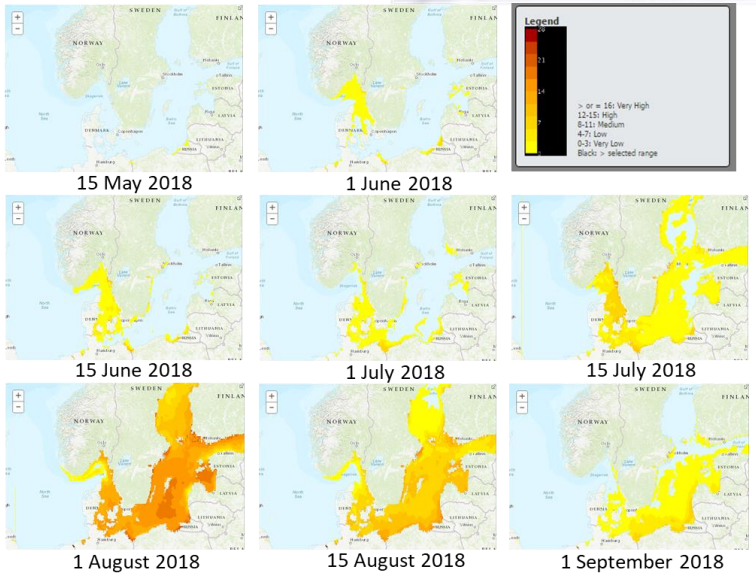
NIPH
Norwegian Institute of Public Health

Molecular epidemiology of *Vibrio* infections in Nordic countries and Norway (2014-2018)

Ettore Amato, PhD
Senior Advisor - Norwegian Institute of Public Health
Dept. Infection control and preparedness
Food-, Water-borne infection and Zoonosis

Background – *Vibrio* infections

- Gram-negative bacilli, major cause of severe waterborne infection.
- Ubiquitous bacteria found in aquatic and marine habitats.
- Non-cholera *Vibrio* spp. (e.g. *V. parahaemolyticus*, *V. vulnificus*) cause vibriosis infections through exposure to seawater or consumption of raw or undercooked contaminated seafood.
- Several clinical manifestations, from mild self-limiting gastroenteritis to severe infections.
- *V. vulnificus* infections are the most expensive marine acquired infections, long-term medical interventions often required.
- A notable data gap in the field of *Vibrio* research: need of surveillance data regarding *Vibrio spp.* infections globally.



https://www.nejm.org/doi/full/10.1056/nejmicm1716464
https://link.springer.com/article/10.1007/s10096-004-1241-2
https://www.infectiousdiseaseadvisor.com/home/topics/skin-infections/consequences-of-climate-change-might-affect-spread-of-certain-bacteria/
https://www.ecdc.europa.eu/en/publications-data/vibrio-suitability-tool

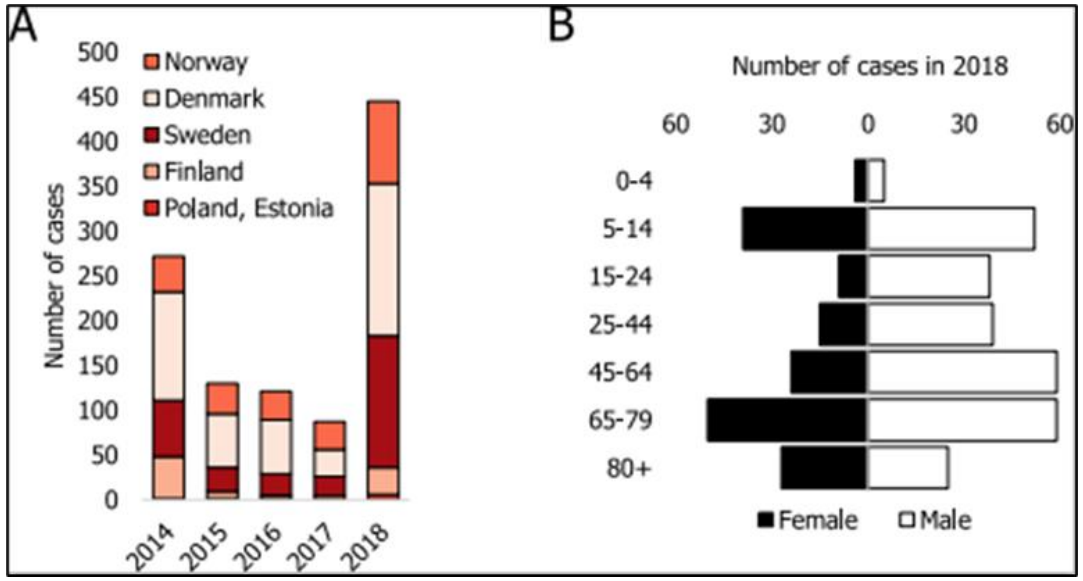
Epidemiological and microbiological investigation of the large increase of vibriosis in northern Europe in 2018

