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Surveillance systems for non-cholera *Vibrio* and *Shewanella* infections in EU/EEA countries

Survey findings, 2025

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Survey findings, 2025



This report was commissioned by the European Centre for Disease Prevention and Control (ECDC), coordinated by Therese Westrell (Principal Expert, Food- Waterborne and Zoonotic Diseases, ECDC) and Ettore Amato (Senior Advisor, Norwegian Institute of Public Health), and produced by ECDC EPIET and EUPHEM fellows Arthur Rakover (EPIET fellow – C2024, Norwegian Institute of Public Health), Maximilian Riess (EUPHEM fellow – C2018, Public Health Agency of Sweden), Daniel Vincent Thomas López (EUPHEM fellow – C2018, Statens Serum Institut of Denmark), and Marius Linkevicius (EUPHEM fellow – C2018, Finnish Institute for Health and Welfare).

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Abbreviations

EU	European Union
EEA	European Economic Area
FWD	Food- and Waterborne Diseases
Ctx	Cholera toxin gene
CSF	Cerebrospinal fluid
EPIET	Public Health Epidemiology Path of the ECDC Fellowship Programme
EUPHEM	Public Health Microbiology Path of the ECDC Fellowship Programme
ICD	International Statistical Classification of Diseases and Related Health Problems, 10th Revision accessible at: https://icd.who.int/browse10/2016/en

Executive summary

This report provides a descriptive overview of surveillance arrangements for non-cholera *Vibrio* and *Shewanella* infections in EU/EEA countries. Warmer coastal waters are creating increasingly favourable conditions for pathogenic aquatic bacteria. The occurrence and detection of human infections from such depend on exposure patterns, population susceptibility, diagnostic practices and reporting systems. These infections can be acquired through exposure to recreational waters or the consumption of contaminated seafood.

In January 2025, an online survey was distributed to ECDC's National Focal Points for Food- and Waterborne Diseases and Zoonoses in order to collect information on surveillance systems, data sources, case definitions and plans for future implementation. Responses were received from 29 of the 30 EU/EEA countries surveyed. Six countries reported indicator-based surveillance for non-cholera *Vibrio* infections, although the scope differed: Estonia, Germany, Norway, Slovenia, and Sweden covered multiple non-cholera *Vibrio* species, while Finland reported surveillance limited to *V. parahaemolyticus*. Thirteen countries collected information through other systems, including laboratory databases, event-based surveillance (outbreak reporting) or administrative registries; these arrangements could coexist with indicator-based surveillance. Nine countries reported no surveillance or other system for these pathogens. Indicator-based surveillance for *Shewanella* infections was reported only by Norway, while nine countries collected information through other systems.

The findings demonstrate substantial heterogeneity in surveillance arrangements and case definitions across the EU/EEA. They have informed ECDC's work, in collaboration with experts from the Food- and Waterborne Diseases and Zoonoses network, to initiate voluntary EU/EEA surveillance of vibriosis. The voluntary surveillance will support the collection of comparable case-based data to improve understanding of the epidemiology, geographical distribution, risk groups and trends in vibriosis, inform prevention and public health action, and contribute to the assessment of environmental risk. Voluntary annual case reporting is planned to open in EpiPulse Cases in spring 2027, after a pilot phase in late 2026 for submission of retrospective data.

Background

Vibrio species are Gram-negative bacteria naturally found in marine and estuarine environments [1]. Among these, only toxin-producing *V. cholerae* serogroups O1 and O139 cause classic cholera disease [2,3]. The other approximately 200 serogroups of non-O1/non-O139 *V. cholerae* rarely harbour the cholera toxin gene (*ctx*) [4]. Such non-toxigenic *V cholerae* and other non-cholera *Vibrio* species (e.g. *V. vulnificus*, *V. parahaemolyticus*, *V. alginolyticus*) can cause vibriosis. Clinical manifestations range from mild gastroenteritis and otitis to serious wound infections that may lead to necrotising fasciitis and septicaemia, with a potentially fatal outcome [5–7]. *V. vulnificus* can cause severe invasive disease, particularly in people with underlying conditions; case-fatality can be high among patients with septicaemia or other severe invasive infections [8]. *Vibrio* infections are usually acquired through bathing in brackish seawater or freshwater lakes, as well as through consumption of raw or undercooked contaminated seafood, particularly raw oysters [9,10].

