



CROATIA & FWD AMR RefLabCap 2021-2024

*prim. Ana Gverić Grginić, MD & prim. Ivana Ferenčak, MD
Clinical Microbiology Specialist
Division for Microbiology
Department for Intestinal Pathogens Diagnostics
NRL for Salmonellae ECDC
Department for Genomics and Bioinformatics
Croatian Institute of Public Health*

Copenhagen, October 28th 2024.



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**CROATIAN INSTITUTE
OF PUBLIC HEALTH**



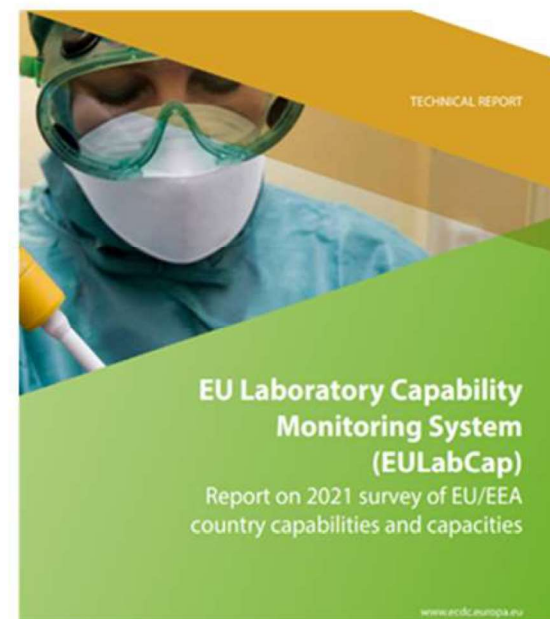
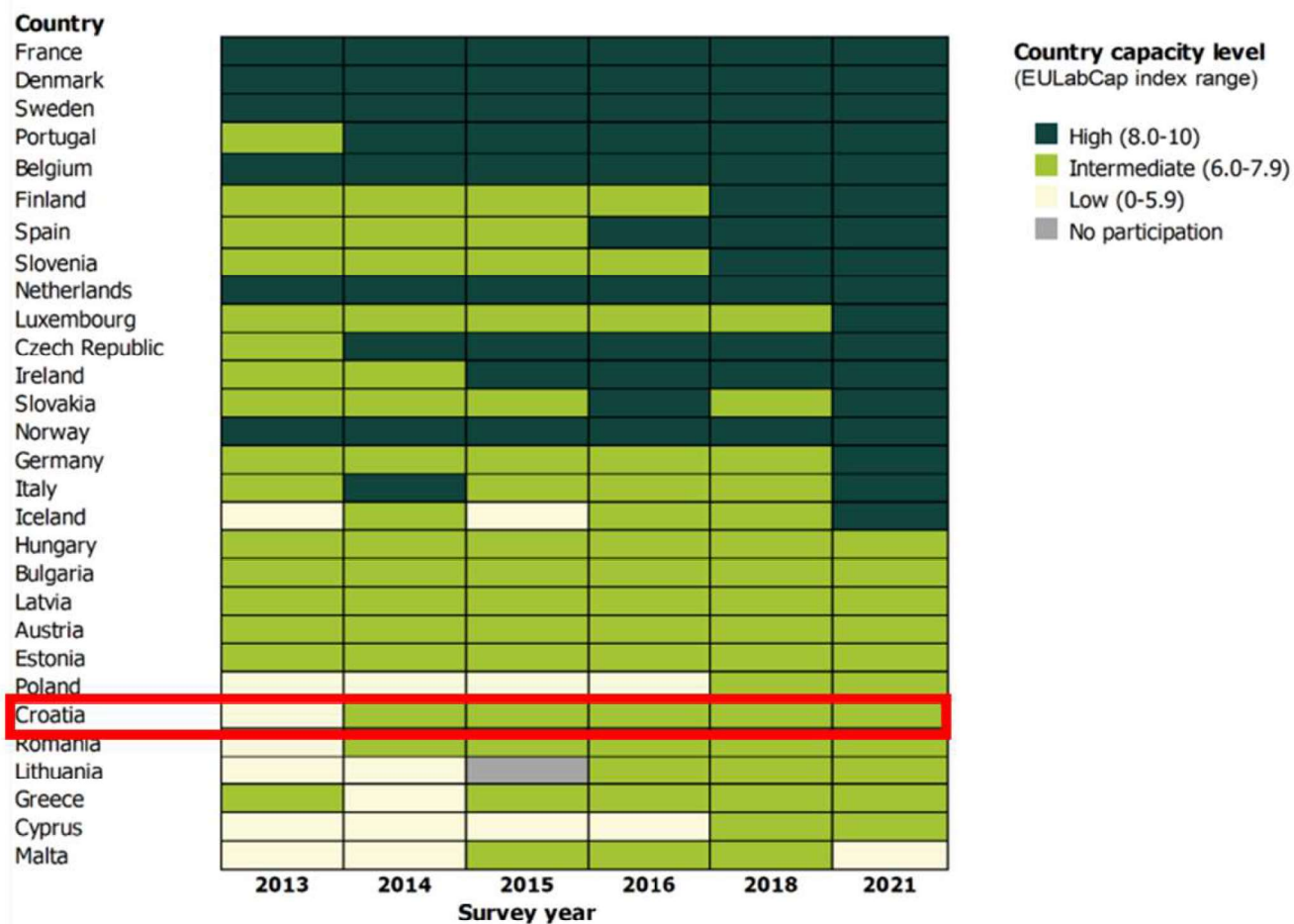
**21 public health institutes
32 acute care hospitals**