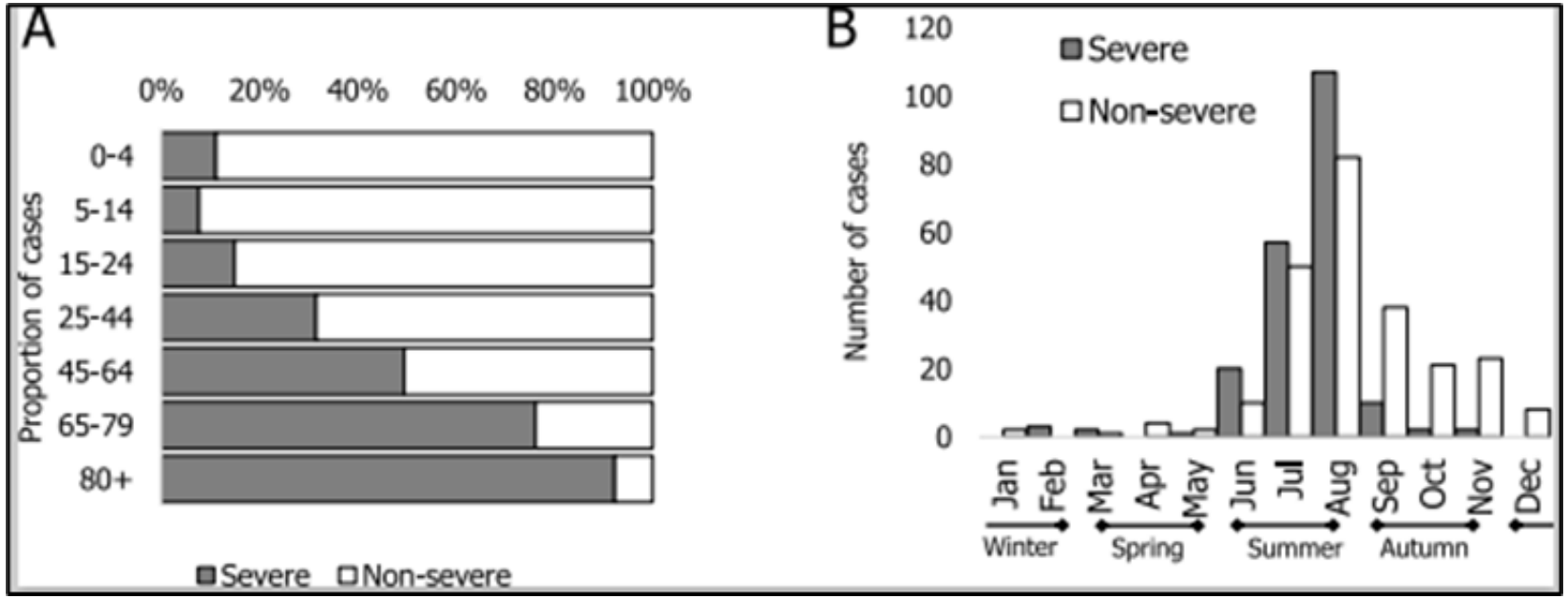
Epidemiological and microbiological investigation of the large increase of vibriosis in northern Europe in 2018

