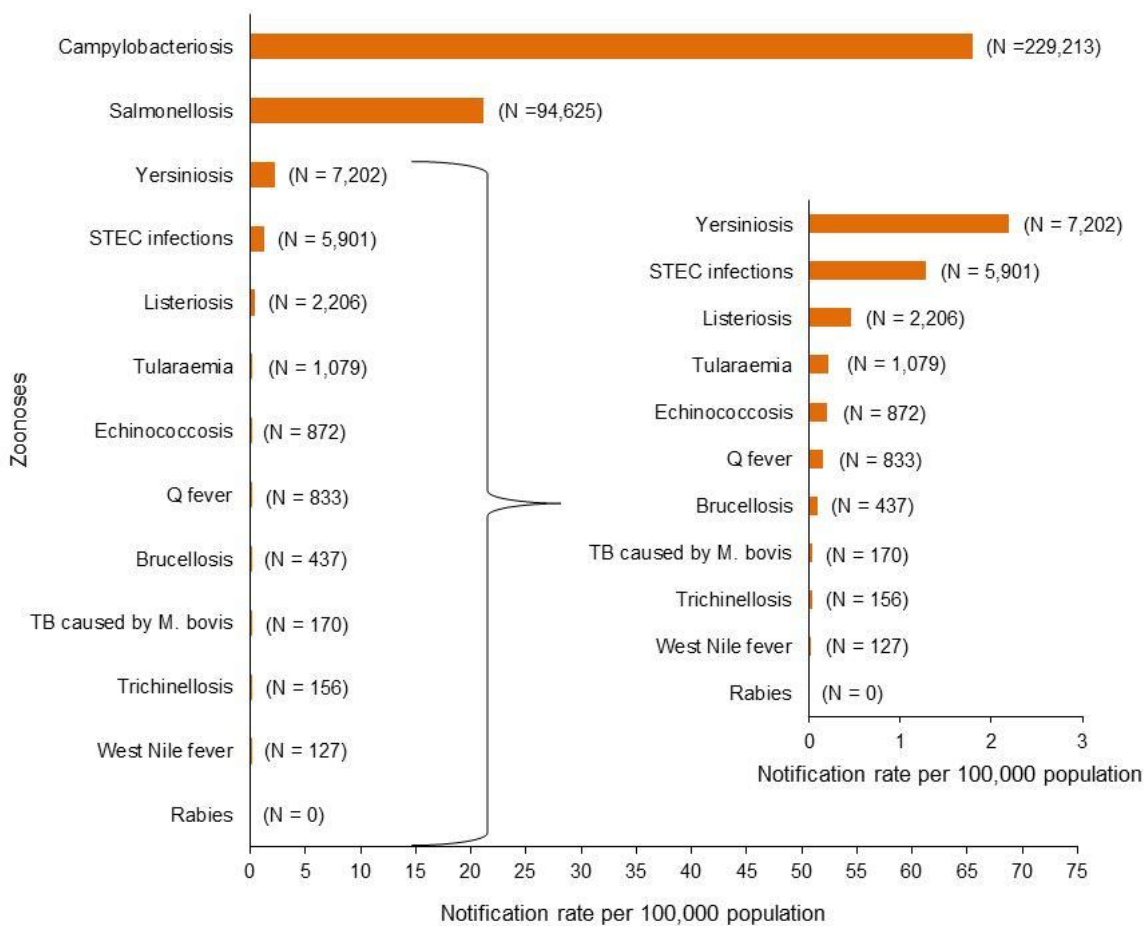
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HUMAN ZOOSES CASES IN EU, 2015



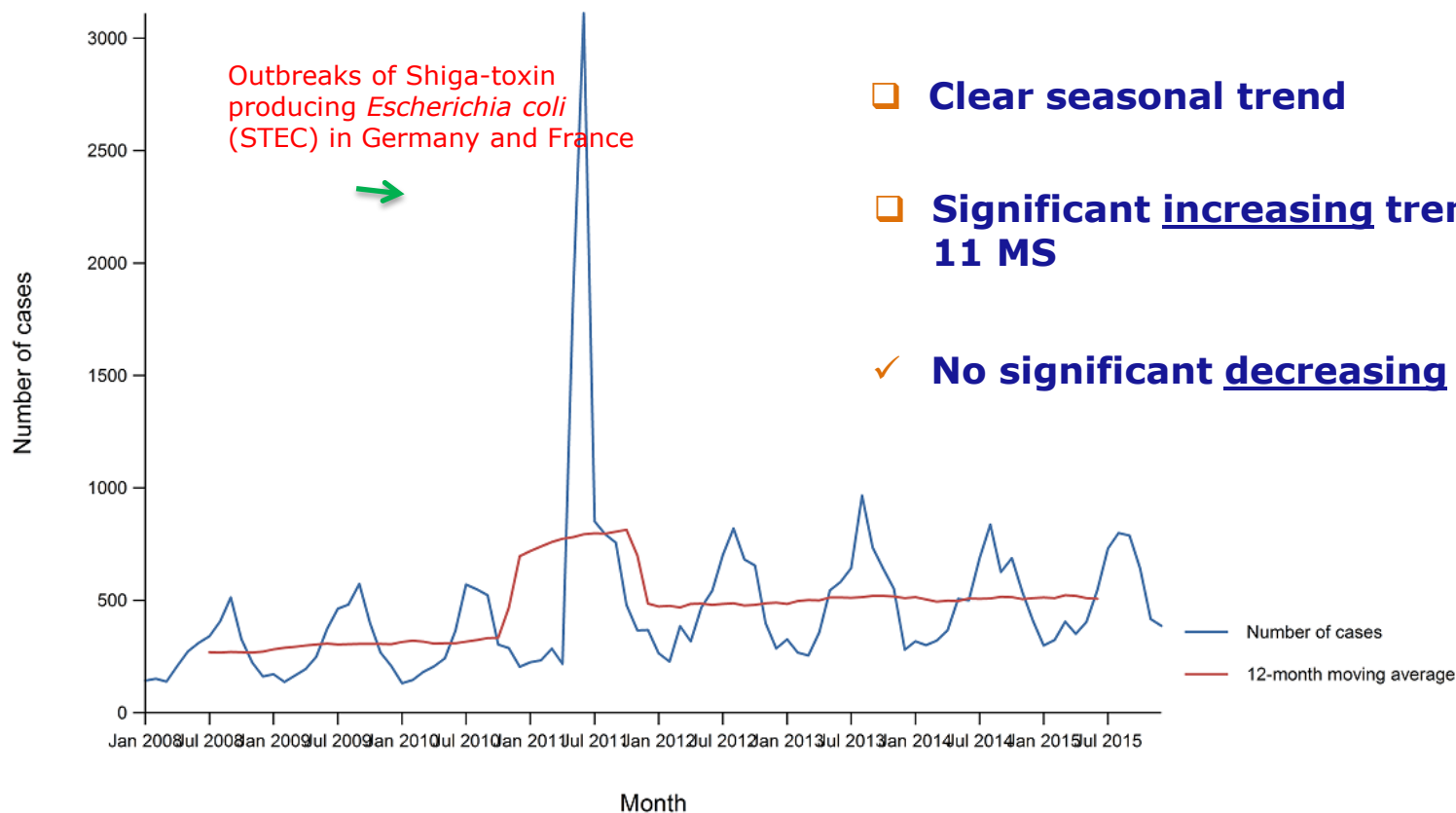
Reported notification rates of zoonoses in confirmed human cases in EU, 2015

