

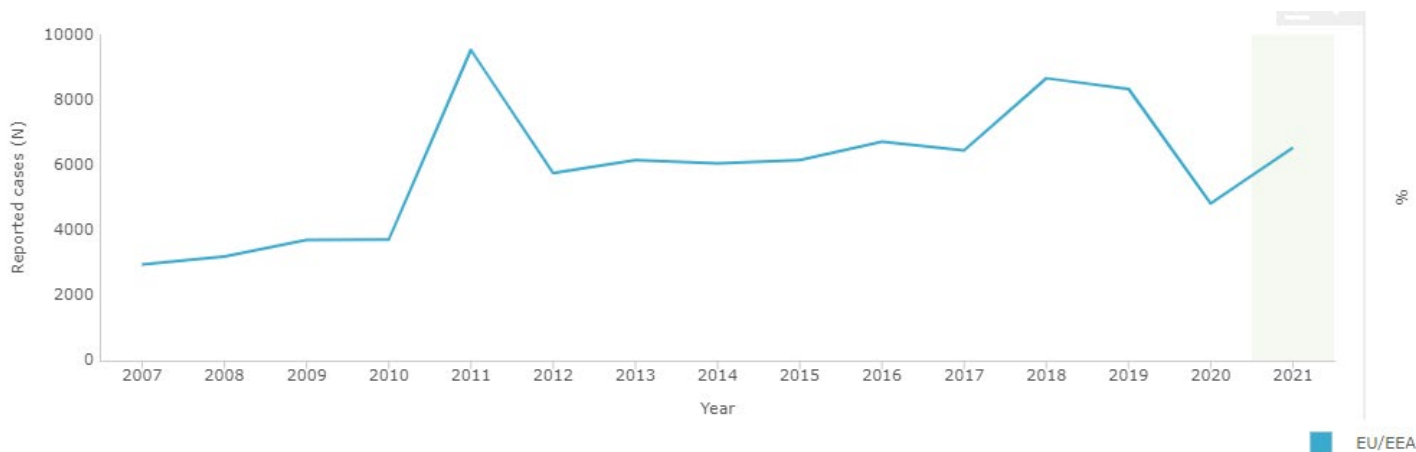
Update on STEC infections in the EU/EEA

Johanna Takkinen, Principal Expert Food- and Waterborne Diseases
EURL STEC workshop, 10 October 2022