Ettore Amato, Maximilian Riess, Daniel Thomas-Lopez, Marius Linkevicius, Tarja Pitkänen, Tomasz Wołkowicz, Jelena Rjabinina, Cecilia Jernberg, Marika Hjertqvist, Emily MacDonald, Jeevan Karloss Antony-Samy, Karsten Dalsgaard Bjerre, Saara Salmenlinna, Kurt Fuursted, Anette Hansen, Umaer Naseer

doi: https://doi.org/10.1101/2021.11.19.21266449

Vibriosis in Nordic countries





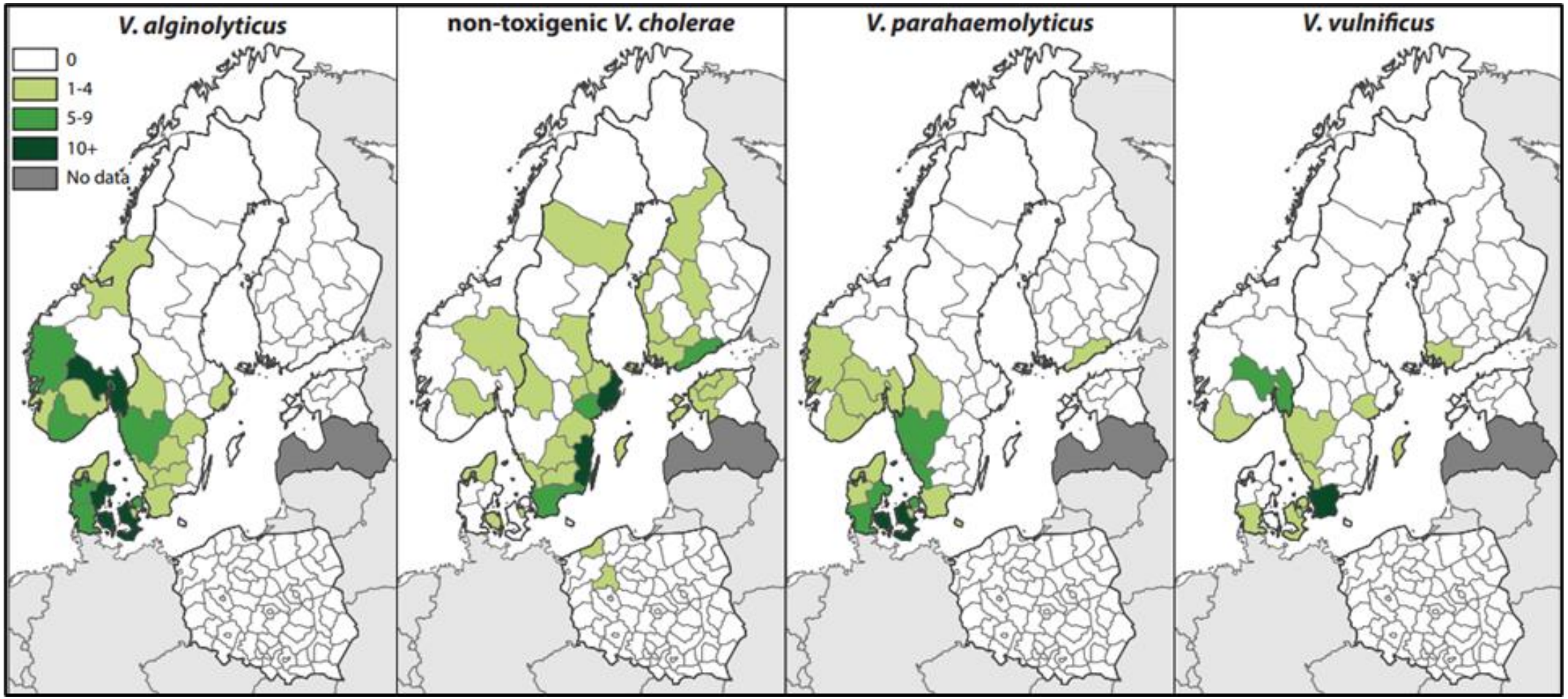
Vibriosis in Nordic countries

Table 2. *Predictors without and with adjustment of severe and non-severe vibriosis cases in the study countries, 2018.*