REPORTED HUMAN CASES OF STEC INFECTIONS AND NOTIFICATION RATES PER 100,000 IN THE EU/EEA, BY COUNTRY AND YEAR, 2011–2015

Country	2015					2014		2013		2012		2011	
	National coverage ^(a)	Data format ^(a)	Total cases	Confirmed cases & rates		Confirmed cases & rates		Confirmed cases & rates		Confirmed cases & rates		Confirmed cases & rates	
				Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
Austria	Y	C	107	107	1.27	131	1.54	130	1.54	130	1.55	120	1.43
Belgium ^(a)	N	A	100	100	-	85	-	117	-	105	-	100	-
Bulgaria	Y	A	0	0	0.00	0	0.00	1	0.01	0	0.00	1	0.01
Croatia	Y	A	0	0	0.00	4	0.09	0	0.00	0	0.00	-	-
Cyprus	Y	C	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Czech Republic	Y	C	26	26	0.25	29	0.28	17	0.16	9	0.09	7	0.07
Denmark	Y	C	228	173	3.06	229	4.07	191	3.41	199	3.57	215	3.87
Estonia	Y	C	8	8	0.61	6	0.46	8	0.61	3	0.23	4	0.30
Finland	Y	C	74	74	1.35	64	1.17	98	1.81	32	0.59	27	0.50
France ^(b,c)	N	C	262	262	-	221	-	218	-	208	-	221	-
Germany	Y	C	1647	1616	1.99	1663	2.06	1,639	2.00	1,573	1.93	5,558	6.82
Greece	Y	C	1	1	0.01	1	0.01	2	0.02	0	0.00	1	0.01
Hungary	Y	C	15	15	0.15	18	0.18	13	0.13	3	0.03	11	0.11
Ireland	Y	C	625	598	12.92	572	12.42	564	12.29	412	8.99	275	6.02
Italy ^(c)	Y	C	68	59	-	68	-	64	-	50	-	51	-
Latvia	Y	C	4	4	0.20	0	0.00	0	0.00	0	0.00	0	0.00
Lithuania	Y	C	3	3	0.10	1	0.03	6	0.20	2	0.07	0	0.00
Luxembourg	Y	C	4	4	0.71	3	0.55	10	1.86	21	4.00	14	2.74
Malta	Y	C	4	4	0.93	5	1.18	2	0.48	1	0.24	2	0.48
Netherlands	Y	C	858	858	5.08	919	5.46	1,184	7.06	1,049	6.27	845	5.07
Poland	Y	C	2	0	0.00	5	0.01	5	0.01	3	0.01	5	0.01
Portugal	Y	C	0	0	0.00	-	-	-	-	-	-	-	-
Romania	Y	C	0	0	0.00	2	0.01	6	0.03	1	0.01	2	0.01
Slovakia	Y	C	1	1	0.02	2	0.04	7	0.13	9	0.17	5	0.09
Slovenia	Y	C	23	23	1.11	29	1.41	17	0.83	29	1.41	25	1.22
Spain	Y	C	86	86	0.19	50	0.11	28	0.06	32	0.07	20	0.04
Sweden	Y	C	551	551	5.65	472	4.89	551	5.77	472	4.98	477	5.07
United Kingdom	Y	C	1328	1328	2.05	1324	2.06	1,164	1.82	1,337	2.11	1,501	2.40
EU Total	-	-	6025	5901	1.27	5903	1.32	6,042	1.35	5,680	1.29	9,487	2.21
Iceland	Y	C	1	1	0.30	3	0.92	3	0.93	1	0.31	2	0.63
Norway	Y	C	221	221	4.28	151	2.96	103	2.04	75	1.50	47	0.96
Switzerland ^(c)	Y	C	308	308	3.72	125	1.51	82	1.00	66	0.82	76	0.97

TREND IN REPORTED CONFIRMED CASES OF HUMAN STEC INFECTIONS IN THE EU/EEA, 2008-2015

- In 2015, 6,005 cases of STEC infections, of which 5,901 confirmed reported in the EU



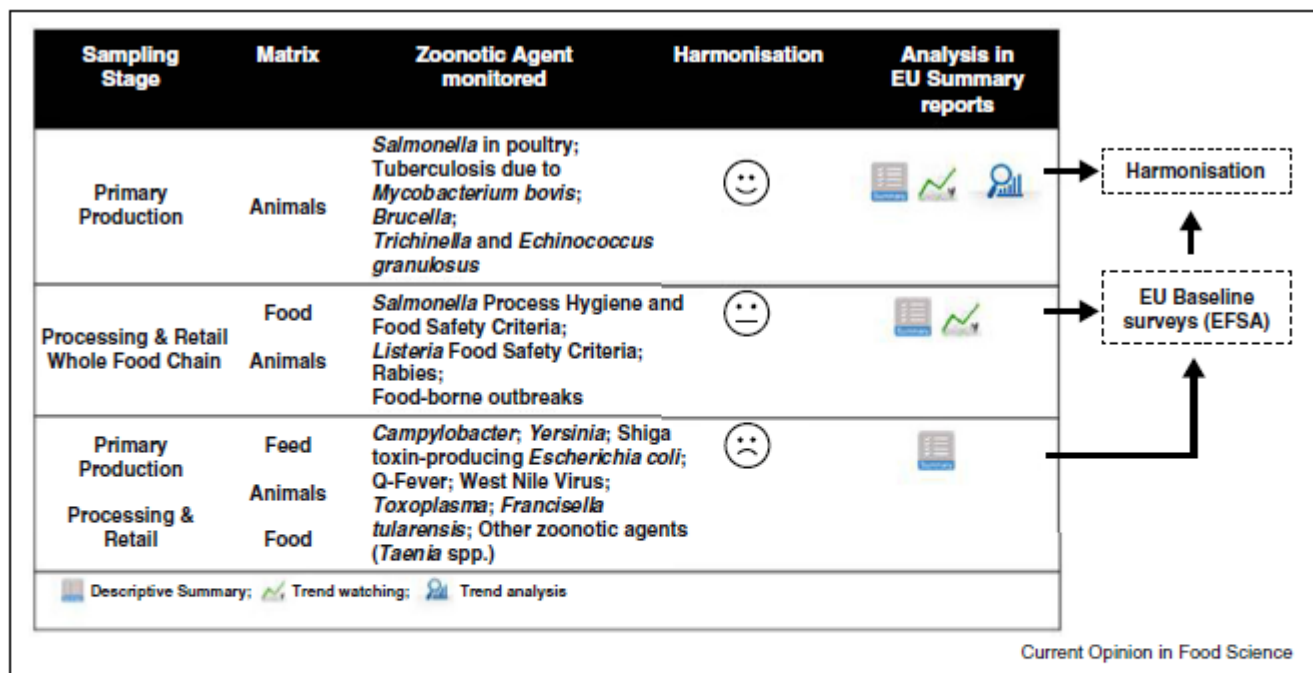
DISTRIBUTION OF REPORTED CONFIRMED CASES OF HUMAN STEC INFECTIONS IN THE EU/EEA, 2013–2015, BY THE 20 MOST FREQUENT SEROGROUPS

Serogroup	2015			2014			2013		
	Cases	MSs	%	Cases	MSs	%	Cases	MSs	%
O157	1,510	21	41.7	1,692	23	46.3	1,828	23	48.9
O26	537	16	14.8	444	16	12.2	476	17	12.7
NT ^(a)	430	10	11.9	315	9	8.6	298	10	8.0
O103	171	14	4.7	193	12	5.3	160	12	4.3
O91	114	12	3.1	105	11	2.9	94	11	2.5
O145	95	12	2.6	105	11	2.9	96	11	2.6
O146	74	10	2.0	83	9	2.3	75	9	2.0
O128	49	12	1.4	47	11	1.3	41	8	1.1
O-rough ^(b)	45	8	1.2	55	7	1.5	41	5	1.1
O111	42	11	1.2	54	11	1.5	78	13	2.1
O76	31	9	0.9	21	7	0.6	22	9	0.6
O55	29	8	0.8	42	11	1.1	12	6	0.3
O113	28	7	0.8	37	10	1.0	36	6	1.0
O182	25	5	0.7	13	5	0.4	18	5	0.5
O80	24	4	0.7	15	3	0.4	8	4	0.2
O117	24	7	0.7	24	8	0.7	27	8	0.7
O177	23	5	0.6	14	8	0.4	23	7	0.6
O5	23	6	0.6	16	7	0.4	15	5	0.4
O78	21	7	0.6	8	4	0.2	5	5	0.1
O8	21	9	0.6	15	7	0.4	11	5	0.3
Other	308	-	8.5	356	-	9.7	373	-	10.0



APPROPRIATE USE OF ZOOSES MONITORING DATA

The degree of harmonisation of the applied monitoring schemes and collected data limits the type of analysis that can be performed. Based on the obtained data, three main data categories can be distinguished:



Categorisation of the zoonoses monitoring data and possible analyses as evaluated by EFSA. The data obtained in the EFSA Data Collection Framework can vary according the level of data quality and harmonisation. EFSA consistently proposed and analysed well-designed EU-wide baseline surveys on the occurrence of zoonotic agents and contributed to improved harmonisation of monitoring in the MS. Data can be divided into three main categories according the sampling stage, the matrices collected and the zoonotic agent monitored. The types of data analyses suggested by EFSA strongly depend on this level of harmonisation and can either be a descriptive summary, or trend-watching, or a full trend analysis of the monitoring data.

SUMMARY OF STEC STATISTICS RELATED TO HUMANS, MAJOR FOOD CATEGORIES AND MAJOR ANIMALS SPECIES, EU, 2012 - 2015

Humans	2015	2014	2013	2012	Data source
Total number of confirmed cases	5,929	5,900	6,042	5,680	ECDC
Total number of confirmed cases/100,000 population (notification rates)	1.68	1.75	1.80	1.70	ECDC
Number of reporting MS	28	27	27	27	ECDC
Infection acquired in the EU	3,991	3,959	3,916	3,678	ECDC
Infection acquired outside the EU	532	474	485	543	ECDC
Unknown travel status or unknown country of infection	1,406	1,467	1,641	1,459	ECDC
Number of outbreak-related cases*	572	957	633	na	EFSA
Total number of outbreaks	50	67	74	41	EFSA
Food	2015	2014	2013	2012	
Meat and meat products					
<i>Number of sampled units</i>	10,385	8,576	11,024	11,876	EFSA
<i>Proportion of positive units</i>	2.8%	2.9%	2.3%	3.3%	EFSA
<i>Number of reporting MS</i>	16	16	19	18	EFSA
Milk and milk products					
<i>Number of sampled units</i>	4,518	6,811	4,933	4,606	EFSA
<i>Proportion of positive units</i>	1.4%	1.2%	2.7%	1.9 %	EFSA
<i>Number of reporting MS</i>	11	12	13	12	EFSA
Fruits and vegetables (and juices)					
<i>Number of sampled units</i>	2,052	2,054	3,250	2,025	EFSA
<i>Proportion of positive units</i>	0.1%	0.1%	0.2%	0.1%	EFSA
<i>Number of reporting MS</i>	22	23	23	20	EFSA
Animals	2015	2014	2013	2012	
Bovine animals					
<i>Number of sampled herds</i>	49	1,178	1,307	1,664	EFSA
<i>Proportion of positive herds</i>	2%	2.1%	7%	7.1%	EFSA
<i>Number of reporting MS</i>	2	5	4	4	EFSA
Small ruminants					
<i>Number of sampled herds</i>	109	44	11	58	EFSA
<i>Proportion of positive herds</i>	14.7%	9.1%	9.1%	10.3%	EFSA
<i>Number of reporting MS</i>	7	7	7	6	EFSA



STEC IN FOOD: COMPLIANCE OF MONITORING WITH FSC

STEC sprouted seeds monitoring results at retail, EU, 2013-2015

Sprouted seeds	Number of reporting MS	Sample units tested	Sample units positive (percent)
2013	6	444	0 (0.0%)
2014	6	481	0 (0.0%)
2015	7	576	1 (0.2%)

The food safety criterion prescribes that sprout monitoring results must be compliant with “absence in 25 grams”, of Shiga toxin producing *E. coli* (STEC) O157, O26, O111, O103, O145 and O104:H4, at retail (Regulation (EC) 209/2013).