Shewanella species are also Gram-negative motile bacilli of aquatic habitats. Human infections caused by members of genus *Shewanella* are rare and they are mainly reported from geographical areas with temperate climate [11]. The clinical symptoms of *Shewanella* infection are generally mild and similar to those caused by most non-cholera *Vibrio* species [12]. *Shewanella* species are also known as spoilage microorganisms in marine fish and can cause gastrointestinal infections [13]. Although rare, few cases of necrotising fasciitis caused by *Shewanella* spp. have been reported in the literature, mostly in individuals with underlying health conditions and exposure to marine environments [14,15].

In recent years, the number of reported non-cholera *Vibrio* and *Shewanella* infections in the Baltic Sea region has been increasing, raising significant public health concerns [7,12]. This rise is strongly linked to higher sea surface temperatures and environmental factors such as low seawater salinity, which create favourable conditions for these bacteria to thrive [12,16–18]. During the warm summer of 2018, northern Europe experienced an important increase in vibriosis cases caused by pathogenic species such as *V. vulnificus* and *V. parahaemolyticus*, with 445 infections reported in the Baltic region (Norway, Sweden, Denmark, Finland, Poland, and Estonia), including 204 severe cases [7]. Similarly, *Shewanella* infections have been increasingly reported during warm summers or heatwaves [12,15,18].

Global warming is recognised as one of the main factors contributing to the occurrence of infectious diseases in areas where they were previously unlikely to occur [9,19,20]. Considering the global increase in seawater temperatures, the number of waterborne infections is likely to increase in the future, particularly in marine environments with favourable growth conditions, such as brackish water of estuaries, enclosed water bodies with limited circulation or other shallow shore segments with moderate salinity where bacterial concentrations can accumulate [21]. These effects highlight the need for continued and improved global surveillance of waterborne pathogens that cause human infections [20] to monitor relevant epidemiological indicators that are crucial to assess key aspects such as source of infection, route of transmission, outbreak dynamics, host susceptibility, changes in incidence, impact of prevention and control measures [7].

However, there is a notable gap in surveillance data for non-cholera *Vibrio* and *Shewanella* infections since they are not a notifiable disease in the majority of European countries [9,22]. As a result, there is a paucity of epidemiological and surveillance data regarding these pathogens at the European level, which may become increasingly relevant with continuing climate change. Additionally, a complete overview of European countries that have or plan to introduce such surveillance systems is missing. To fill these gaps, an online survey was conducted among the ECDC National Focal Points for Food- and Waterborne Diseases and Zoonoses, to collect updated information on the surveillance practices for these pathogens in the EU/EEA countries.

Methods

We developed a questionnaire using the online survey management system EU Survey (Annex 1) to collect information on the establishment or implementation of surveillance systems for non-cholera *Vibrio* and *Shewanella* infections in EU/EEA countries. Information was collected on geographical coverage, data sources, reporting requirements, surveillance design and case definitions. For this report, indicator-based surveillance was defined as the systematic collection, analysis, interpretation and reporting of structured health data using specified reporting criteria or case definitions. Laboratory databases, event-based surveillance, outbreak reporting systems and administrative registries were described separately. Because a country could use more than one source or system, these categories were not necessarily mutually exclusive.

The ECDC FWD team distributed the online questionnaire to the National Focal Points for Food- and Waterborne Diseases and Zoonoses in January 2025.

A descriptive analysis was performed to map and describe the surveillance practices for non-cholera *Vibrio* and *Shewanella* infections. Data synthesis was conducted by summarising information in tables, which detailed the characteristics of the system, case definitions, type of infections and pathogen species monitored, as well as other surveillance systems in place. Maps were generated using EMMa, the mapping tool available through the ECDC Geoportal [23].

Limitations

The survey results represent information reported by national focal points at the time of data collection. The questionnaire did not independently validate national legal provisions, surveillance coverage, case definitions or laboratory practices. Differences in how respondents interpreted terms such as indicator-based surveillance, laboratory database, comprehensiveness and event-based surveillance may therefore have affected comparability between countries.