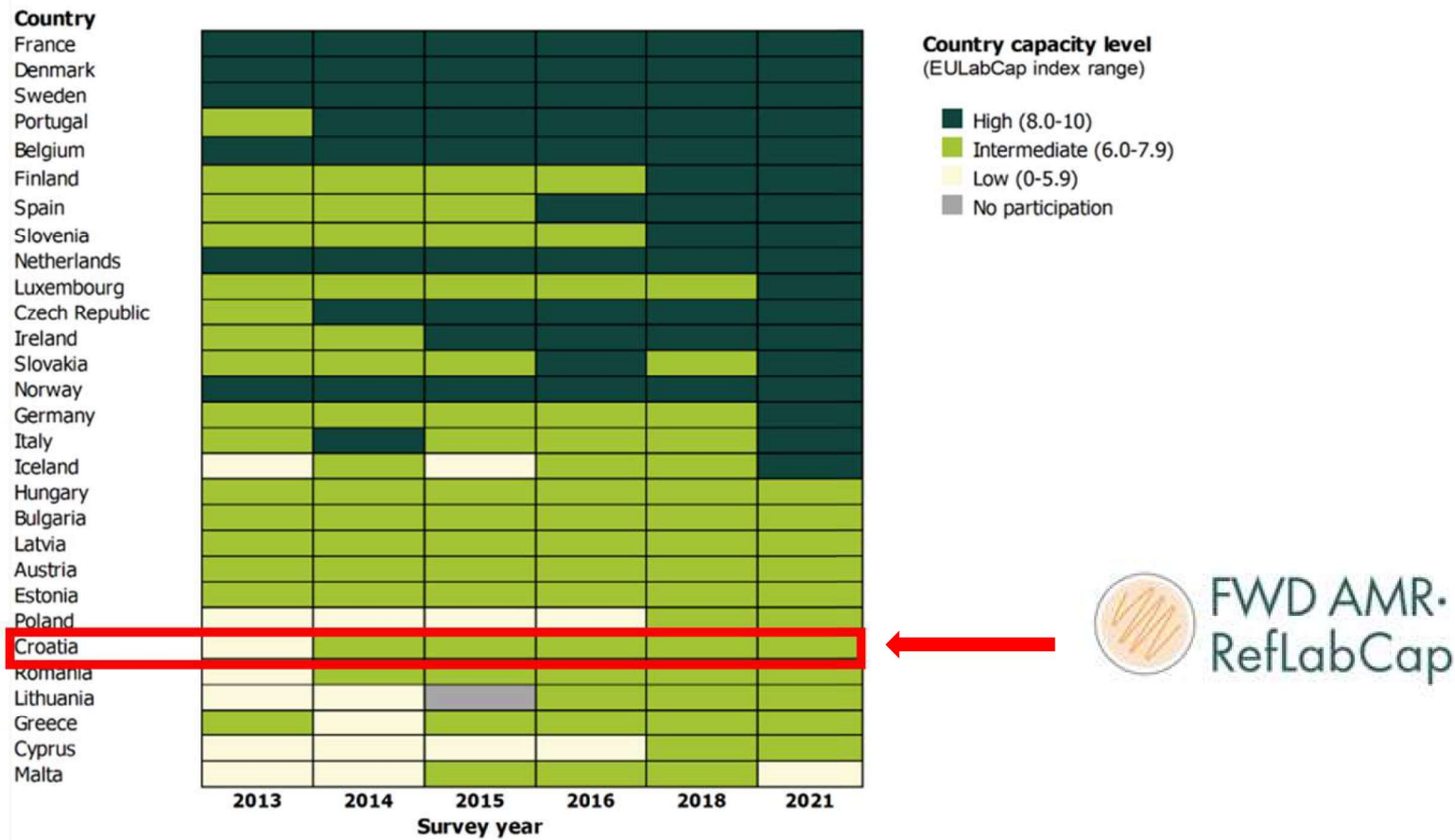
**21 microb labs in PHIs
14 microb labs in ACHs**