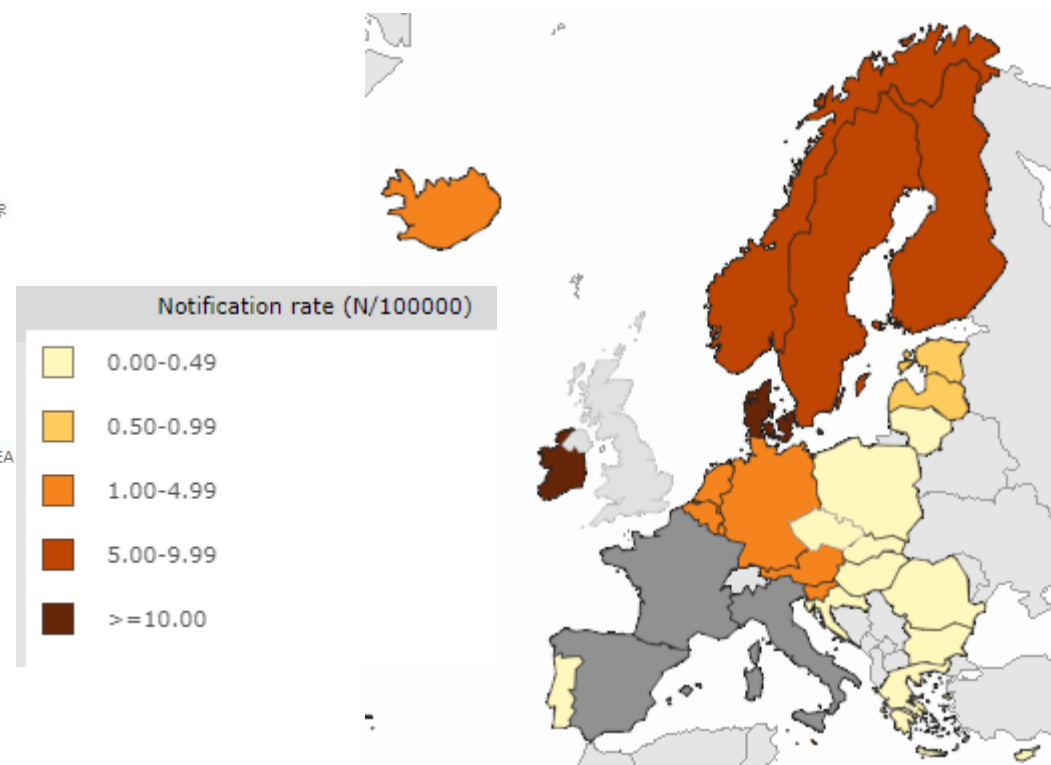
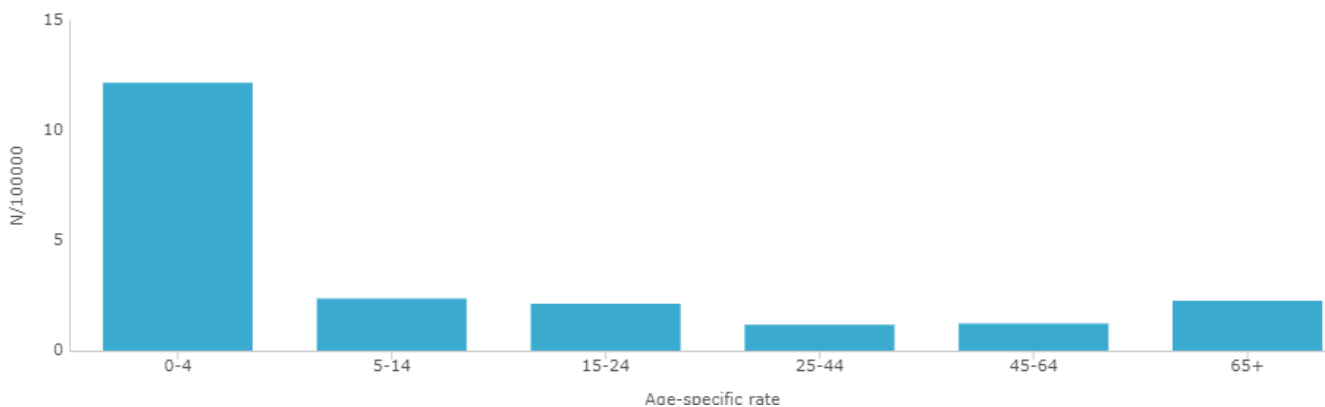
Epidemiology of STEC in EU/EEA