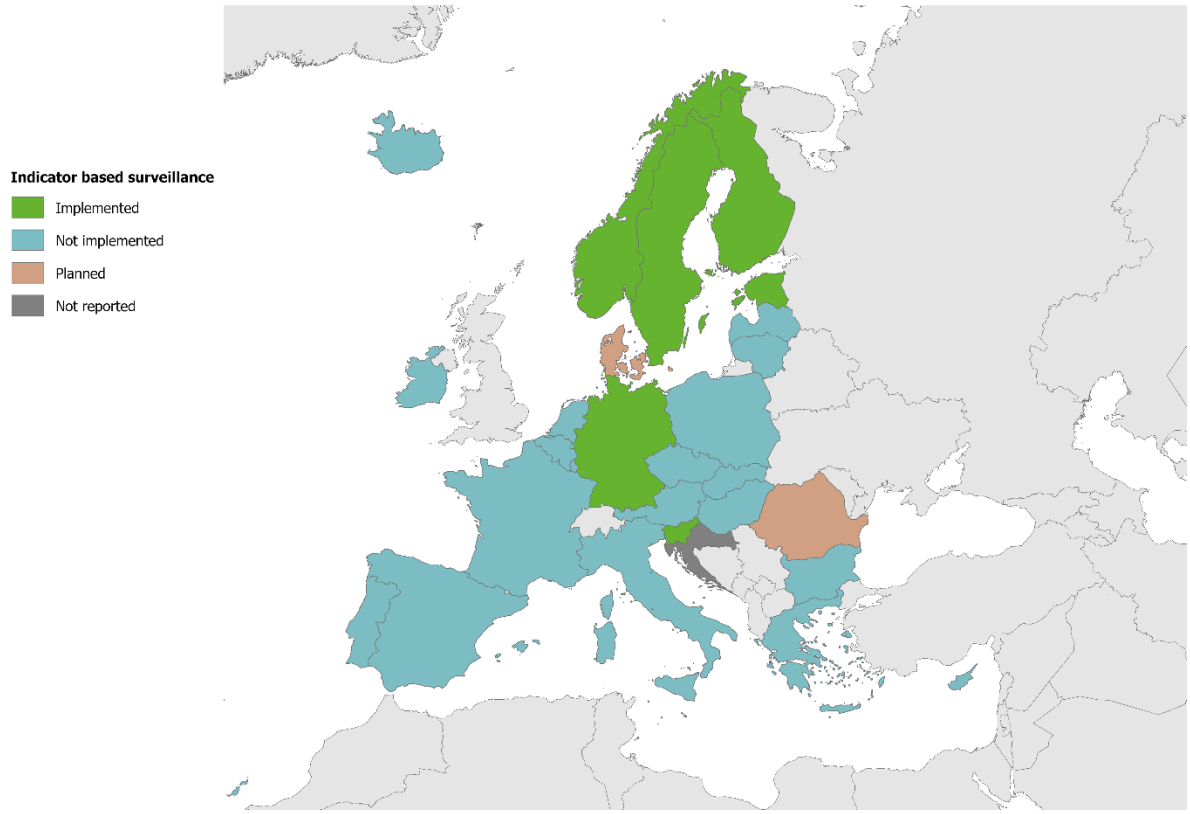
Results

Overall, 26 EU and 3 EEA countries out of the 30 EU/EEA countries surveyed responded to the questionnaire on non-cholera *Vibrio* and *Shewanella* infections, resulting to a response rate of 97%. Data from Croatia were not provided. The results of the survey are presented below.

Surveillance of non-cholera *Vibrio* spp. infections

Of the 29 responding countries, six reported indicator-based surveillance for non-cholera *Vibrio* infections: Estonia, Finland, Germany, Norway, Slovenia, and Sweden reported surveillance covering multiple non-cholera *Vibrio* species, while Finland reported surveillance limited to *V. parahaemolyticus*. Fourteen countries (including Finland for other non-cholera Vibrio infections) reported collecting information through other systems, including laboratory databases, event-based surveillance or administrative registries based on ICD-10 diagnose codes. Ten countries reported no surveillance or other system for these pathogens. Denmark and Romania reported plans to introduce surveillance of vibriosis within the next one or two years.