1 microb labs/110,000 inh

Annex 5. EU/EEA country EULabCap performance level by year, 2013–2021



Annex 5. EU/EEA country EULabCap performance level by year, 2013–2021







Mapping activities



1. newtwork
meeting 2023



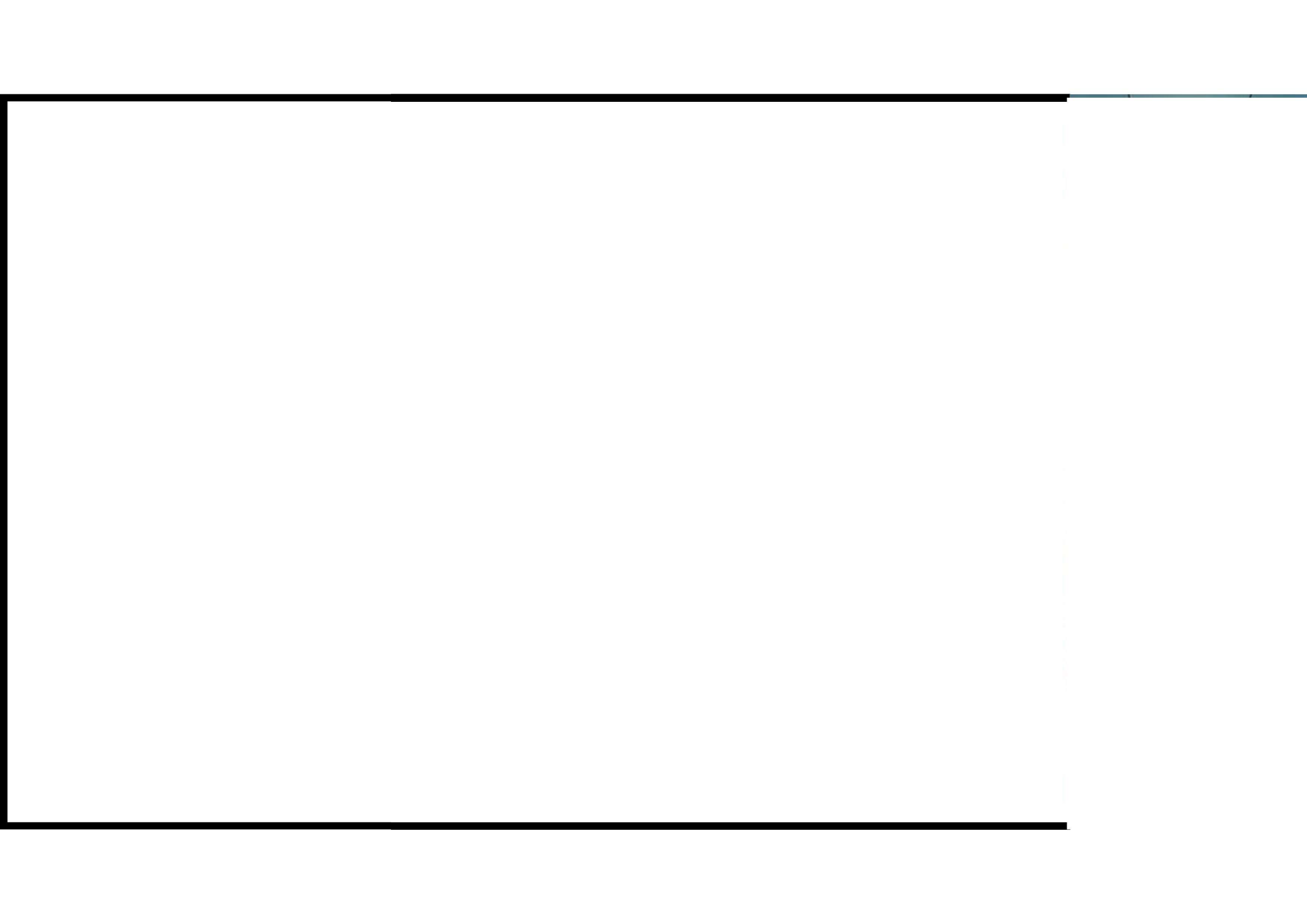
Sentinel surveillance
2023

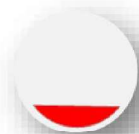


1. data in ECDC-EFSA
report



more Net**WORKING**...





Mapping activities

- **Action Plan**
- **survey** through the Google form platform to assess our baseline on *Salmonella* spp. diagnostics and AMR surveillance
- **general director's office** sent the survey on February 17th, 2023
- after two weeks we received 32 responses from 19 (**90%**) public health laboratories and 13 (**93%**) hospital laboratories
- all labs perform identification of *Salmonella* spp. at least to the species level

Methods of *Salmonella* spp. identification

- phenotypic methods of species identification by biochemical reactions (manual/automatic systems) **(80,6%)**
- molecular methods (PCR) **(6,5%)**
- MALDI-TOF **(12,9%)**