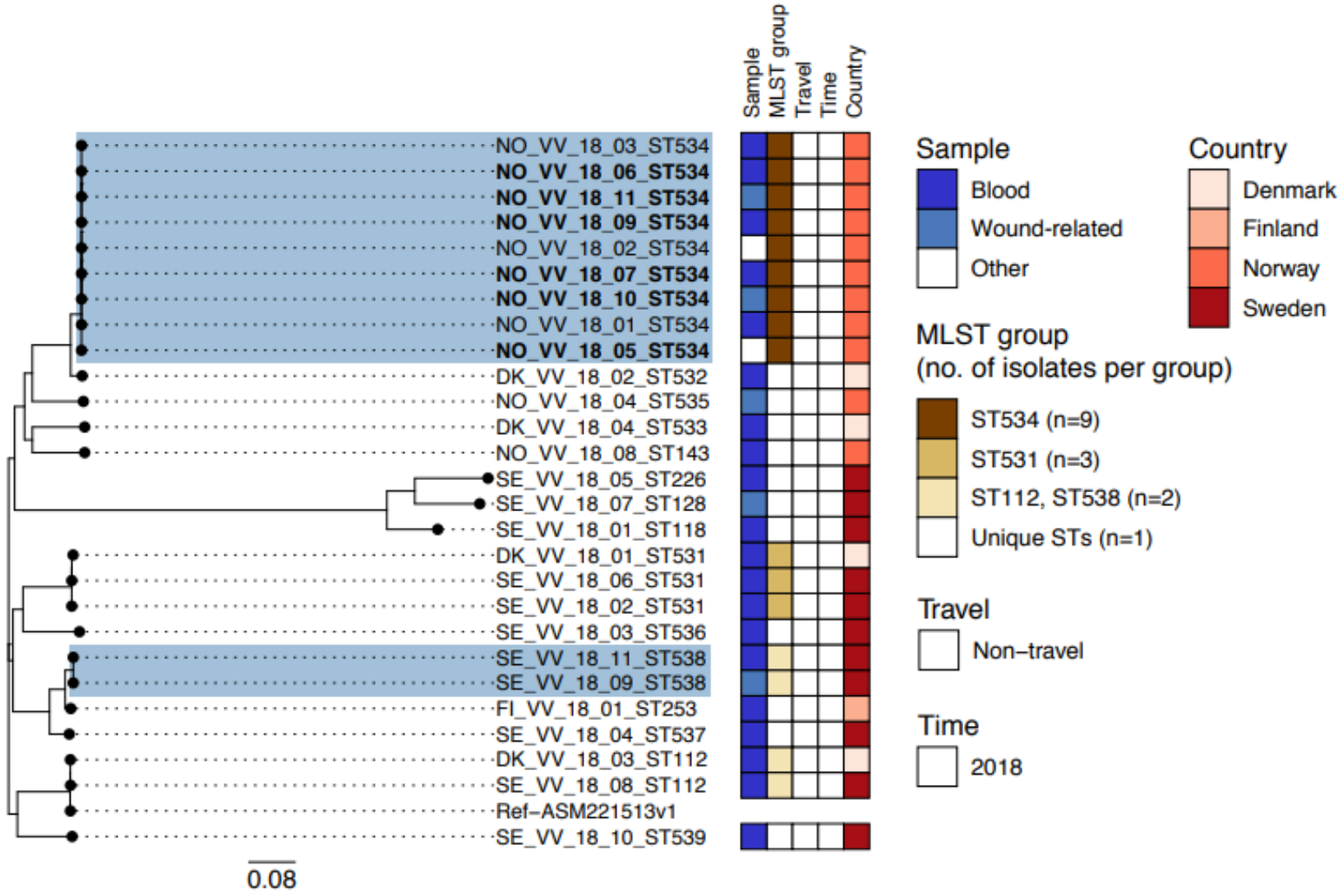
Characteristics	Severe infections		Non-severe infections		Univariate logistic regression [a]	MVA [a]
	n	%	n	%		
All cases (N=445)	204	45.8	241	54.2	OR (95% CI)	adjOR (95% CI)
Sex						
Female	89	53.0	79	47.0	1	1
Male	115	41.5	162	58.5	0.6 (0.43-0.93)	0.7 (0.42-1.27)
Age group						
0-4	1	11.1	8	88.9	0.3 (0.03-2.35)	0.1 (0.01-1.69)
5-14	7	7.7	84	92.3	0.2 (0.07-0.47)	0.1 (0.05-0.41)
15-24	7	14.9	40	85.1	0.4 (0.14-1.02)	0.4 (0.16-1.26)
25-44	17	31.5	37	68.5	1	1
45-64	41	49.4	42	50.6	**2.1 (1.04-4.35)**	1.9 (0.86-4.18)
65-79	83	76.1	26	23.9	**6.9 (3.37-14.33)**	**3.9 (1.73-8.68)**
80+	48	92.3	4	7.7	**26.1 (8.1-84.2)**	**15.5 (4.41-54.31)**
Season						
Summer	184	56.4	142	43.6	**7.6 (4.13-13.93)**	**5.1 (2.40-10.86)**
Autumn	14	14.6	82	85.4	1	1
Winter	3	23.1	10	76.9	1.8 (0.43-7.19)	3.1 (0.52-18.04)
Spring	3	30.0	7	70.0	2.5 (0.58-10.88)	1.5 (0.27-8.49)
Vibrio species						
V. alginolyticus	48	31.6	104	69.1	0.9 (0.55-1.61)	1.6 (0.79-3.31)
Non-toxigenic *V. cholerae*	33	33.0	67	67.0	1	1
V. parahaemolyticus	58	65.2	31	35.8	**3.8 (2.08-6.94)**	**2.1 (1.00-4.49)**
V. vulnificus	43	95.6	2	4.4	**43·7 (9.96-191)**	**17.2 (3.28-90.45)**
Vibrio spp.	22	37.3	37	62.7	1·2 (0.62-2.36)	2.1 (0.86-5.30)