Figure 1. Implementation of surveillance systems for non-cholera *Vibrio* spp. infections in EU/EEA countries, 2025



Note: Finland's indicator-based surveillance is limited to V. parahaemolyticus *only.*

All six countries (Estonia, Finland, Germany, Norway, Slovenia, and Sweden) having introduced an indicator-based surveillance (Table 1) employed comprehensive surveillance methods. They all implemented a national passive surveillance design, with data reporting primarily conducted by laboratories, supplemented by physicians and hospitals in Norway, Slovenia, and Sweden.

Across EU/EEA countries, the case definition for vibriosis varies. A more detailed list is provided in Table 2.

Table 1. Characteristics of national indicator-based surveillance systems for non-cholera *Vibrio* infections implemented in six EU/EEA countries, 2025

Country	Year of introduction	Coverage	Data source	Reporting	Comprehensive-ness	Design	Data reported by
Estonia	2022	Na	Combined	Cp	Co	P	L
Finland[1]	NA	Na	Lab	Cp	Co	P	L
Germany	2020	Na	Combined	Cp	Co	P	L
Norway	2019	Na	Combined	Cp	Co	P	L; Ph; H
Slovenia	NA	Na	Combined	Cp	Co	P	L; Ph; H
Sweden	2004	Na	Combined	Cp	Co	P	L; Ph; H

[1] Finland's indicator-based surveillance system covers V. parahaemolyticus *only*
NA: not available
Coverage: Na – National, R – Regional
Data source (type of data used): Lab – Laboratory-based only, Combined – Combined clinical and laboratory data
Reporting: Cp – compulsory, V – voluntary
Comprehensiveness: Co – comprehensive, Se – sentinel
Surveillance design: A – active, P – passive
Data reported by: L – laboratories, Ph – physicians, H – hospitals

Table 2. Case definitions, type of infection and species monitored as stated by six responding EU/EEA countries with implemented indicator-based surveillance systems for reporting of non-cholera *Vibrio* cases, 2025

EU/EEA country	Type of infection	Type of species	Case definition
Estonia	All	All non-cholera *Vibrio* spp.	No case definition (under development).
Finland	Gastrointestinal infections;	*Vibrio parahaemolyticus*	A case is defined as *V. parahaemolyticus* from faecal sample, culture or PCR (or other nucleic acid detection).
Germany	All	All non-cholera *Vibrio* spp.	Cases fulfilling the reference definition (i.e. confirmed cases) need both: - clinical picture of vibriosis, defined as at least one of the following seven criteria: wound infection, sepsis, diarrhoea, vomiting, pneumonia, ear infection* or death from vibriosis, AND - laboratory evidence of vibriosis (culture). If *V. cholerae* is detected in individuals with gastroenteritis, antigen and toxin gene testing should be performed to exclude cholera. *only notifiable, if the pathogen is *V. cholerae.*
Norway	All	All non-cholera *Vibrio* spp.	Laboratory detection of *Vibrio* spp. other than toxin-producing *Vibrio cholerae* O1 or O139 by isolation from a clinical specimen or a clinically compatible case with epidemiological association. The following clinical and epidemiological criteria apply in case where no laboratory evidence is available: - clinical criteria are severe infection with necrotising fasciitis or septicaemia; - By epidemiological link is meant exposure to a common source, exposure to contaminated food or water where *Vibrio* spp. (other than toxin-producing *Vibrio cholerae* O1 and O139) is detected or considered probable.
Sweden	All	All non-cholera *Vibrio* spp.	Confirmed case: Isolation of *Vibrio* spp. other than toxin producing *Vibrio cholerae* O1 and O139 in all the sample sites.
Slovenia	Gastrointestinal infections; Bloodstream infections	All non-cholera *Vibrio* spp.	Food poisoning caused by *Vibrio parahaemolyticus* A05.3 Clinical criteria A patient with at least one of the following symptoms or signs: — diarrhea, abdominal cramps, nausea, vomiting, fever. Laboratory criteria At least one of the following two laboratory tests:

EU/EEA country	Type of infection	Type of species	Case definition
			— Isolation of *Vibrio parahaemolyticus* from stool or vomit, — Isolation of *Vibrio parahaemolyticus* at 10^5 or more CFU/g of suspected food. Epidemiological criteria — Epidemiological link to a case that is a confirmed case of food poisoning caused by *Vibrio parahaemolyticus*. Case classification: A. (Possible case (Not applicable). B. Probable case (A patient who meets the clinical and epidemiological criteria). C. Confirmed case (A patient who meets the clinical and laboratory criteria). Report: Report a probable or confirmed case.