Salmonella spp. serovar identification by serotyping

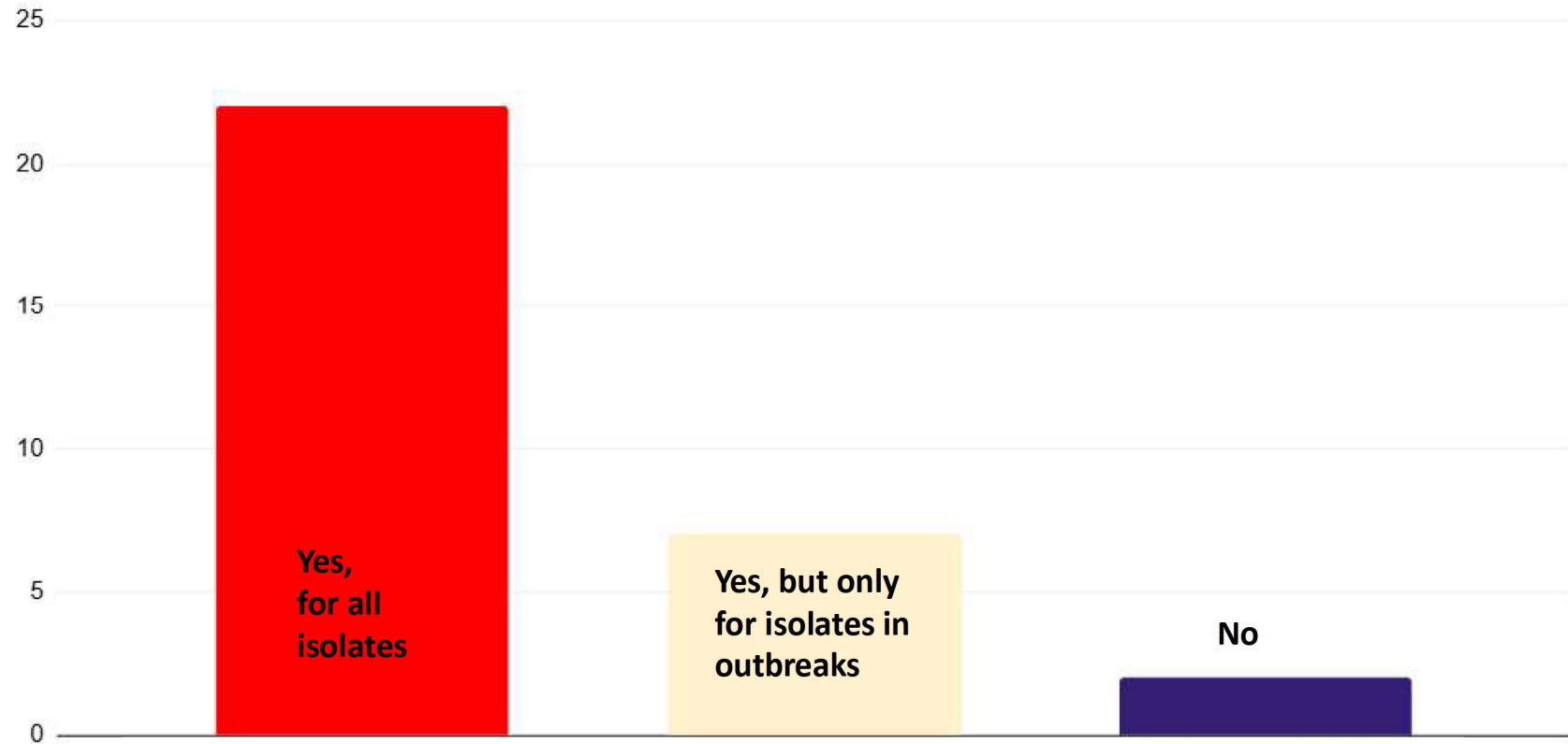




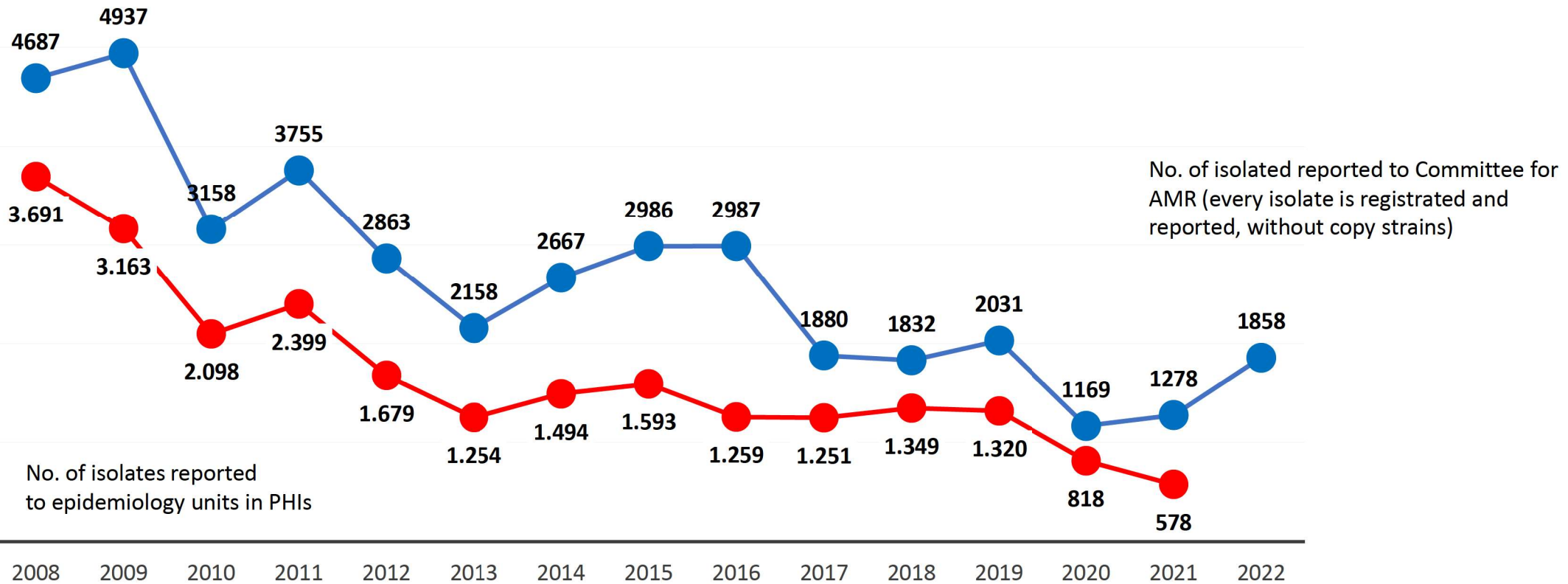
Mapping activities

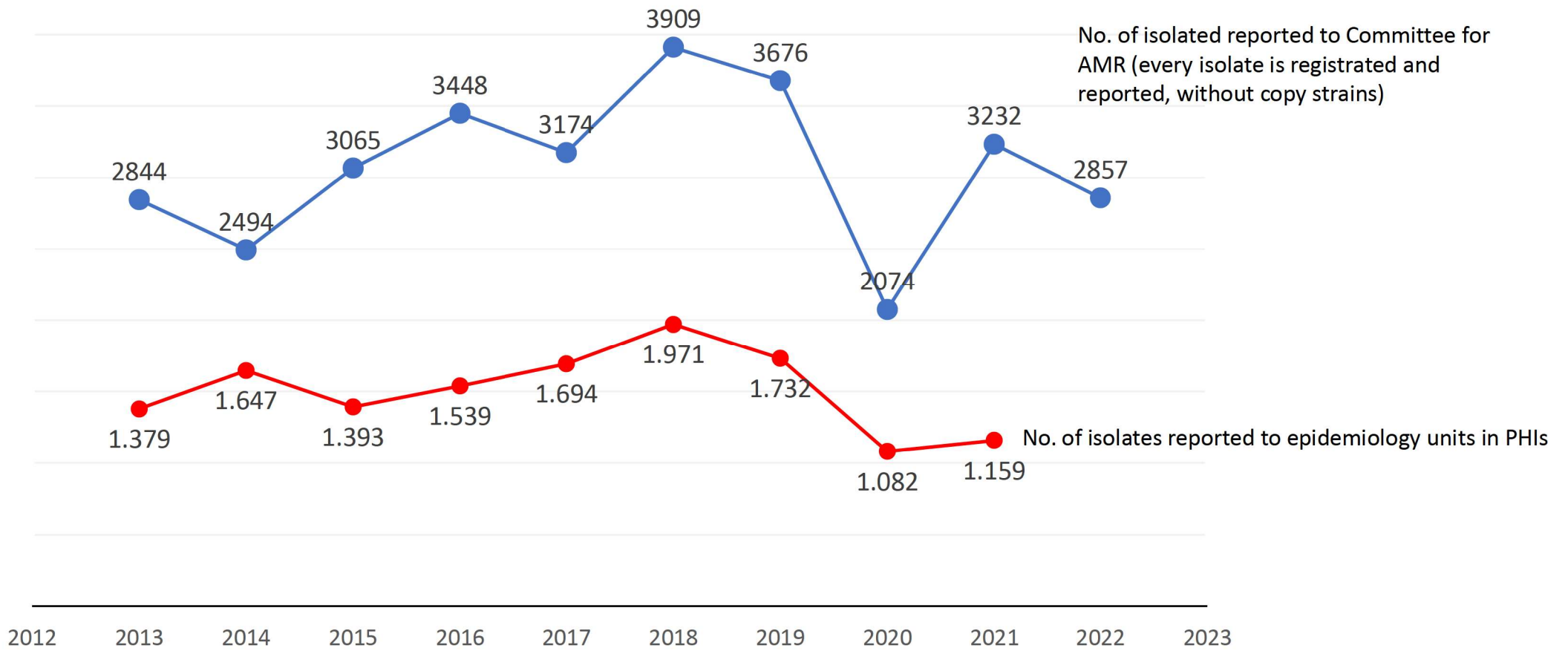
- all labs perform **AST** according to the EUCAST guidelines (since 2013)
- at the end of the year annual AST results are reported to the Commission for resistance surveillance in Croatia (MoH), and are included in the GLASS project (*Salmonella*)
- BUT half of the laboratories are unfamiliar with the obligation to report results of antimicrobial susceptibility tests as specified in the EU protocol for harmonized antimicrobial resistance monitoring in human *Salmonella* spp. and *Campylobacter* spp. isolates