VEROTOXIGENIC *ESCHERICHIA COLI*

➤ **Important note for data analysis and interpretation:**

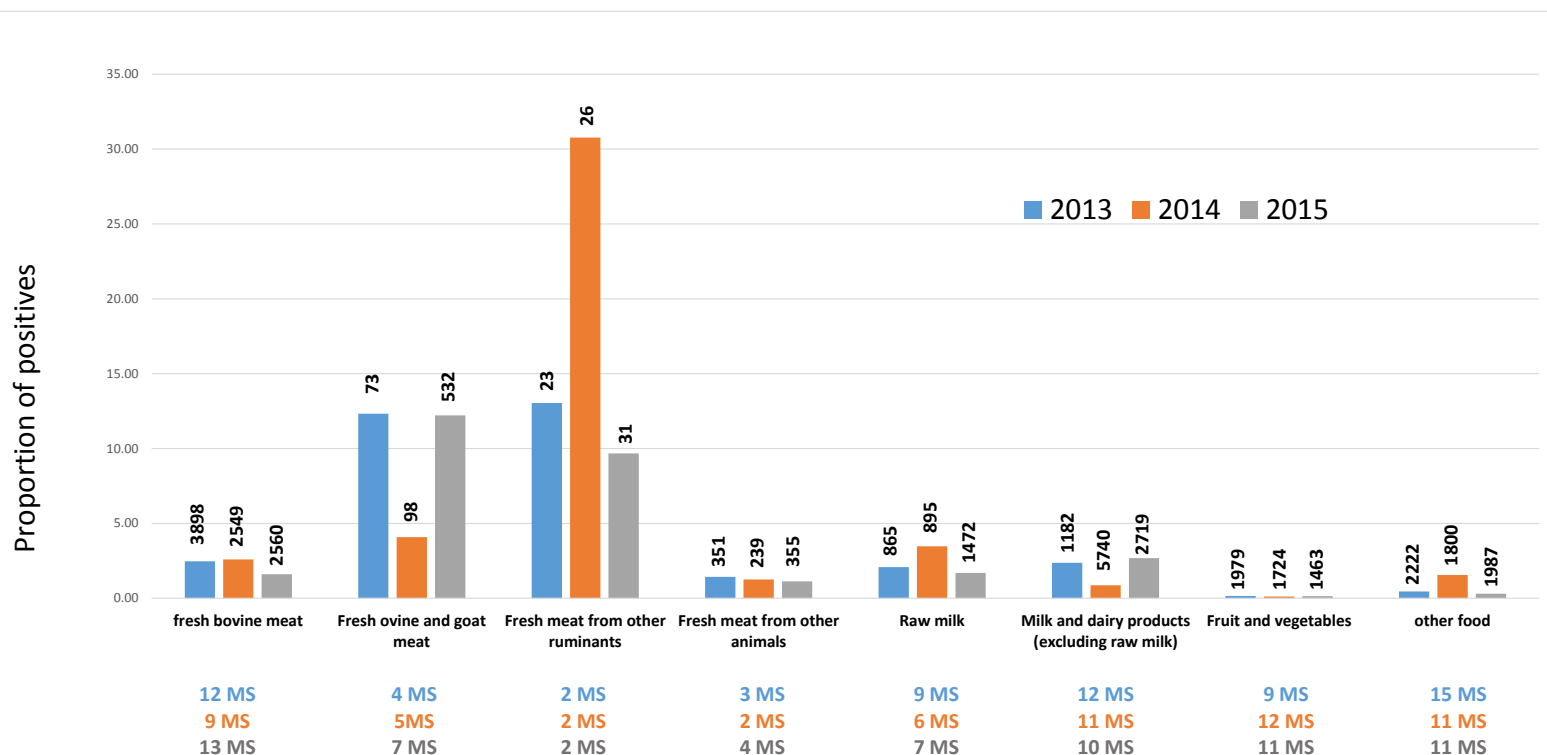
Different investigations are **not necessarily directly comparable** owing to **differences in sampling strategies and the analytical methods applied**

Two main categories of **analytical methods** used:

- 1. Aiming at detecting any VTEC**, regardless their serotype, including: ISO/TS 13136:2012, other PCR-based methods, and also methods based on the detection of verocytotoxin production by immunoassays.
- 2. Designed to detect only VTEC O157**, such as the method ISO 16654:2001 and the equivalent NMKL 164:2005. Focus has traditionally been on VTEC O157 in many of the MS surveillance programmes → impact on prevalence and frequency distribution of VTEC serogroups

STEC IN FOOD, OCCURRENCE

The proportion of STEC-positive samples in the main food categories, regardless the analytical method employed, in the reporting MSs, 2013-2015



VTEC IN FOOD

ANALYSIS OF VTEC SEROGROUPS IN FOOD (cont.)

Proportion of positive samples for any STEC and STEC belonging to the 'top-5' serogroups in food categories in Member States and non-Member States, 2015

Food category ^(b)	Samples tested by ISO 13136	Samples positive for											
		any STEC		O157		O26		O103		O145		O111	
		n	%	n	%	n	%	n	%	n	%	n	%
bovine meat	4,625	82	1.77	11	0.24	13	0.28	3	0.06	4	0.09	1	0.02
ovine and goat meat	621	79	12.72	8	1.29	8	1.29	4	0.64	1	0.16	0	0.00
other ruminants meat ^(c)	45	5	11.11	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
pig meat	859	22	2.56	1	0.12	0	0.00	0	0.00	0	0.00	0	0.00
other meat ^(d)	2,743	43	1.57	2	0.07	2	0.07	0	0.00	0	0.00	0	0.00
mixed meat	206	13	6.31	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
milk and dairy products ^(e)	3,185	41	1.29	4	0.13	4	0.13	1	0.03	0	0.00	0	0.00
raw milk ^(f)	1,312	24	1.83	5	0.38	2	0.15	2	0.15	0	0.00	0	0.00
fruit and vegetable	1,479	2	0.14	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
seeds ^(g)	942	2	0.21	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
other food	1,274	6	0.47	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Total	17,291	319	1.84	31	0.18	29	0.17	10	0.06	5	0.03	1	0.01

VTEC IN FOOD

ANALYSIS OF VTEC SEROGROUPS IN FOOD (cont.)

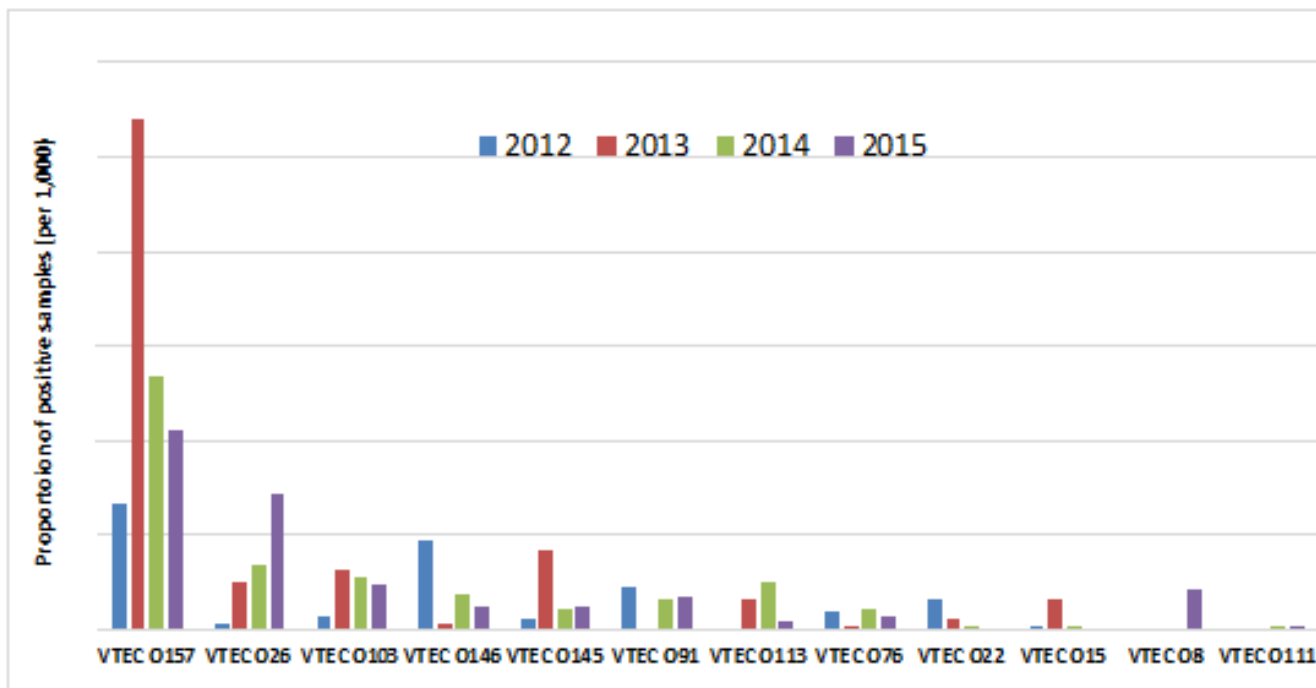
Frequency distribution of non-O157 STEC serogroups in food categories in Member States, 2015