[a] *Data of Poland and Estonia were not included in the logistic regression analyses.*

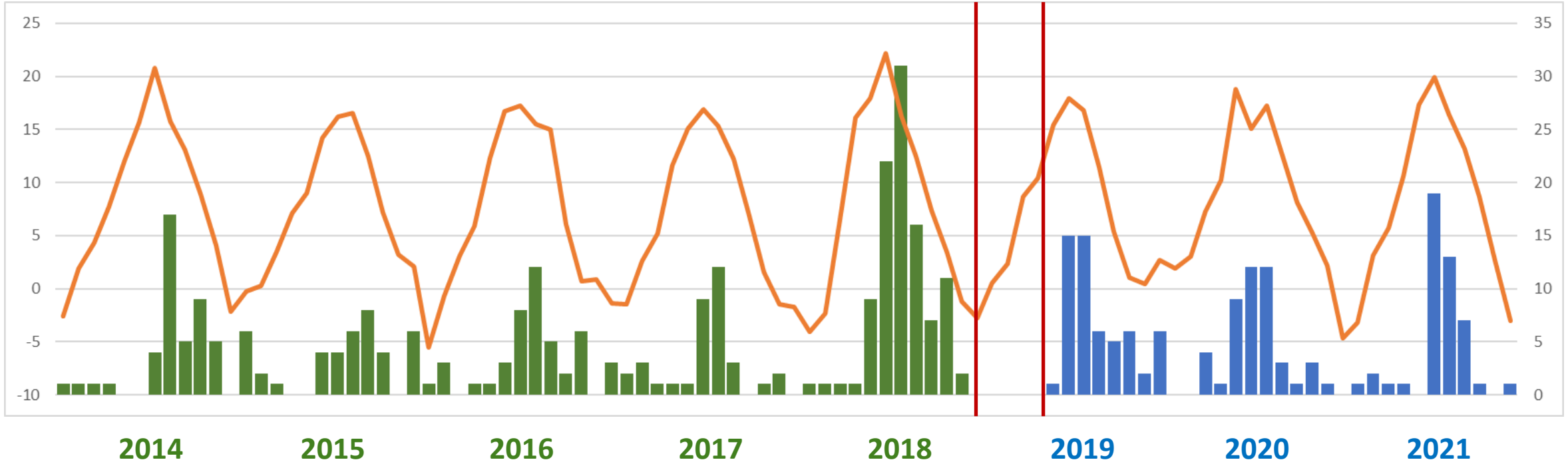
Vibriosis in Nordic countries