Do you cooperate with competent epidemiology unit in data exchange (reporting) of patients with Salmonella spp. isolates?

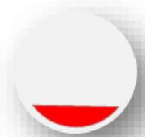


Salmonella spp.





***Campylobacter* spp.**



Mapping activities

- **no official network and/or joint communications' channel between** laboratories performing diagnostics of *Salmonella* spp. and NRL
- no officially defined position of the NRL, and the obligations of regional laboratories regarding providing data and/or isolates to NRL or obligations of NRL toward competent authorities and regional laboratories, or epidemiologists
- requirement to send isolates from outbreaks (exception *S. Enteritidis* and *S. Typhimurium*) for serotyping and confirmation to the NRL through “The act on the protection of the population against communicable diseases”
- 11 laboratories (**32%**) sends unidentified serovars in NRL for Salmonellae





Sentinel surveillance
2023

- Genomic sentinel surveillance
- October 15th-December 15th 2023
- all primary isolates of *Salmonella* spp. and *Campylobacter* spp. sent to NRL for Salmonellae with filled questionnaire
- WGS 234 *Salmonella* spp. isolates
- WGS 169 isolates *Campylobacter* spp.
- January 2024_ECDC **WGS pilot study** 100 isolates of *Salmonella* spp. and 50 isolates of *Campylobacter* spp.