Food category ^(b)	STEC isolates with serogroup reported n	STEC serogroups													
		% of total STEC isolates with serogroup reported in the specific food category													
		O26	O103	O145	O111	O146	O91	O76	O113	O5	O174	O87	O116	O6	Other serogroups
bovine meat	53	26.4	5.7	7.5	1.9	0.0	5.7	0.0	3.8	0.0	5.7	1.9	1.9	0.0	39.6
ovine and goat meat	27	29.6	14.8	3.7	0.0	7.4	7.4	0.0	0.0	3.7	0.0	0.0	0.0	7.4	25.9
other ruminants meat ^(c)	5	0.0	0.0	0.0	0.0	40.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	40.0
pig meat	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
other meat ^(d)	16	12.5	0.0	0.0	0.0	6.3	12.5	6.3	0.0	0.0	6.3	0.0	0.0	0.0	56.3
mixed meat	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
milk and dairy products ^(e)	5	80.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
raw milk ^(f)	4	50.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
fruit and vegetable	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
seeds	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
other food	2	0.0	0.0	0.0	0.0	0.0	0.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0
Total	117	25.6	8.5	4.3	0.9	4.3	6.0	2.6	1.7	0.9	3.4	0.9	1.7	1.7	37.6

VTEC IN FOOD

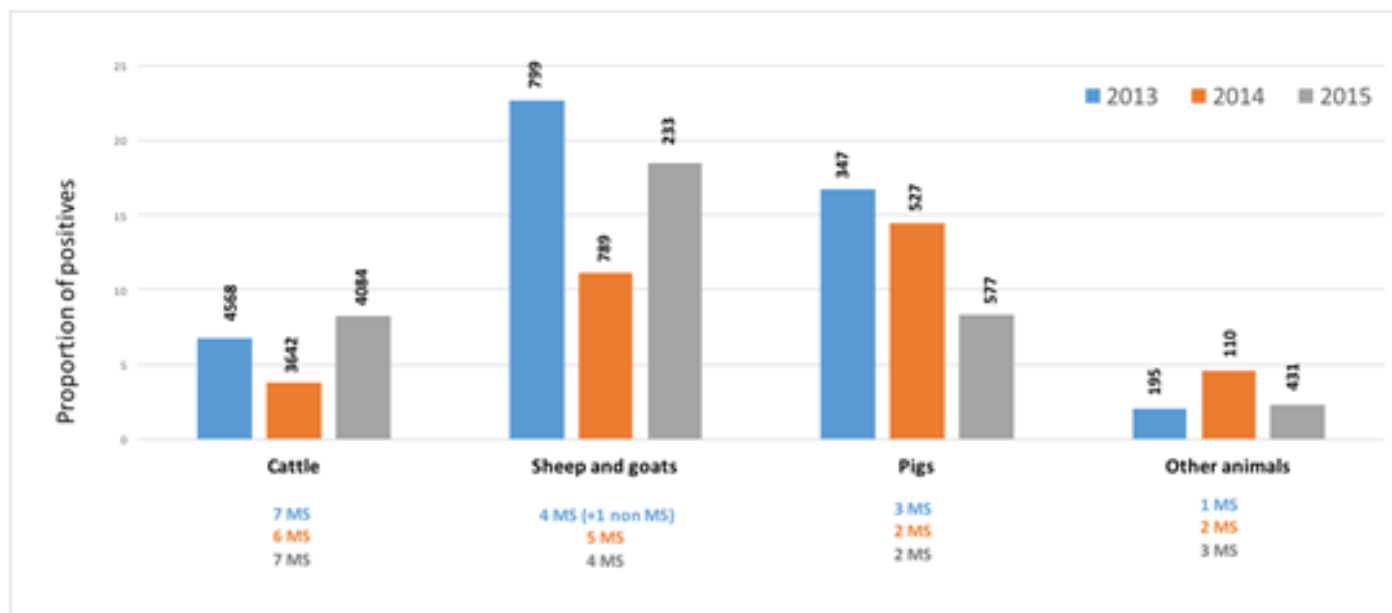
ANALYSIS OF VTEC SEROGROUPS IN FOOD (cont.)

Proportion of food samples positive for the most frequent STEC serogroups (per 1,000 samples tested), reported by Member States and non-Member States, 2012–2015





VTEC IN ANIMALS

Proportion of VTEC-positive samples in the main animal categories, regardless the analytical method employed, in the reporting MS, 2012-2015



'Other animals'
 include: cats, dogs,
 horses, donkeys,
 turkeys, and other
 animals.

SOME OBSERVATIONS

- 
- **Analytical method** reported by most reporting countries. The standard method ISO TS 13136:2012 was used for testing 82.8% of the food samples in 2015.
 - **Highly variability** in the **number of samples tested** by country for each food and animal category → possible **bias** in the estimates of VTEC prevalence or VTEC serogroup distribution.
 - In food, contamination reported for **meat from other ruminants, fresh ovine and goat meat, milk, and fresh bovine meat**. VTEC were also reported in **cheese samples**, in particular those made from sheep's and goats' milk
 - **Contamination was rare in ready-to eat food of vegetal origin. Few VTEC-positive** samples (2/925) reported for **sprouted seeds**, the sole food category for which microbiologic criteria for VTEC have been established in the EU.
- 

MAIN CONCLUSIONS (NEW ASPECTS)

A vertical collage on the left side of the slide features several images: a black and white cow, a tray of brown eggs, a landscape with a winding river, a bunch of purple grapes, and a basket of strawberries. The collage is partially overlaid by a white diagonal line.

A wide range of VTEC serogroups was reported, with VTEC O157 being the most frequent in both food and animal samples.

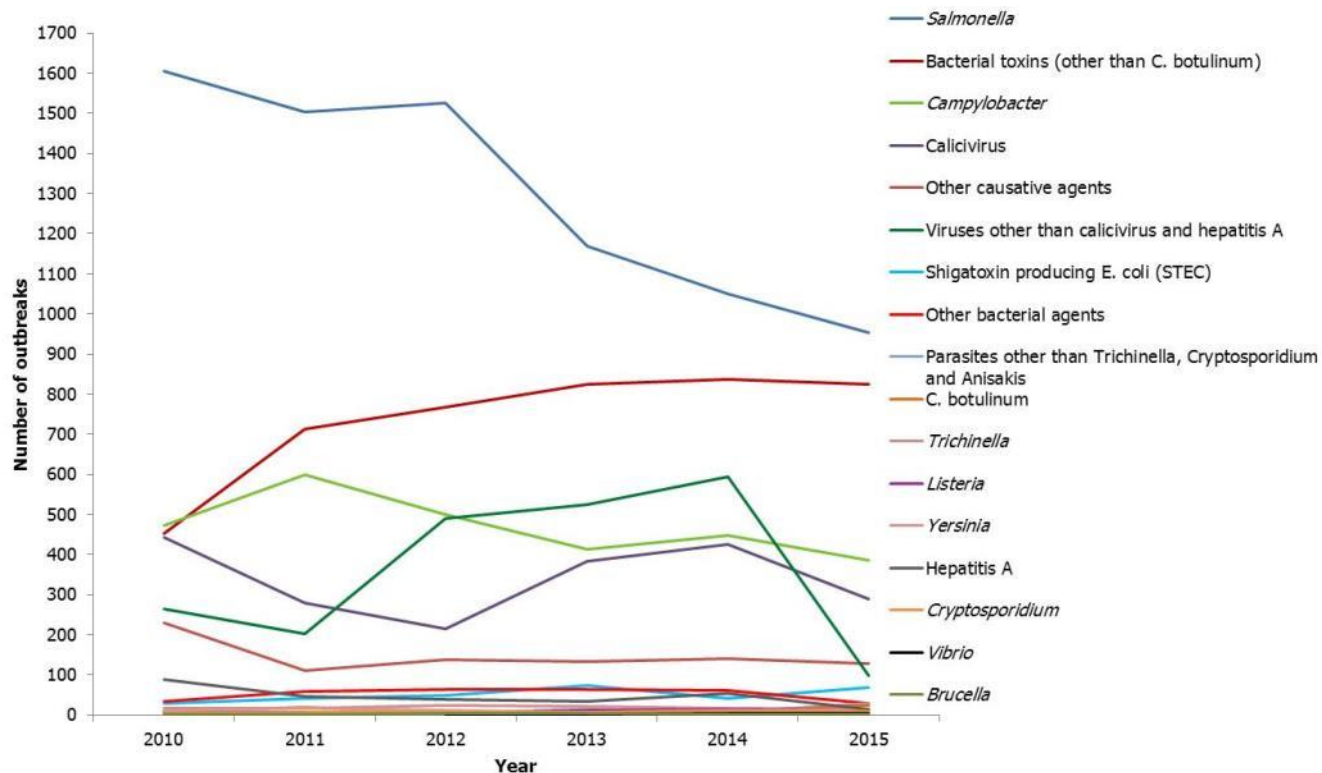
→ However, many of the MS' surveillance and monitoring programmes are traditionally focused on this serotype and this may have introduced a **bias in the estimates of the frequency of VTEC serogroups** → interesting to note that serogroups O26 and O103 were reported more frequently than O157 in food samples tested using the ISO/TS 13136:2012 standard method, which is able to detect any VTEC regardless its serotype