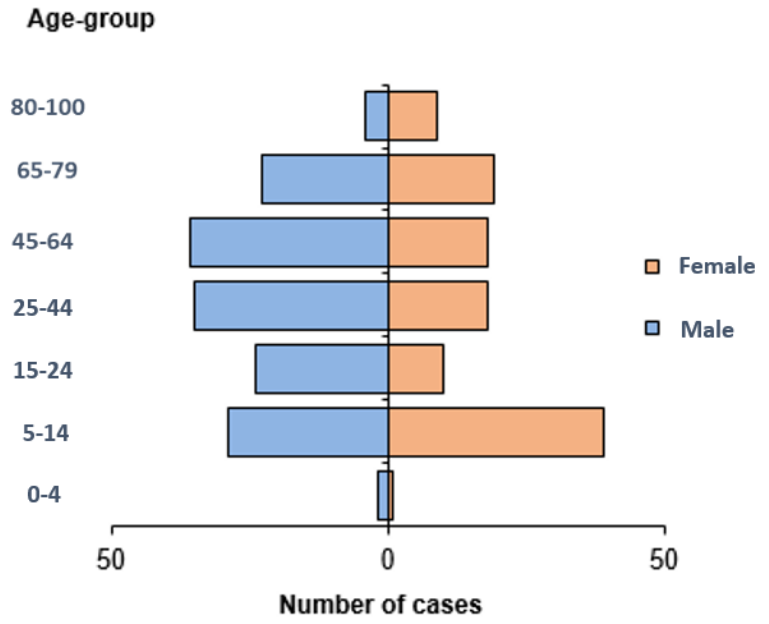
Vibriosis in Nordic countries

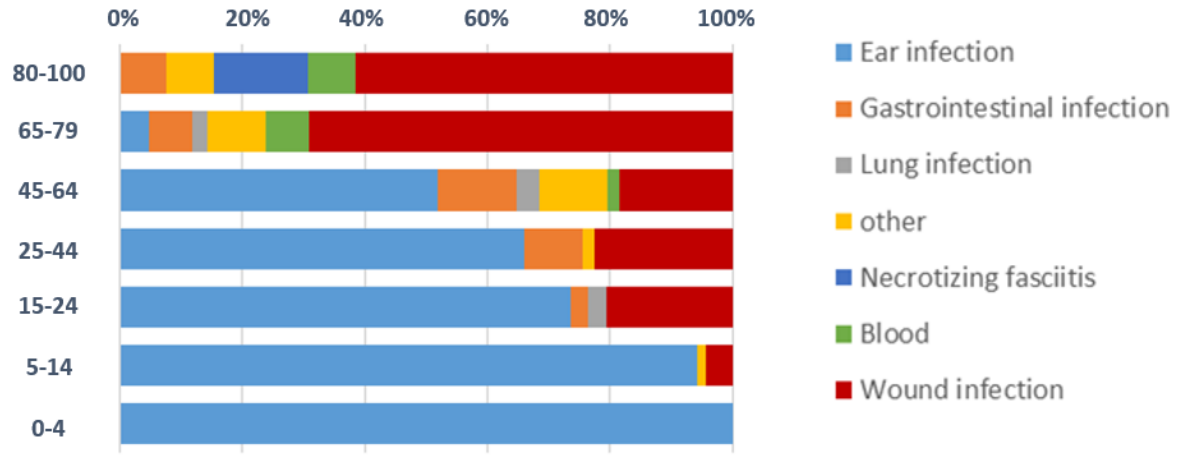


Vibriosis in Norway (2014-2018)