***Salmonella enterica* serovar Strathcona**

Dear NFPs for FWD in Croatia,

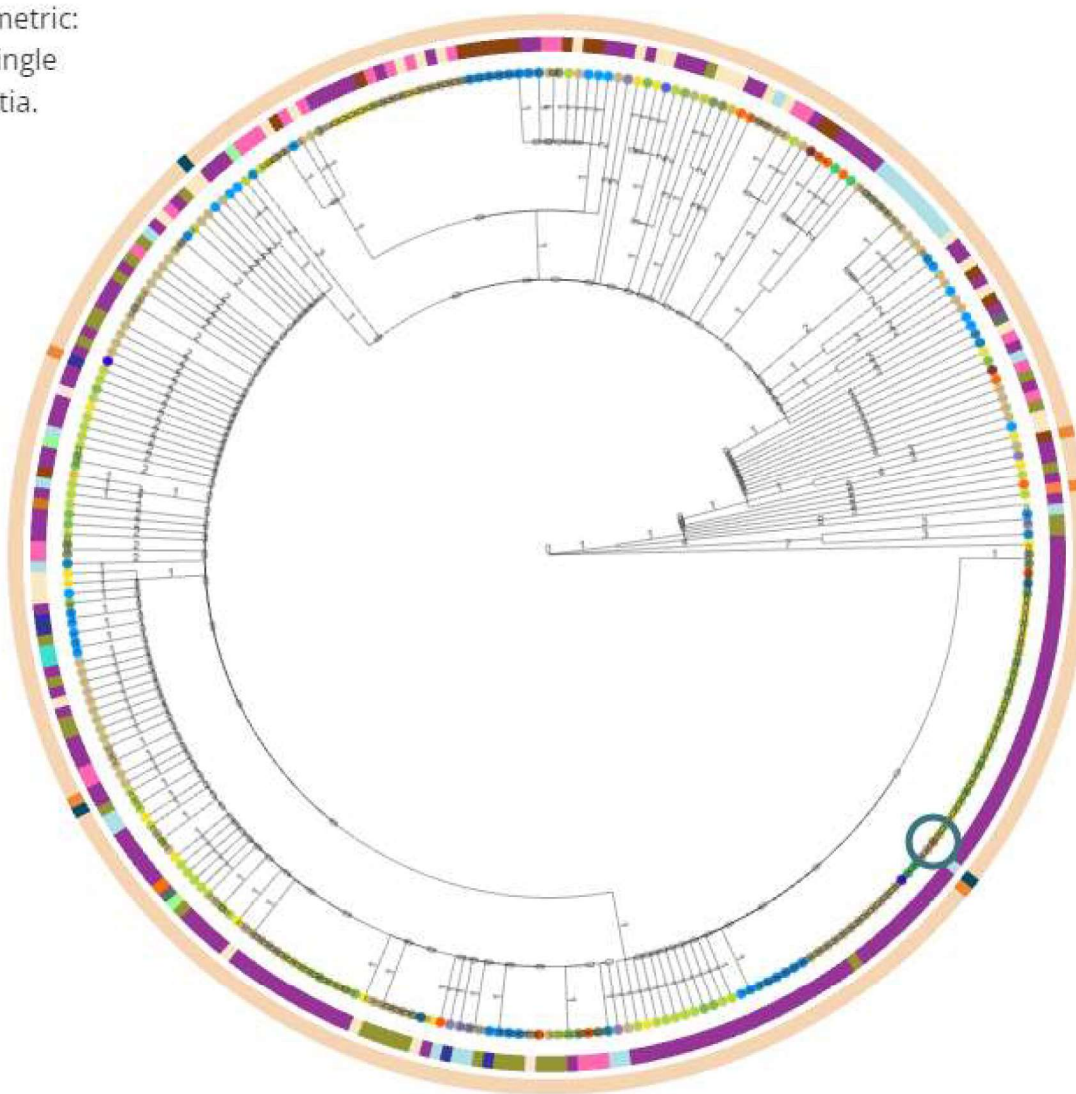
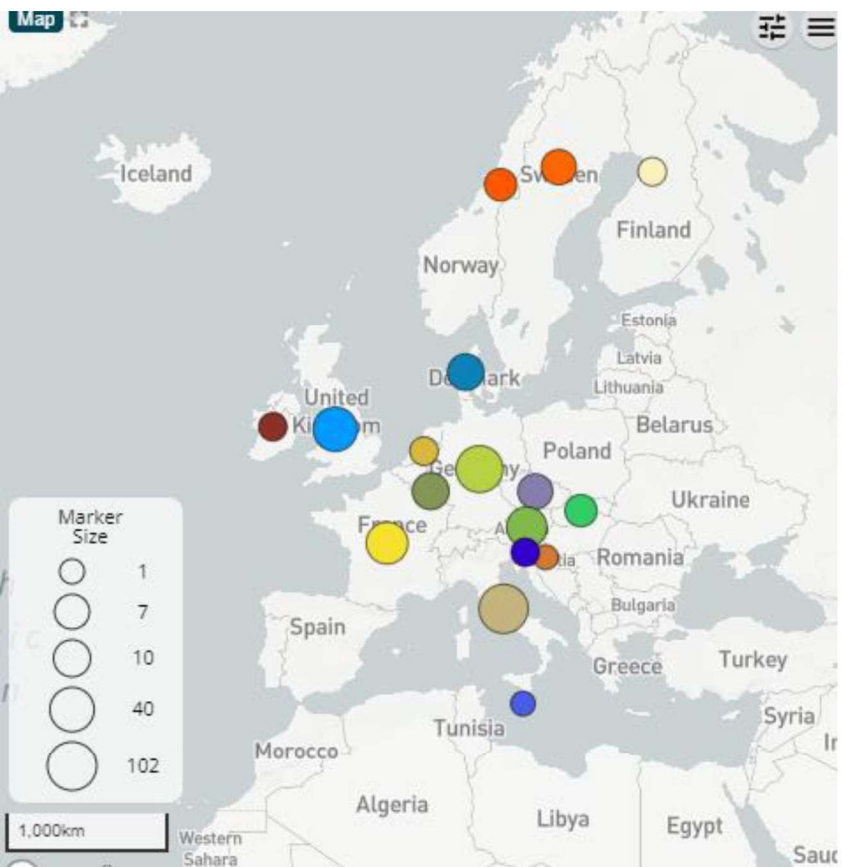
You may have seen that there is a multi-country outbreak of *Salmonella* Strathcona ongoing in the EU/EEA with over 50 laboratory-confirmed cases reported in five countries. The event was opened by Germany in EpiPulse on 27 October: [2023-FWD-00090](#).

We have also noticed that there are two genetically close *S. Strathcona* isolates from Croatia in Enterobase, sequences uploaded in October 2023. The names of the isolates in Enterobase are 5394 and 5395. Based on your matching isolates, these could be linked to the ongoing multi-country outbreak in other countries in the EU/EEA.

We wonder if you are also experiencing an increase of cases/national outbreak caused by *S. Strathcona*? If yes, have you performed any investigations?



Salmonella. Cluster 2023-
10.SALM.09.STRATHCONA. Distance metric:
cgMLST ChewBBACA. Tree method: Single
linkage. Visualisation created by Croatia.



- | | |
|----|------|
| AT | 2011 |
| CZ | 2012 |
| DE | 2013 |
| DK | 2014 |
| FI | 2015 |
| FR | 2016 |
| HR | 2017 |
| IE | 2018 |
| IT | 2019 |
| LU | 2020 |
| MT | 2021 |
| NL | 2022 |
| NO | 2023 |
| SE | 2024 |
| SI | |
| SK | |
| UK | |
- FOOD
HUMAN
NON-FOOD MATRICES



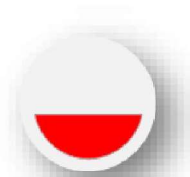
Two strains were detected in outpatient females (3y and 6y) with acute diarrheal disease in September 2023 in continental Croatia.

Third strain was detected in November 2023 in costal region in female (54y) who was asymptomatic carrier.

Three strains of *S. Strathcona* ST2559 belonging to Enterobase hierarchical cluster HC5_26490 NRL were registered.

Two were confirmed by WGS in NRL for salmonellae in Croatian Public Health Institute.

Third strain was confirmed by WGS ECDC centralized analysis.