VTEC O26 was the second most reported serogroup in both food and animal samples (as well as in humans), with an increasing trend between 2011 and 2015

VTEC serogroups most frequently found in **food** samples (**O157, O26, O103, O113, O146, O91, O145**) are those most commonly reported in **human infections** in the EU/EEA in 2014 and previous years




FBO, OVERVIEW, EU, 2010-2015



Number of food-borne and water-borne outbreaks reported by causative agent in the EU Member States from 2010 to 2015. For the year 2015 no FBO data were reported by Malta and Spain .

Due to the degree of harmonisation of the applied monitoring schemes and collected data: these datasets allow for; **descriptive summaries** to be made, and **monitoring (trend watching)**, but are less suitable for trends analyses

STEC FOOD-BORNE DISEASE OUTBREAKS




In 2015, 10 MS reported a total of **50 food-borne outbreaks** caused by Shiga toxin-producing *Escherichia coli* (STEC) (excluding 19 water-borne outbreaks) representing 1.6% of the reported food-borne outbreaks in the EU.

In total, 572 people were affected of which 52 were hospitalised, no deaths were reported. There was a 32% increase in the number of outbreaks compared with 2014, when 38 outbreaks were reported involving 270 cases and 34 hospitalisations.

Four STEC outbreaks were supported by strong evidence; three of them were caused by STEC O157 and were reported by the United Kingdom. The implicated foods were mixed leaf lettuce and raw minced lamb (1 outbreak), chicken burgers and beef burgers (1 outbreak) and various meat products. All were general outbreaks with ‘multiple places of exposure in one country’ (2 outbreaks), and ‘temporary mass catering (fairs or festivals)’ as the outbreak setting. No information on the serogroup was available for the remaining STEC strong-evidence household outbreak which was associated with cheese consumption.

OUTLINE

- 
- *Annual monitoring of STEC in the EU*
 - **EFSA activities for molecular typing data collection for food and animal isolates**
 - *EFSA's activities on WGS (EC questionnaire on the availability of WGS)*

STATUS OF ENGAGEMENT OF LABORATORIES

Nominated users

- 12 countries*: AT, BE, DK, DE, FI, IE, IT, LU, PT, SE, SK, UK
- 19 users **

**Salmonella* and STEC: 11 MSs (all except FI)
Listeria: all MSs

Signature of the Collaboration Agreement

- 10 MSs: AT, BE, DE, FI, IE, IT, LU, PT, SE, SK

**3 different users for the 3 pathogens in AT, IE and IT
2 different users for the 3 pathogens in SK

Transmission from EURL Lm database to EFSA (on behalf of the MS)

- 5 MSs gave the permission: BE, DE, FI, IE, SE

Direct transmission to EFSA

- 1 MS submitted data: LU
- Process on-going with other laboratories (BE, IT)

COORDINATION ACTIVITIES



Download Issue

TABLE OF CONTENTS

EUROPEAN UNION COLLABORATIVE PROJECTS BETWEEN EUROPEAN UNION OR NATIONAL REFERENCE LABORATORIES

The ECDC-EFSA molecular typing database for European Union public health protection

Auteur : Valentina Rizzi, Teresa Da Silva Felicio, Benjamin Felix, Celine M. Gossner, Wilma Jacobs, Karin Johansson, Saara Kotila, Damien Michelon, Mario Monguidi, Kirsten Mooijman, Stefano Morabito, Luca Pasinato, Jonas Torgny Björkman, Mia Torpdahl, Rosangela Tozzoli, Ivo Van Walle

<http://euroreference.mag.anses.fr/en>

OUTLINE

- *Annual monitoring of STEC in the EU*
- *EFSA activities for molecular typing data collection for food and animal isolates*
- **EFSA's activities on WGS (EC questionnaire on the availability of WGS)**




EFSA INTEREST ON WGS FOR FOOD SAFETY

EFSA is interested in using WGS for:

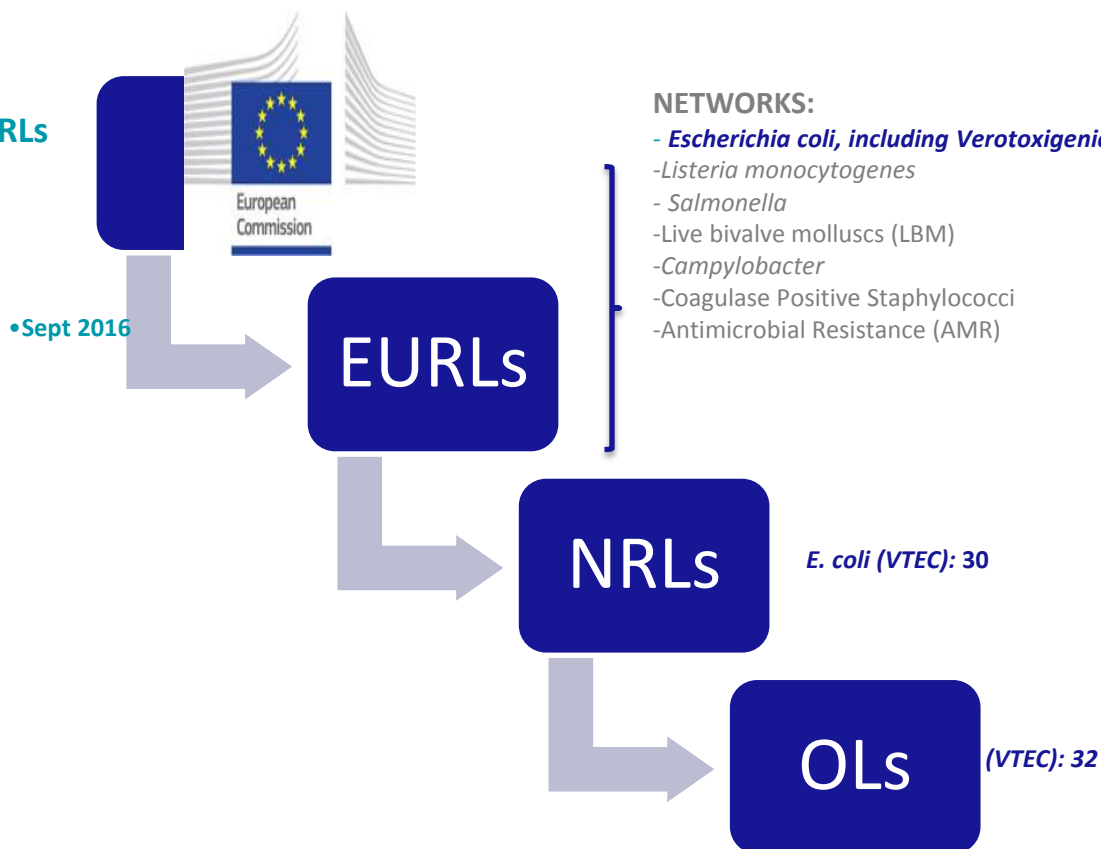
- ❑ Source attribution
- ❑ Outbreak detection and investigation
- ❑ Common source trace back investigations
- ❑ Detection and surveillance of emerging pathogens
- ❑ Monitoring of antimicrobial resistance

Our main interest is to use the data generated by new Sequencing technologies (WGS, Metagenomics) for Food Safety and Public Health Protection

ACTIVITIES ON WGS

- Procurement: Closing data gaps for performing RA on *L. monocytogenes* in “Ready to Eat Foods” (RTE): “Molecular characterisation employing WGS of strains from different compartments along the food chain and from humans”, LISEQ
- Grant: Comparative genomics of quinolone-resistant *Campylobacter jejuni* of poultry origin from major poultry producing European countries – GENCAMP
- Questionnaire on the availability of Whole Genome Sequencing (WGS) methods for food- and water-borne pathogens isolated from animals, food, feed and animal/ food/ feed environmental samples 
- Advisory Board WGS EU funded project (COMPARE, Effort, ECDC’s projects..)