Vibriosis in Norway (2014-2018)





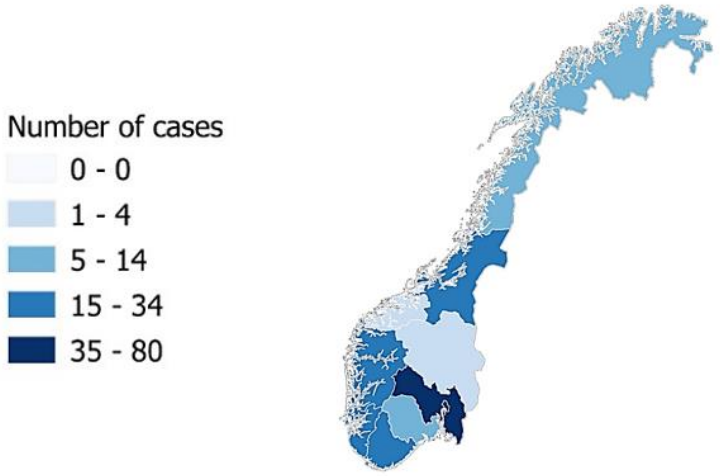
Male to Female ratio of 1.3

- Highest number of cases in young adults followed by adults and elderly;
- Different infection type and severity per age-group;

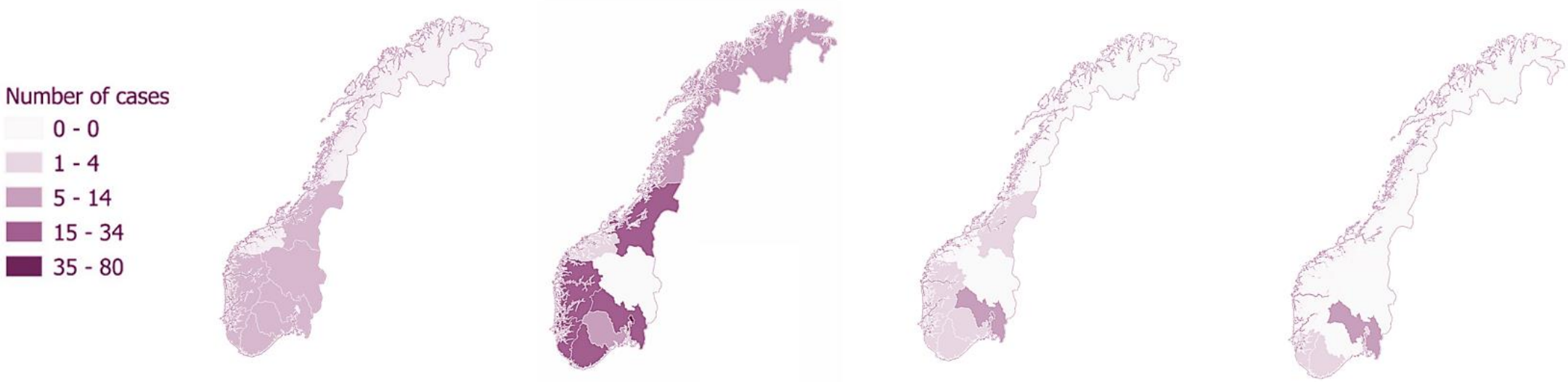
Vibriosis in Norway (2014-2018)