Number of reported cases:

6 534 cases in 2021



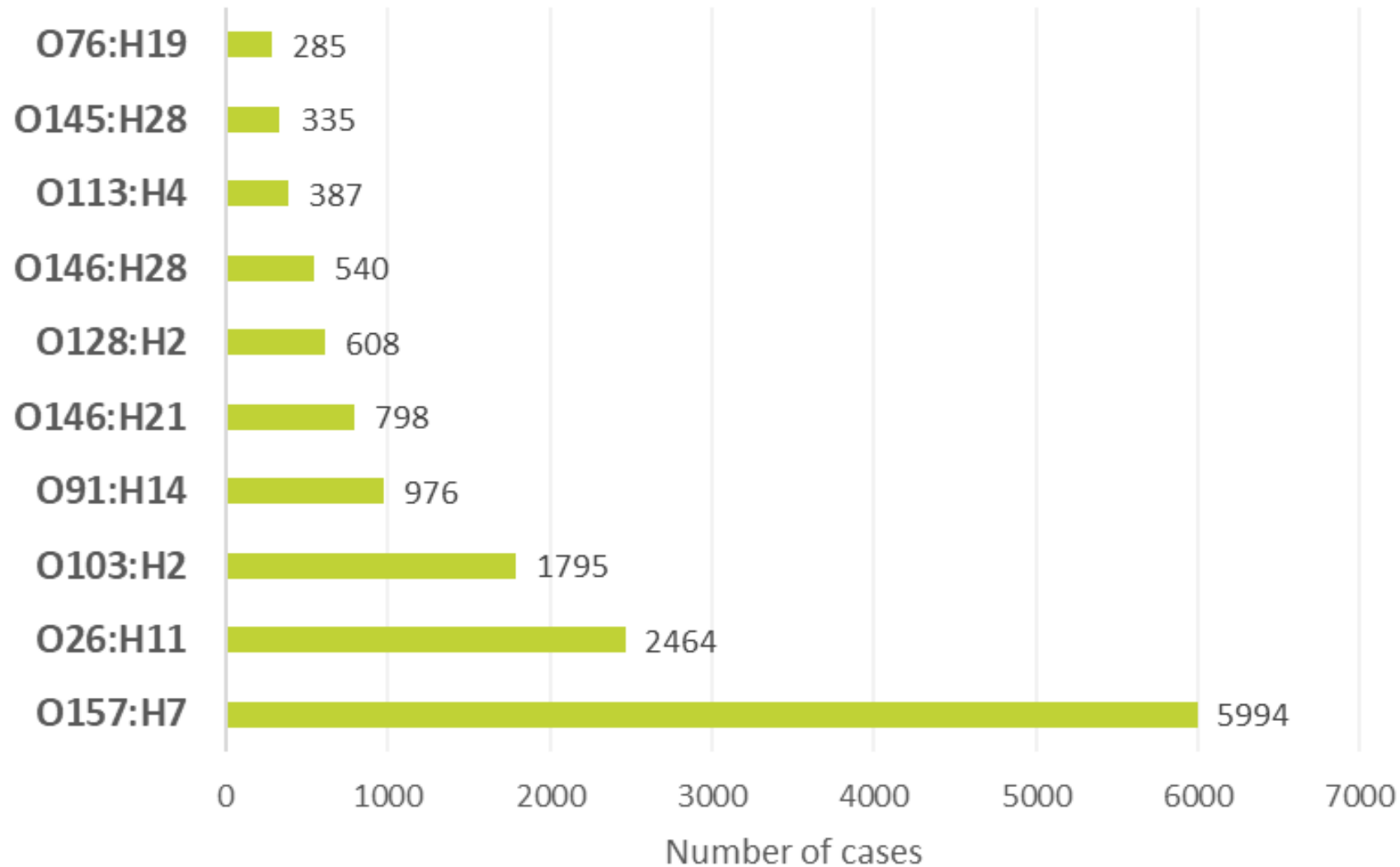
Notification rate / 100 000:



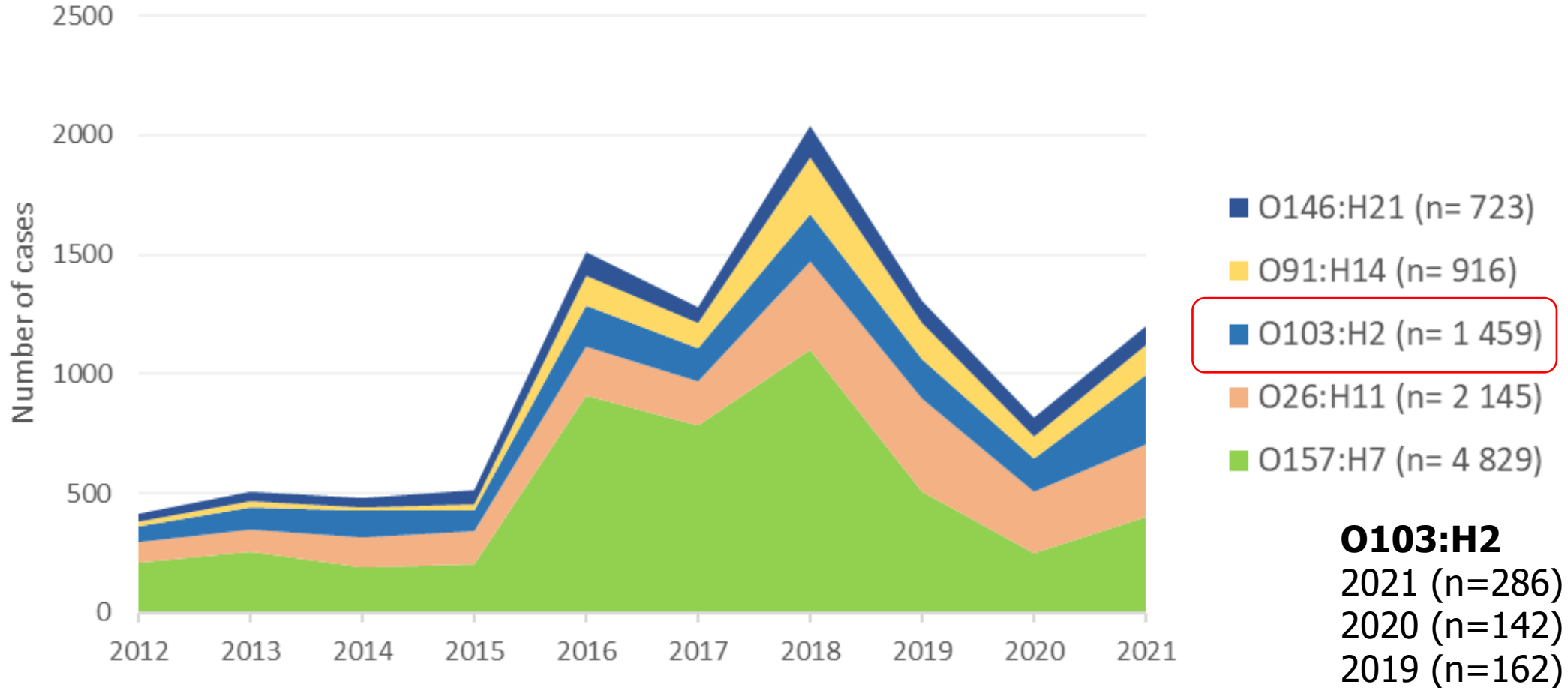
STEC toxin subtypes - methods

- Case-based dataset 2007-2021 as of 3 October 2022
- Confirmed cases
- Toxin genes or gene combinations with < 30 cases excluded
=> combinations of three toxin genes excluded
- Frequencies of serotypes and Shiga toxin gene subtypes
- HUS associations
- Trends for 2012-2021 (data not available from the UK in 2020-21)

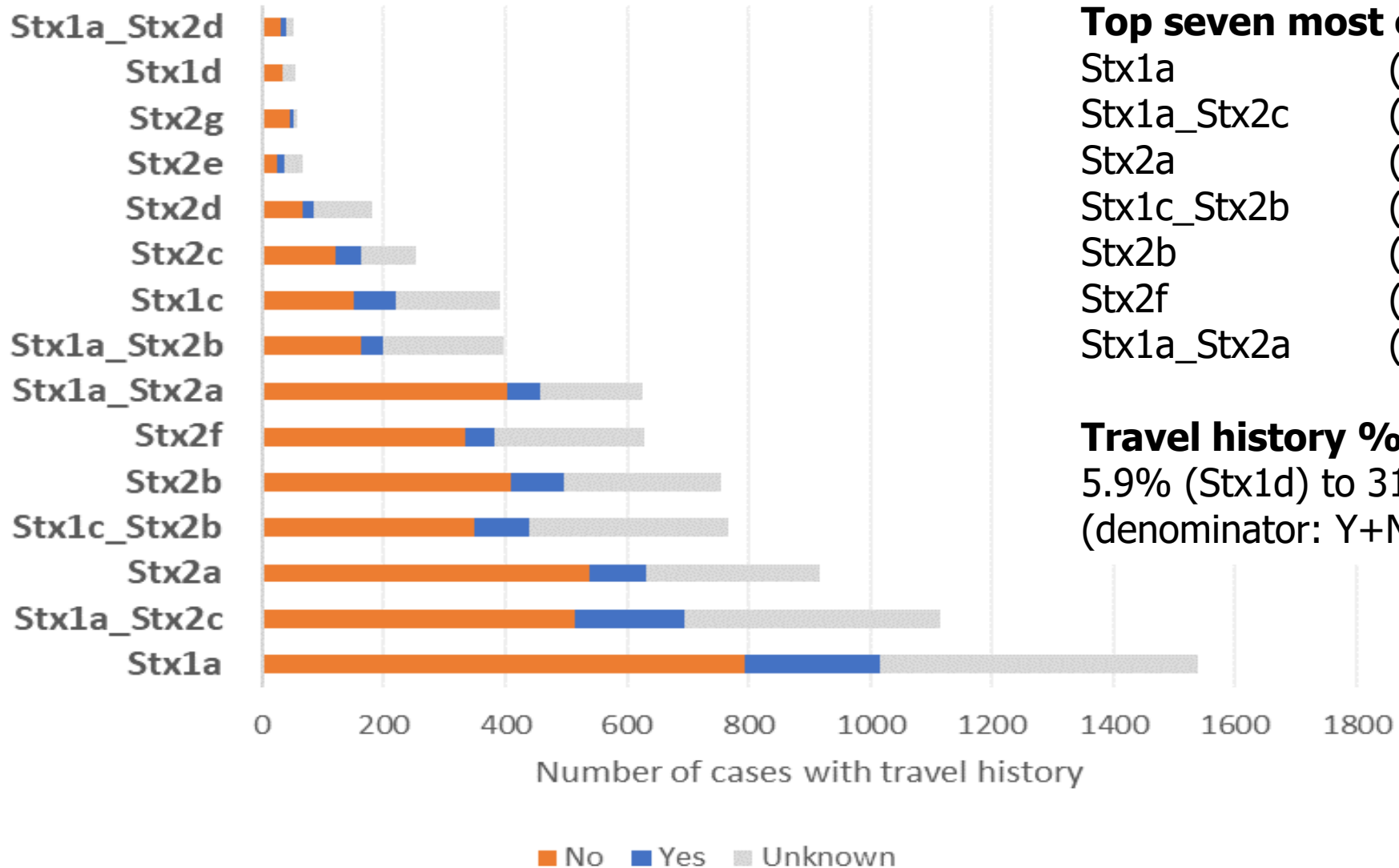
10 most common STEC serotypes (n=14 182), 2007-2021