1. newtwork meeting 2023

-2023

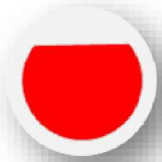
-microbiologists from 21 laboratories

-epidemiologists from CIPH

-presentation of mapping exercise survey results

-challenges, problems, and future collaboration

-presentation of first WGS results and ECDC/EFSA AMR report



1. data in ECDC-EFSA
report

Approved: 19 January 2024

DOI: 10.2903/j.efsa.2024.8583

SCIENTIFIC REPORT

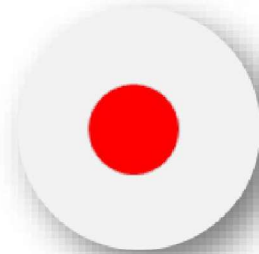


The European Union summary report on antimicrobial resistance in zoonotic and indicator bacteria from humans, animals and food in 2021–2022

**European Food Safety Authority (EFSA) | European Centre for Disease Prevention
and Control (ECDC)**

Country	Nalidixic acid		Ciprofloxacin ^(b)		Azithromycin		Colistin		Sulfamethoxazole ^(c)		Trimethoprim		Co-trimoxazole		Tetracycline	
	N	% Res	N	% Res	N	% Res	N	% Res	N	% Res	N	% Res	N	% Res	N	% Res
Austria	136	7.4	136	7.4	136	0	-	-	136	44.1	136	3.7	-	-	136	42.6
Belgium	-	-	91	15.4	84	0	-	-	91	38.5	91	18.7	-	-	91	37.4
Bulgaria ^(a)	-	-	33	9.1	-	-	-	-	-	-	-	-	33	15.2	-	-
Croatia	-	-	193	68.9	-	-	-	-	-	-	-	-	193	22.8	-	-
Cyprus	-	-	25	0	-	-	19	0	-	-	-	-	25	16.0	-	-
Czechia	-	-	31	29.0	27	0	31	0	-	-	31	3.2	31	3.2	30	20.0
Denmark	69	4.3	69	5.8	69	0	69	1.4	69	23.2	69	5.8	-	-	69	17.4
Estonia	7	NA	7	NA	-	-	7	NA	7	NA	7	NA	-	-	7	NA
Finland	34	0	34	0	-	-	-	-	-	-	34	0	-	-	34	0
France	113	8.8	113	8.8	113	0	113	0	113	25.7	113	4.4	-	-	113	23.9
Germany	416	7.2	416	4.8	-	-	-	-	-	-	416	9.1	416	40.1	416	27.6
Greece	15	6.7	15	6.7	15	0	3	0	15	46.7	15	13.3	-	-	15	40.0
Hungary ^(a)	-	-	173	50.3	-	-	-	-	-	-	172	1.7	164	13.4	173	21.4
Ireland ^(d)	69	4.3	69	5.8	69	0	69	0	69	34.8	69	4.3	-	-	69	27.5
Italy	51	13.7	51	15.7	41	0	41	0	48	47.9	51	19.6	-	-	51	56.9
Latvia ^(a)	-	-	1	NA	-	-	-	-	-	-	1	NA	1	NA	-	-
Lithuania ^(a)	-	-	31	25.8	-	-	-	-	-	-	30	10	32	9.4	-	-
Luxembourg	-	-	15	26.7	-	-	-	-	-	-	-	-	15	13.3	15	33.3
Malta	-	-	11	63.6	-	-	-	-	-	-	-	-	-	-	-	-
Netherlands	66	4.5	66	4.5	66	1.5	66	0	66	27.3	66	3	-	-	66	28.8
Poland	9	NA	9	NA	9	NA	9	NA	-	-	9	NA	9	NA	9	NA
Portugal	48	8.3	48	27.1	48	0	-	-	48	52.1	48	0	-	-	48	27.1
Romania	-	-	13	7.7	-	-	-	-	-	-	13	0	13	0	-	-
Slovakia ^(a)	-	-	35	8.6	-	-	-	-	-	-	-	-	14	0	12	41.7
Slovenia	-	-	60	56.7	-	-	-	-	61	9.8	61	9.8	61	6.6	61	9.8
Spain	43	4.7	43	4.7	-	-	-	-	43	62.8	43	4.7	-	-	43	60.5
Sweden ^(d)	175	0.6	175	2.3	175	0	175	0	175	5.7	175	1.7	-	-	175	5.1
Total (27 MSs)	1,251	6.2	1,963	19.6	852	0.1	602	0.3	941	30.2	1,650	6.4	1,007	25.0	1,633	26.8

Salmonella Typhimurium



more Net**WORKING**...