Drafted by
 EC + EFSA
 supported by EURLs



Closed Dec. 2017:
Total 154 respondents (7 EURLs, 71 NRLs, 76 OLs)*
 27 MS + 3 non MSs

*: Respondents:

- Some labs have provided different answers for each NRL network they represent
- Some labs have provided a single answer for all NRL networks they represent

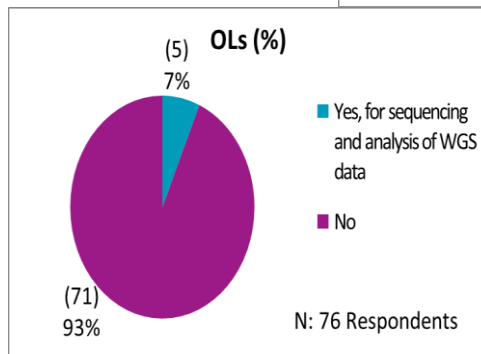
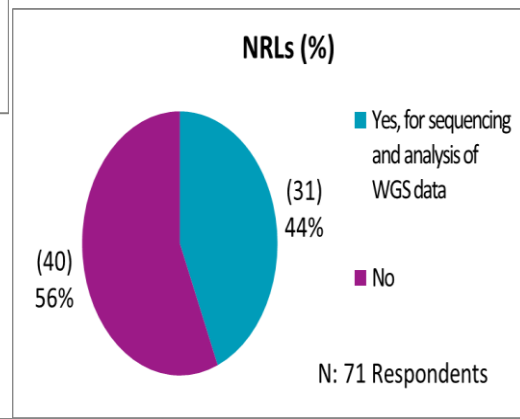
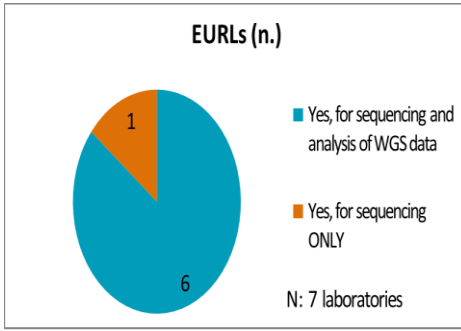
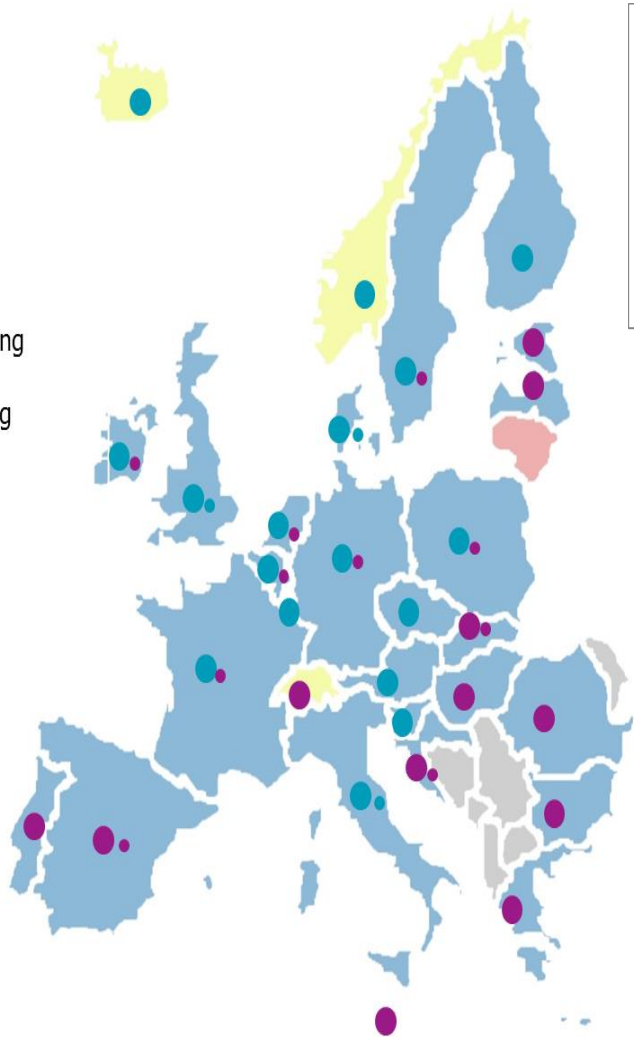
QUESTIONNAIRE SECTIONS

- General questions on use of WGS in the lab
- WGS projects on microorganisms
- WGS capacity (in-house, outsourcing)
 - General questions on objectives, strains and running in parallel with other methods
 - Laboratory methods
 - Bioinformatics analysis
- Collaboration and support by EURLs

EC SURVEY: WGS FOR FOOD/WATERBORNE PATHOGENS

Q1. DO YOU CARRY OUT WGS ACTIVITIES? 28% YES (N=154 respondents)

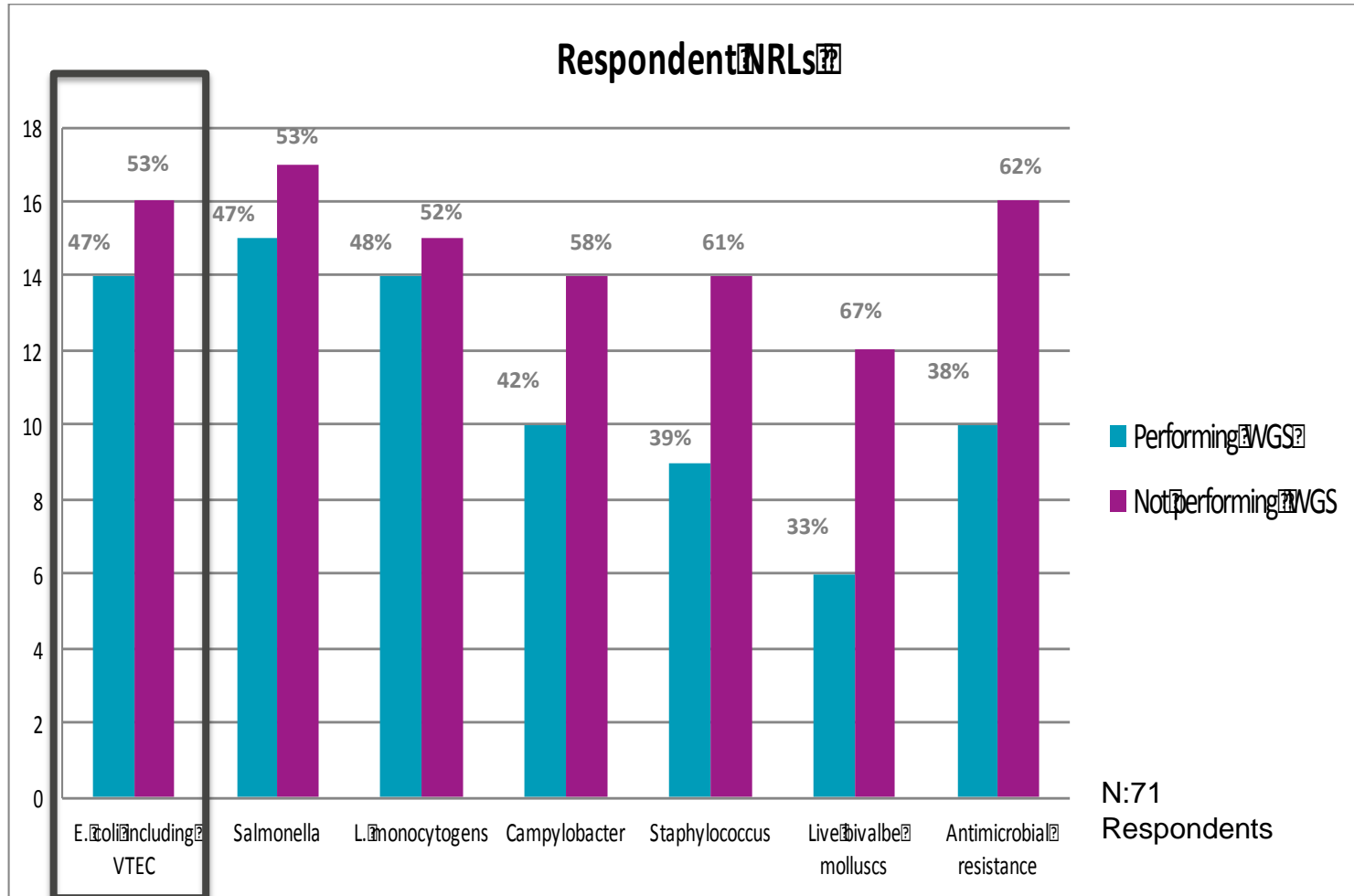
- NRLs sequencing
- OLs sequencing
- NRLs non sequencing
- OLs non sequencing
- Non-MS answering
- Not answered