Thirteen countries reported collecting information on non-cholera Vibrio infections through systems other than, or in addition to, the indicator-based surveillance systems described above, including laboratory databases, event-based surveillance, outbreak reporting and administrative data based on ICD-10 diagnosis codes (Table 3). Finland, which has indicator-based surveillance limited to *V. parahaemolyticus*, also reported additional arrangements for other non-cholera *Vibrio* infections. Belgium, Denmark, Finland, France, Hungary, Iceland, Italy, Latvia, Malta, Romania, Slovakia and Spain reported laboratory data or related laboratory arrangements, while Czechia reported case-based data using ICD-10 diagnosis codes. France, Hungary, Ireland, Italy, Latvia, the Netherlands and Spain also reported event-based surveillance, i.e. reporting of [foodborne] outbreaks. Austria, Bulgaria, Cyprus, Greece, Liechtenstein, Lithuania, Luxembourg, Poland, and Portugal reported having no surveillance or other systems in place for these infections.

Table 3. Other surveillance systems than indicator-based in place for detection of non-cholera *Vibrio* spp. infections in 15 EU/EEA countries, 2025

EU/EEA country	Other systems in place for non-cholera *Vibrio* infections	Description of other systems
Belgium	Laboratory databases	The national reference centre receives samples on a voluntary basis for testing and/or confirmation. The data are shared with the National Institute of Public Health (Sciensano). Point source foodborne outbreak events are mandatorily notifiable.
Czechia	Other	Case-based data are collected by the electronic reporting system (ISIN), into which vibrioses are reported under different diagnose codes of ICD-10 (e.g. diagnose code B99, where the agent can be included in a note; *Vibrio vulnificus* as a cause of diseases classified in other chapters is reported in the ISIN under the code B98.1; for reporting food poisoning caused by *Vibrio parahaemolyticus*, the diagnosis A05.3 is specified. The obligation to report infectious diseases and their suspicions (i.e. also infections with non-cholera *Vibrio*) is given by Act No. 258/2000 and the relevant implementing regulation (Decree No. 306/2012), as amended.
Denmark	Laboratory databases	A national laboratory database is in place with data from 2014. Since 2024, it is allowed to survey sea-bacteria and a laboratory-based surveillance system for *Vibrio and Shewanella spp.* is planned to be implemented.
Finland	Other	Non-cholera Vibrio infections have to be notified to National Infectious Diseases Register (NIDR) only when the isolate is from blood or if the species is *Vibrio parahaemolyticus* from any other site. Infectious disease act is currently under reform, and vibriosis data is expected to be available from national registers later on. THL's reference laboratory receives non-cholera vibrios through testing of all *V. cholerae* isolates for cholera toxin gene. Most of these turn out to be non-cholera *V. cholerae*.
France	Laboratory databases; Event-based	The national reference laboratory for vibrions receives samples for testing and/or confirmation. The data are shared with the National Agency for Public Health. Point source foodborne outbreak events are mandatorily notifiable. This is our best source of data on *Vibrio parahaemolyticus*.
Hungary	Laboratory databases; Other; Event-based	In Hungary, the type of epidemiological surveillance for *Vibrio* spp. is passive, with physicians and laboratories reporting each laboratory-confirmed case of *Vibrio* spp. to health authorities through an electronic reporting system (EMS). Since 2018 the National Center for Public Health and Pharmacy perform whole genome sequence-based typing (WGS) for clinical samples.
Ireland	Event-based	The Irish outbreak surveillance system collects information on unusual clusters of disease or changing patterns of illness and is expected to capture information on clusters or outbreaks of vibrio infections.