Salmonella Enteritidis ST11 outbreak in hotel during July-August 2024

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	
HRV000-HZJZ-7970	3	4	6	3	5	3	2	2	4	2	2	1	1	2	2	1	4	2	2	2	3	4	5	2	4	
HRV000-HZJZ-7971	3	4	5	3	4	4	4	3	3	5	3	5	5	4	3	5	6	3	5	5	3	5	7	4	7	
HRV000-HZJZ-7972	2	3	5	1	4	4	2	3	2	4	0	1	2	3	2	3	5	1	2	3	2	3	5	2	5	
HRV000-HZJZ-7973	3	4	3	2	4	2	1	2	3	3	3	2	3	2	3	4	4	4	3	4	1	6	5	3	4	
HRV000-HZJZ-7974	3	4	5	3	4	2	2	1	3	3	3	3	3	2	3	3	4	3	3	3	3	5	7	4	5	
HRV000-HZJZ-7975	4	5	5	4	4	4	3	3	5	4	5	4	4	3	4	5	5	5	5	3	4	4	9	3	5	
HRV000-HZJZ-7976	2	3	5	2	4	2	1	1	3	2	3	2	2	1	2	3	3	3	3	3	2	5	7	3	5	
HRV000-HZJZ-7977	3	4	4	3	2	3	2	2	4	3	4	3	3	2	3	4	4	4	4	2	3	4	8	4	4	
HRV000-HZJZ-7978	2	3	5	1	4	2	0	1	2	2	2	1	2	1	2	3	3	3	2	3	2	5	7	2	5	
HRV000-HZJZ-7979	3	4	4	3	5	5	4	4	4	3	4	3	5	5	4	3	4	6	4	6	6	1	6	4	6	
HRV000-HZJZ-7980	3	4	6	3	5	3	2	2	4	2	2	1	1	2	2	1	4	2	2	2	3	4	5	2	4	
HRV000-HZJZ-7981	5	6	7	4	6	4	3	3	4	3	4	4	5	4	5	3	6	5	4	5	5	7	5	5	7	
HRV000-HZJZ-7982	2	3	4	1	3	1	0	1	2	2	2	1	2	1	2	3	3	3	2	3	2	5	6	2	5	
HRV000-HZJZ-7983	3	4	5	3	4	2	2	1	3	3	3	3	3	2	3	3	4	3	3	3	3	5	7	4	5	
HRV000-HZJZ-7984	4	5	6	3	5	3	2	2	3	4	3	3	4	3	4	4	3	4	3	4	4	6	8	4	4	
HRV000-HZJZ-7985	27	28	30	27	29	29	28	28	28	29	28	29	29	28	27	30	30	28	30	30	27	30	32	30	32	
HRV000-HZJZ-7986	3	4	4	3	4	1	2	1	3	3	3	3	3	2	3	3	4	3	3	3	3	5	7	4	5	
HRV000-HZJZ-7987	30	31	31	30	30	30	29	29	31	29	31	30	30	29	29	30	31	31	31	29	30	31	34	31	31	
HRV000-HZJZ-7988	1	2	3	1	2	0	0	0	2	1	2	1	1	0	1	2	3	2	2	2	2	4	5	2	4	
HRV000-HZJZ-7989	4	5	4	4	3	5	5	5	5	5	3	4	4	5	3	4	5	3	5	3	4	3	5	5	3	
HRV000-HZJZ-7990	2	3	4	2	3	3	3	3	3	2	3	4	4	3	2	3	5	3	5	5	2	5	4	5	7	
HRV000-HZJZ-7991	2	3	4	2	3	1	1	1	3	2	3	2	2	1	2	3	3	3	3	3	2	5	6	3	5	
HRV000-HZJZ-7992	1	2	3	1	3	2	2	2	2	3	2	3	3	2	1	4	4	2	4	4	1	4	6	4	6	
HRV000-HZJZ-7993	4	5	6	4	5	3	3	2	2	4	4	4	4	3	4	4	5	4	4	4	4	6	8	5	5	
HRV000-HZJZ-7994	2	3	4	1	3	3	2	3	2	2	2	3	4	3	2	3	5	3	4	5	2	5	4	4	7	
HRV000-HZJZ-7995	6	7	4	6	5	5	5	4	6	6	6	4	4	5	6	4	7	4	4	2	4	4	6	5	2	
HRV000-HZJZ-7996	3	4	5	3	4	4	4	4	4	5	2	3	3	4	3	4	6	2	4	4	3	4	5	4	6	
HRV000-HZJZ-7997	4	5	7	3	6	4	2	3	4	4	2	1	2	3	4	3	3	3	2	3	4	3	7	2	5	
HRV000-HZJZ-7998	1	2	4	0	3	3	1	2	1	3	1	2	3	2	1	4	4	2	3	4	1	4	6	3	6	
HRV000-HZJZ-7999	5	6	5	5	4	4	4	4	6	5	6	5	5	4	5	6	6	6	6	4	5	5	9	4	6	
HRV000-HZJZ-8000	1	2	4	1	3	1	0	0	2	1	2	1	1	0	1	2	3	2	2	2	2	4	6	2	4	
HRV000-HZJZ-8001	2	3	3	2	4	4	3	3	3	4	3	4	4	3	2	5	5	3	5	5	0	4	5	5	5	
HRV000-HZJZ-8002	5	6	5	5	4	6	6	5	5	7	3	5	5	6	5	5	8	3	5	3	5	3	7	6	5	
HRV000-HZJZ-8003	87	88	87	87	88	88	88	88	86	89	88	89	89	88	87	90	89	88	89	90	85	89	89	90	90	
HRV000-HZJZ-8004	2	3	5	2	4	4	3	3	3	3	3	1	2	2	3	1	2	5	1	3	3	2	3	4	3	5
HRV000-HZJZ-8005	3	4	3	3	4	2	2	1	3	3	3	3	3	2	3	3	5	3	3	3	2	5	5	4	3	

Identifikacija

cgMLST-distance matrix

MLST-final report



HR NRL for Salmonellae activities	BeforeProject	AfterProject (outcomes)
WGS	0	300Salm., 100Campy
ECDC/EFSA AMR report	0	2022,2023,...
Sentinel surveillance	0	1,...
Network meeting	0	1,...
No. of referred isolates for identification of serovars by serotyping	2019.-200	2024.-370...

STRENGTHS

- Human potential-HCW
- No. of labs
- Implemented EUCAST
- Guidelines for Intestinal Diseases Diagnostics
- Act on Communicable Diseases Prevention

WEAKNESSES

- digital data connection
- no strategies for financing
- regulations on molecular typing of pathogens
- regulations on intersectoral "One Health" approach
- stakeholders focus

OPPORTUNITIES

- personal connections of experts (clinicians-microbiologists-epidemiologist-vets)
- connections through research projects
- EU regulations

THREATS

- Stakeholders focuses
- Human potentials-HCW emigration
- lack of financial resources

- involvement of national stakeholders in project through some kind of format (e.g. final report or written statement about project results by organizers with addition...Kind reminder of what MS **shall** do according to EU Directives