Status December 2016

EC SURVEY: WGS FOR FOOD/WATERBORNE PATHOGENS

Q1. DO YOU CARRY OUT WGS? BY RESPONDENT (N=71 respondents)*

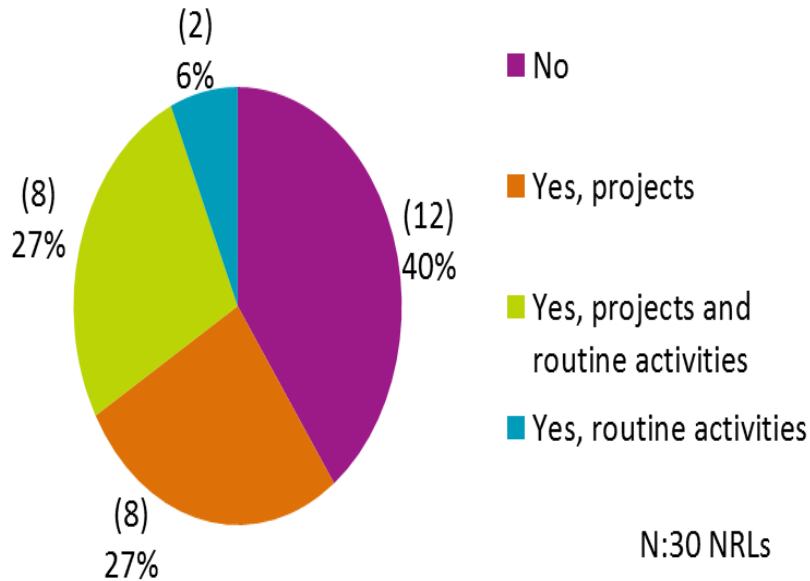


*71 respondents corresponding to a total of 182 replies from pathogen specific laboratories acting as NRLs. Analyses of data by “respondents” or by “Network laboratories” provided a similar picture for the whole questionnaire.

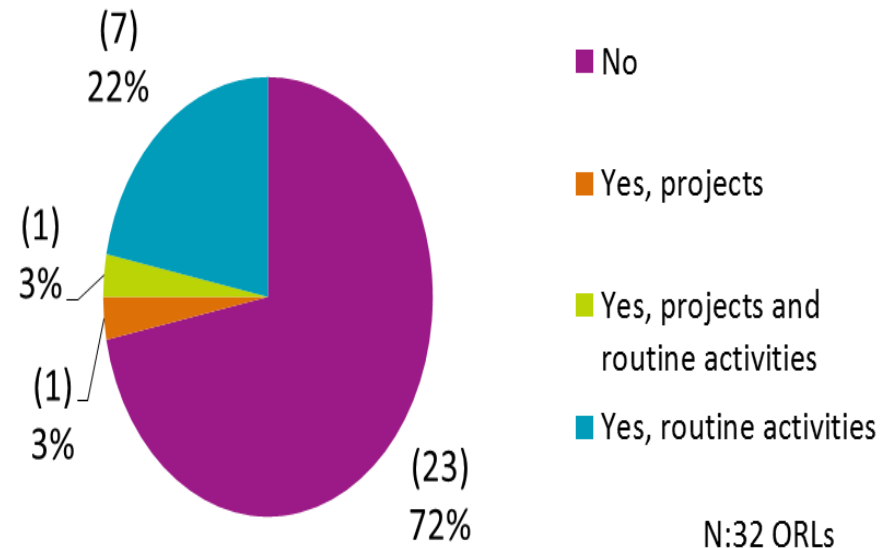
EC SURVEY: WGS FOR FOOD/WATERBORNE PATHOGENS

Q2. WGS, PROJECTS OR ROUTINE ACTIVITIES?

On going or future activities



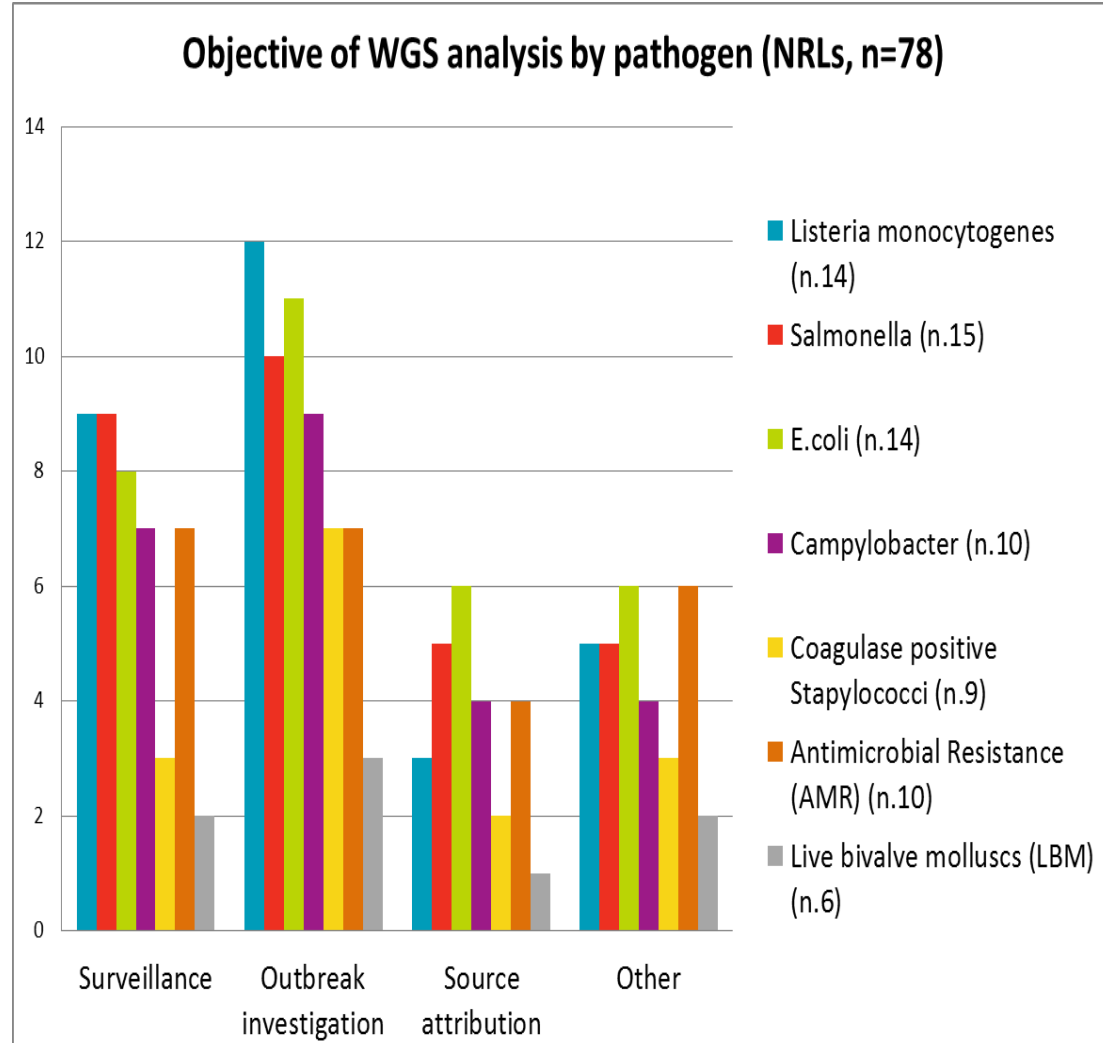
On going or future activities



+

EURL-E.coli (VTEC)

Q4. WHAT IS THE OBJECTIVE OF THE WGS ANALYSIS

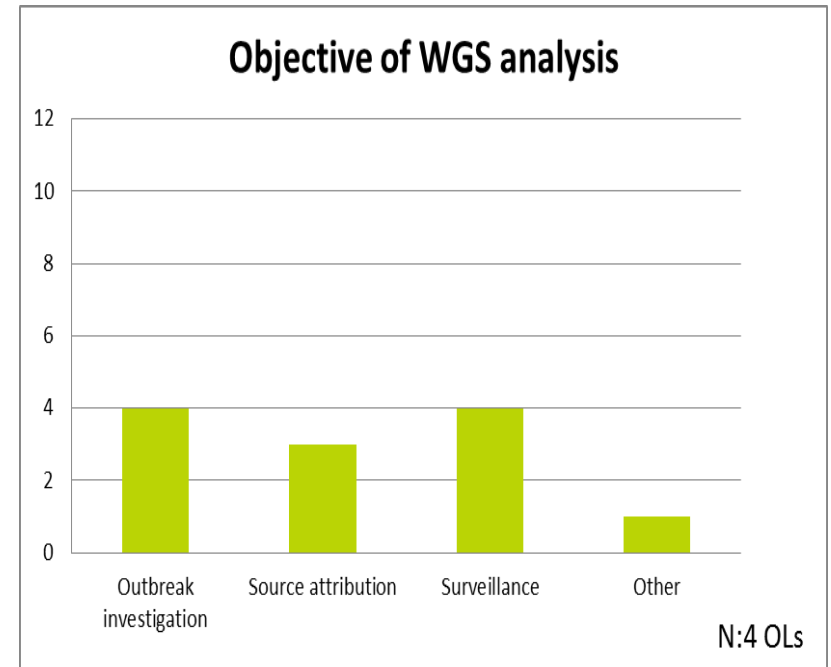
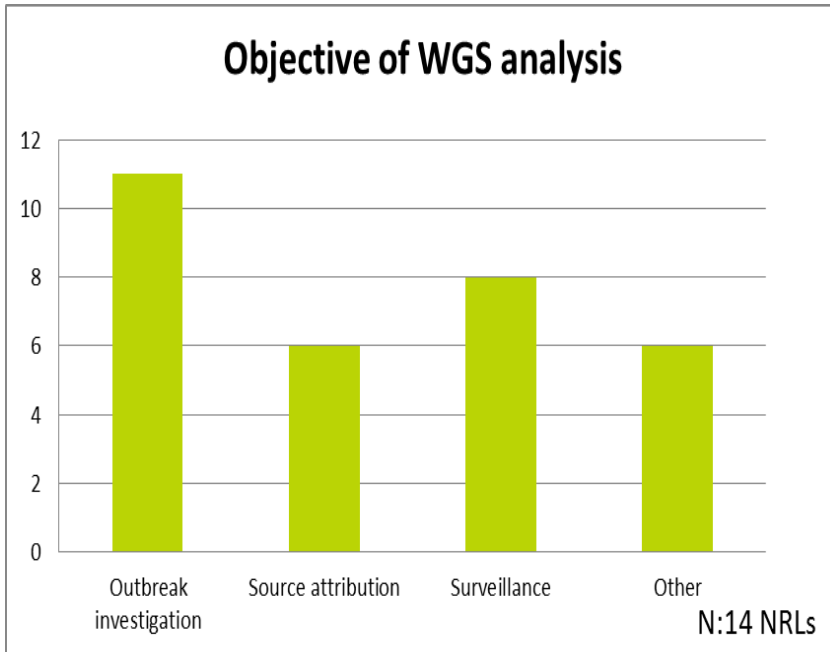