Trend of reporting for five most common STEC serotypes, 2012-2021



STEC toxin subtypes – frequency (n=7 793), 2007-2021



Top seven most common:

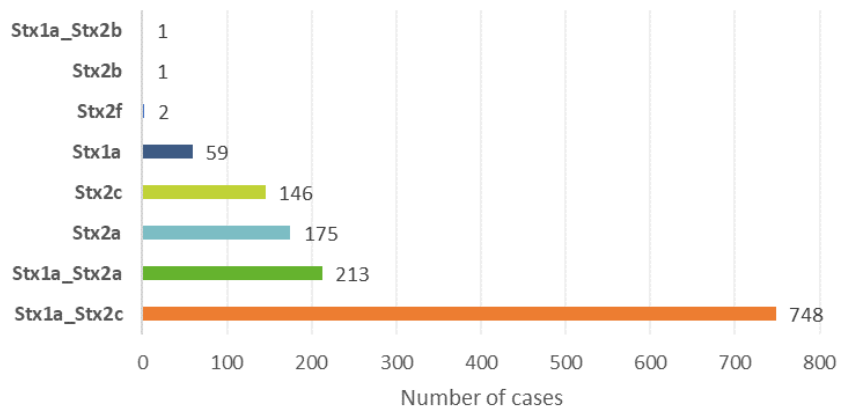
- Stx1a (n=1538)
- Stx1a_Stx2c (n=1 116)
- Stx2a (n=917)
- Stx1c_Stx2b (n=766)
- Stx2b (n=754)
- Stx2f (n=629)
- Stx1a_Stx2a (n=625)

Travel history % ranged from 5.9% (Stx1d) to 31.2% (Stx1c) (denominator: Y+N)

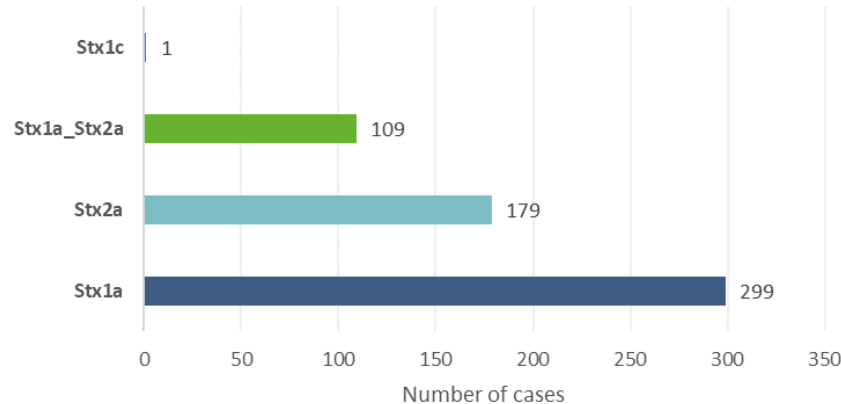
Gene subtypes of five common STEC serotypes, 2007-2021



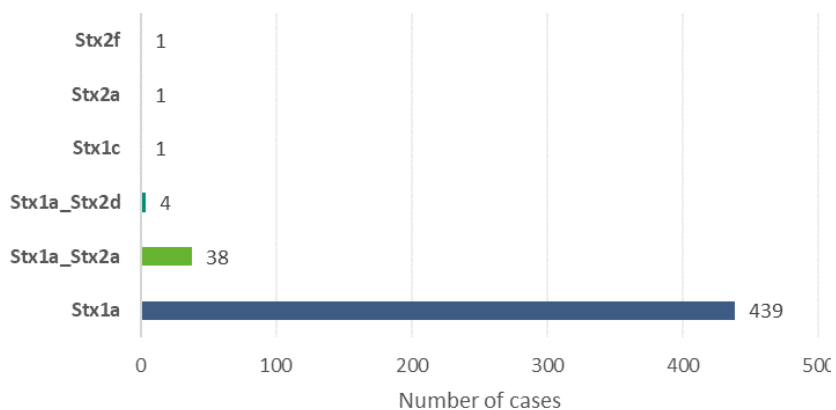
O157:H7 (n=1 345)