Characteristics	Hospitalised cases		Non-hospitalised cases		Univariate logistic regression	MVA
	n	%	n	%	OR (95% CI)	adjOR (95% CI)
All cases (N=227)	24	10.6	203	89.4		
Age group						
0-44	5	20.8	135	66.5	1	1
45-64	4	16.7	39	19.2	2.8 (0.71-10.81)	4.7 (0.90-24.1)
65+	15	62.5	29	14.3	**14.0 (4.70-41.48)**	**19.4 (4.49-84.05)**
Sex						
Male	9	37.5	88	43.3	1	1
Female	15	62.5	115	56.7	1.3 (0.53-3.05)	1.8 (0.50-6.48)
Season						
Summer-Autumn	22	91.7	153	75.4	3.6 (0.81-15.83)	**9.4 (1.11-79.98)**
Winter-Spring	2	8.3	50	24.6	1	1
Vibrio species						
V. alginolyticus	9	37.5	168	82.8	1	1
Non-toxigenic *V. cholerae*	0	0	4	2.0	1 empty	1 empty
V. parahaemolyticus	5	20.8	19	9.4	**4.9 (1.49-16.17)**	**5.1 (1.06-24.76)**
V. vulnificus	8	33.3	2	1.0	**74.67 (13.80- 404)**	**135.8 (14.32-1286.82)**
Vibrio spp.	2	8.3	10	4.9	3.7 (0.71-19.63)	7.9 (0.63-97.89)
Year						
2014	5	20.8	34	16.7	1	1
2015	0	0	34	16.7	1 empty	1 empty
2016	3	12.5	29	14.3	0.7 (0.15-3.20)	0.5 (0.07-3.07)
2017	5	20.8	26	12.8	1.3 (0.34-5.00)	1 (0.20-5.49)
2018	11	45.8	80	39.4	0.9 (0.30-2.90)	0.1 (0.01-0.50)

Vibriosis in Norway (2014-2018)



- Vibriosis cases by Norwegian county;
- Different distribution of cases by Vibrio species;

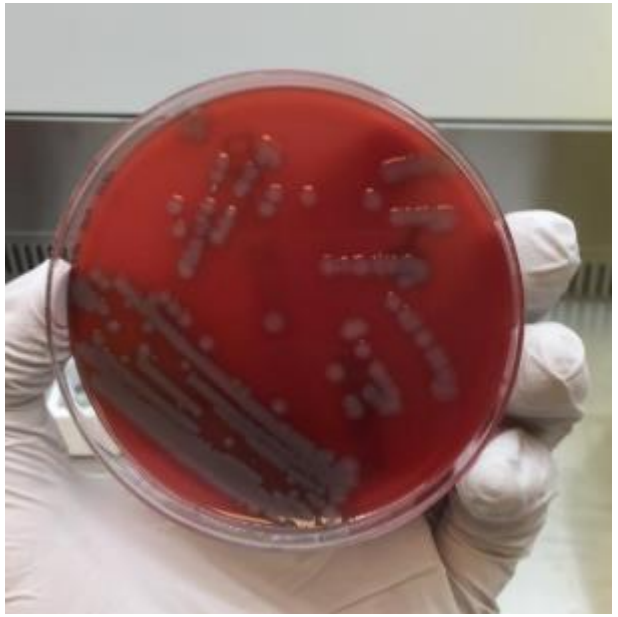


Non-toxigenic Vibrio cholerae ***Vibrio alginolyticus*** ***Vibrio parahaemolyticus*** ***Vibrio vulnificus***

Conclusions

- A **vibriosis surveillance system** is in place in Norway since June 2019 to monitor cases especially during summers and heatwaves;
- Although the low incidence rate for *Vibrio infections in Norway,* severe infections could lead to long-term medical interventions, especially in elderly and immunocompromised individuals;
- It is relevant to continue to monitor the possible impact of global warming for these pathogens in order to increase preparedness and reduce severe infections in the future.
- Due to the very short incubation period (~16h for severe infections), it is important to raise awareness among clinicians on rapid diagnosis;
- NIPH, every year before summer, publish updates in order to inform the public and population at risk providing advices on preventive measures.

Thanks for your attention!



Acknowledgments

- Norwegian Institute of Public Health
- Norwegian Medical Microbiology Laboratories
- ECDC Fellowship Programme