Other: research, epidemiological markers, etc.

BY PATHOGEN SPECIFIC NRLs (N=78 replies)*

*78 replies from pathogen specific laboratories acting as NRLs that perform WGS (information extracted from the 31 NRL respondent).

Q4. WHAT IS THE OBJECTIVE OF THE WGS ANALYSIS? *E.COLI* LABS



Other: research, epidemiological markers (i.e. virulence, resistance, etc).

EURL-E.coli (VTEC): outbreak investigation

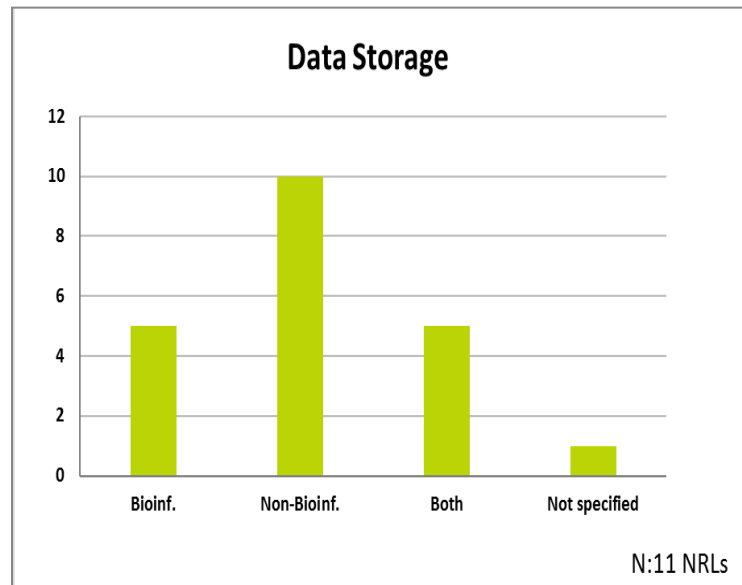
WGS CAPACITY SECTION: BIONFORMATICS ANALYSIS, *E. COLI*

Q12. WHICH ANALYSIS (N=14 NRLs)

A wide range of Commercial programs (Bionumerics, CLC-Bio, SeqSphere, etc), open source platforms (Galaxy, Enterobase, BIGSdb, etc), in house pipelines tools (CGE, PHE, ReMatCh, etc)

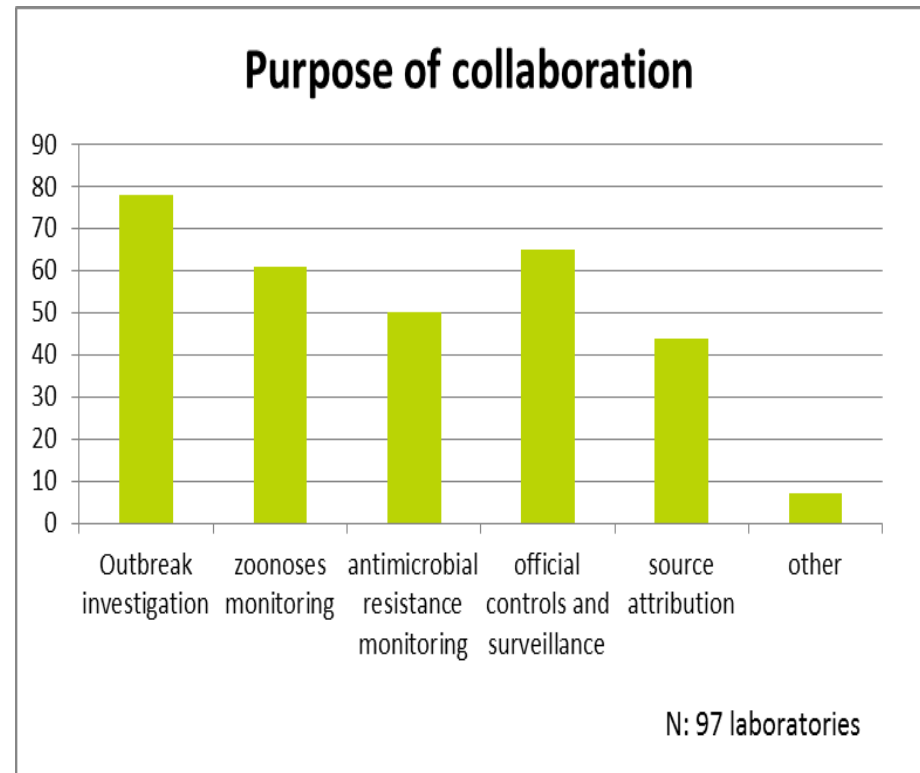
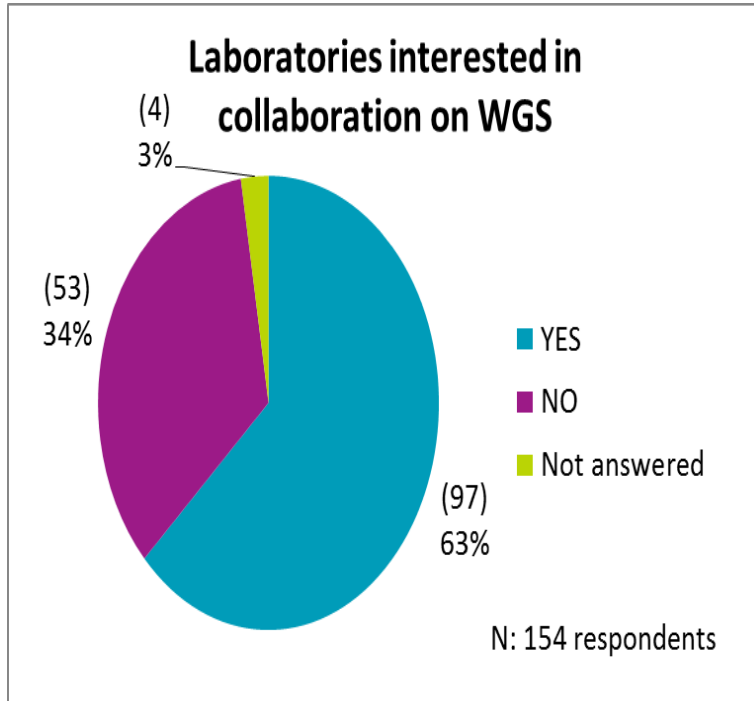
Q13. WHERE? 11/14 NRLs and 3/4 OLs "In house"

Q13. IF "IN HOUSE...", WHO?

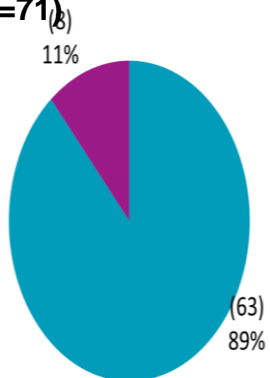


SECTION ON COLLABORATION AND SUPPORT BY EURLS

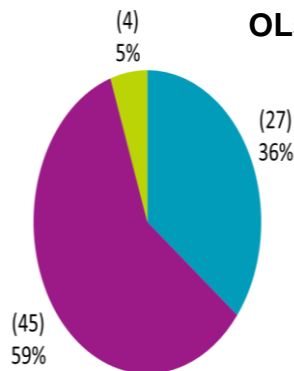
Q.14 INTEREST IN COLLABORATION WITH EURLS? (N=154 respondents)



NRLs (n=71)



OLs (n=76)



Needs:

Technical support, protocols, training, workshops, PTs



Thank you for your attention



EFSA is committed to:

**Excellence,
Independency,
Responsiveness and
Transparency**

Acknowledgements:

BIOCONTAM Unit
DATA Unit
ECDC
EC – SANTE G4
Zoonoses Monitoring Data Network
Steering Committee members

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