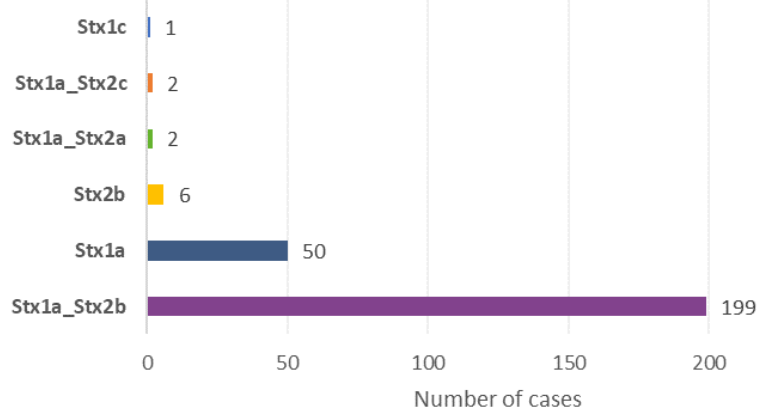
O26:H11 (n=588)



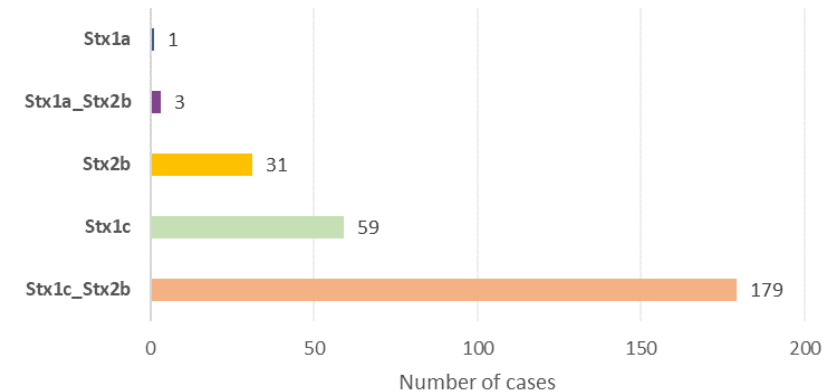
O103:H2 (n=484)



O91:H14 (n=260)



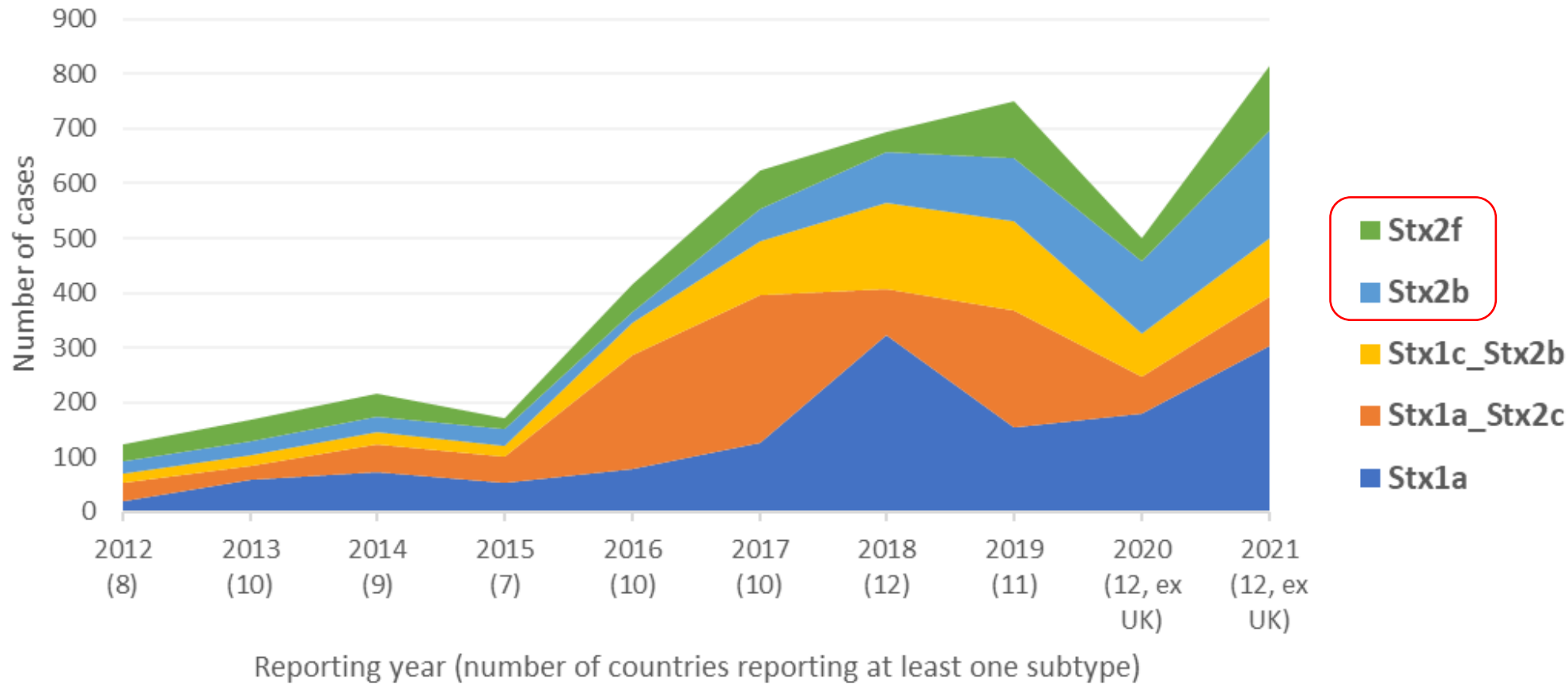
O146:H21 (n=273)



Odds for having HUS by 10 gene subtypes, 2007-2021

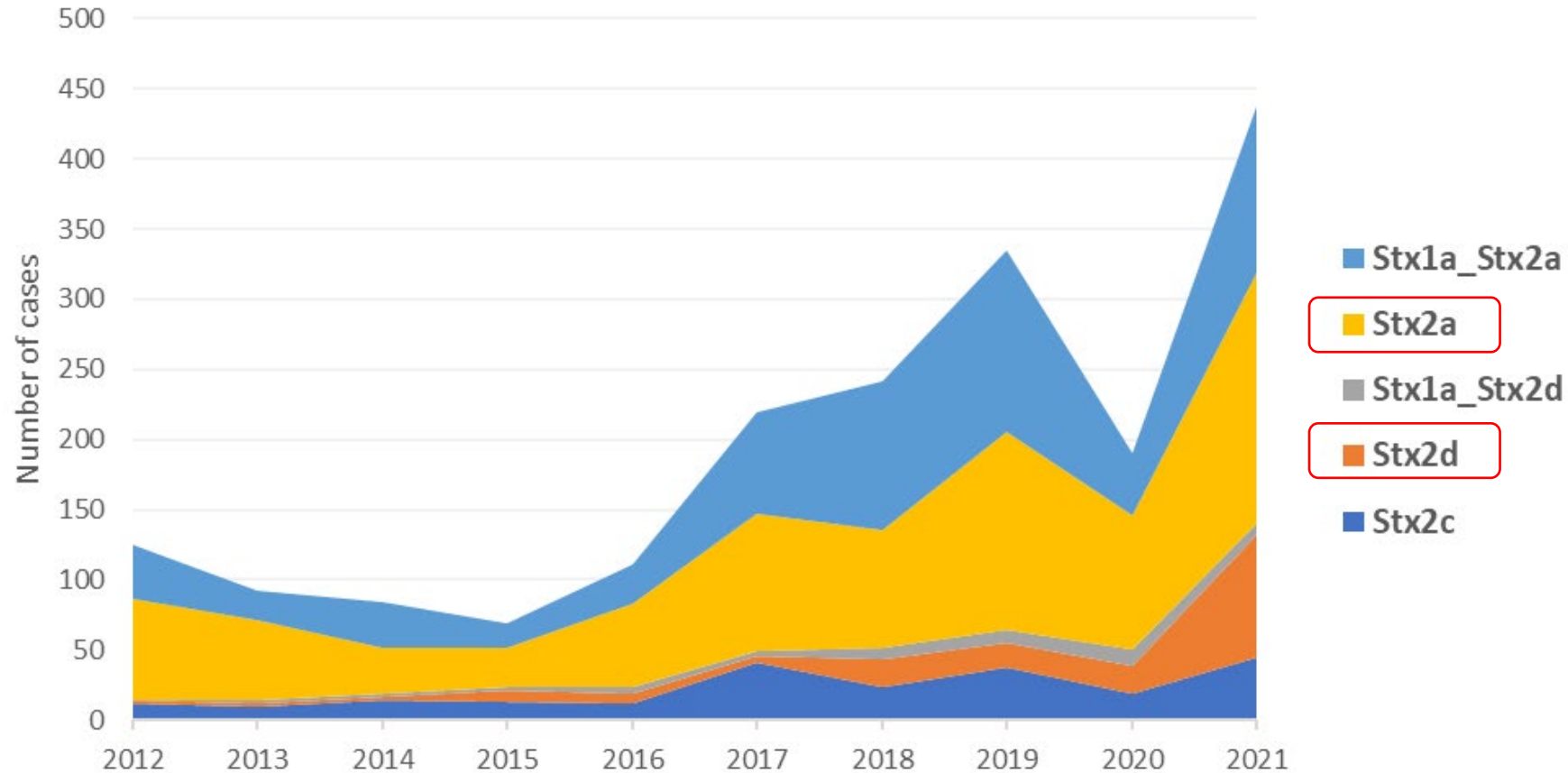
Gene subtype	HUS		Total	% HUS	OR	95% CI	p-value
	Yes	No					
Stx2b	6	732	738	0.8%	Ref.		
Stx1a	13	1329	1342	1.0%	1.2	0.5 - 3.2	0.357
Stx1c_Stx2b	6	547	553	1.1%	1.3	0.4 - 4.2	0.616
Stx1a_Stx2c	9	793	802	1.1%	1.4	0.5 - 3.9	0.615
Stx2f	9	560	569	1.6%	2	0.7 - 5.5	0.204
Stx2c	18	208	226	8.7%	10.6	4.1 - 26.9	< 0.0001
Stx1a_Stx2d	4	42	46	9.5%	11.6	3.2 - 42.8	< 0.001
Stx1a_Stx2a	85	454	539	18.7%	22.8	9.9 - 52.7	< 0.0001
Stx2d	47	107	154	43.9%	53.6	22.4 - 128.4	< 0.0001
Stx2a	262	590	852	44.4%	54.2	23.9 - 122.6	< 0.0001

Trend of five common STEC toxin subtypes less associated with HUS, (n=4 476), 2012-2021



Increase of Stx2f and Stx2b

Trend of five STEC toxin subtypes associated with HUS, (n=1 905), 2012-2021



Increase of Stx2a and Stx2d

Stx2a by age groups, gender and HUS, 2007-2021

Stx2a				
Age group (years)	Female	Male	Total	p-value*
0-4	207	204	411	ns
5-14	72	73	145	ns
15-24	27	26	53	ns
25-44	53	41	95	ns
45-64	71	41	112	< 0.01
>=65	72	27	100	< 0.001
Total	502	412	916	

*Chi-square test

Stx2a + HUS				
Age group (years)	Female	Male	Total	p-value*
0-4	88	81	169	ns
5-14	33	30	63	ns
15-24	4	3	7	ns
25-44	1	0	1	ns
45-64	7	1	8	< 0.05
>=65	11	3	14	< 0.05
Total	144	118	262	

*Chi-square test

- Weak signal of increased risk among females > 45 years
- Serotypes reported for Stx2a + HUS:
 - O26:H11 (61)
 - O157:H7 (40)
 - O157:H- (12)
 - O104:H4 (11) => possible impact of STEC O104:H4 outbreak in 2011

Stx1a_Stx2a by age groups, gender and HUS, 2007-2021

Stx1a_Stx2a				
Age group (years)	Female	Male	Total	p-value*
0-4	100	101	201	ns
5-14	66	61	127	ns
15-24	27	35	62	ns
25-44	50	35	85	ns
45-64	45	21	66	< 0.01
>=65	59	24	83	< 0.001
Total	347	277	624	

*Chi-square test

Stx1a_Stx2a + HUS				
Age group (years)	Female	Male	Total	p-value*
0-4	23	33	56	ns
5-14	14	2	16	< 0.01
15-24	2	2	4	ns
25-44	0	0	0	ns
45-64	4	1	5	ns
>=65	3	1	4	ns
Total	46	39	85	

*Chi-square test

- Weak signal of increased risk among females in 5-14 years
- Main serotypes reported Stx1a_Stx2a+HUS:
 - O157:H7 (26)
 - O26:H11 (20)
 - O111:H8 (14)
- Main serotypes reported in age group 5-14 years:
 - O157:H7 (8)
 - O26:H11 (4)
 - O111:H8 (2)
 - O50:H2 (1)

Conclusions

- Increase in reported gene subtypes since 2015
 - Introduction of PCR-based detection
 - Increase in subtyping of toxin genes as well as reporting
- While STEC O157:H7 is the main reported serotype, reporting has increased for STEC O103:H2
- Of non-HUS-associated gene subtypes, reporting of stx2b and stx2f has increased
- Of HUS-associated gene subtypes, reporting of stx2a and stx2d has increased



THANK YOU!

Acknowledgements

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