EU/EEA country	Other systems in place for non-cholera *Vibrio* infections	Description of other systems
Iceland	Laboratory databases	Laboratory information system (LIS) at the Department of Clinical Microbiology at Landspitali University Hospital includes information on non-cholera *Vibrio* cases detected at the laboratory in the past years. Information on non-cholera cases is available and can be retrieved from the laboratory database, upon request. However, the data are not analysed routinely.
Italy	Laboratory databases; Event-based	Our surveillance system reports also isolates of *Vibrio cholerae* non-O1 and non-O139 and other species of *Vibrio* for confirming cholera cases.
Latvia	Laboratory databases; Event-based	Epidemiological surveillance and laboratory investigation. However, *Vibrio* infections are not reportable.
Malta	Laboratory databases	Laboratory positive detection of *Vibrio cholerae* non-O1/O139 by PCR or cultures.
Netherlands	Event-based	A signaling structure is in place where events are identified and reported for risk assessment and control.
Romania	Other	Voluntary reporting by laboratories to public health authorities.
Slovakia	Laboratory databases	NA
Spain	Laboratory databases; Event-based	Registry based data on diagnose codes is available, in addition to the laboratory and the event-based surveillance.

NA: not available

Surveillance of *Shewanella* infections

Out of the 29 respondents, only Norway has an indicator-based surveillance system for *Shewanella* spp. infections in place since 2019 (Figure 2, Table 4-5), while nine countries reported using other systems, such as laboratory databases, event-based surveillance, or registries based on ICD-10 diagnosis codes (Czechia, Denmark, Finland, Iceland, Ireland, Latvia, Slovenia, Sweden, and the Netherlands) (Table 6). The remaining 19 countries reported having no surveillance system in place for *Shewanella* infections. Denmark and Estonia reported plans to introduce a surveillance system for *Shewanella* infections within the next one or two years.

Figure 2. Implementation of surveillance systems for *Shewanella* spp. infections in EU/EEA countries, 2025

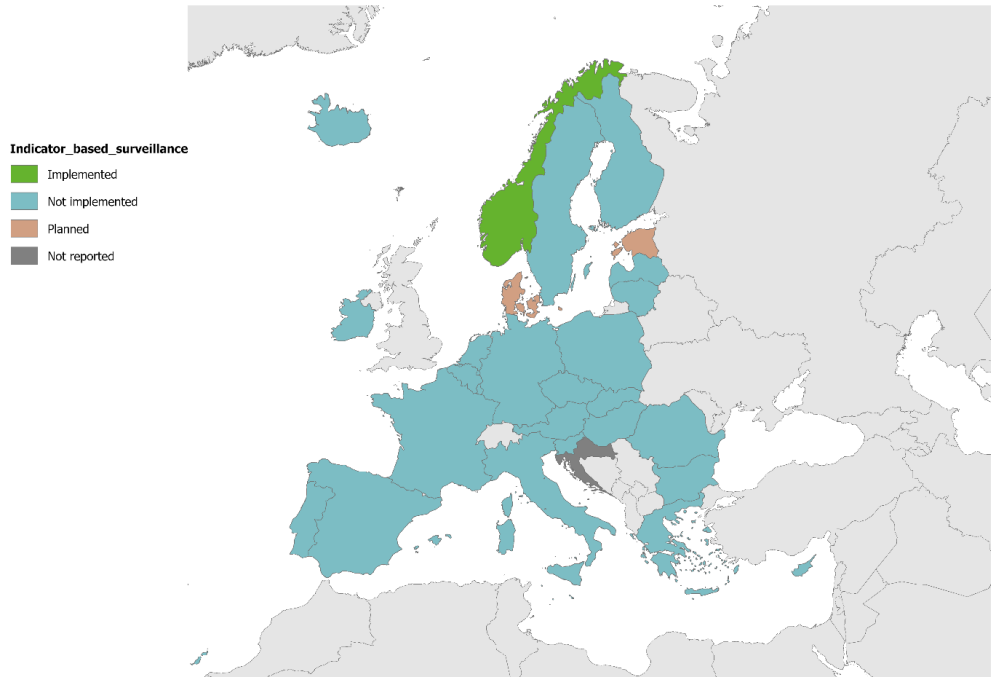


Table 4. Characteristics of national surveillance of *Shewanella* spp. infections in the one EU/EEA country with implemented indicator-based surveillance systems, 2025

Country	Indicator-based Surveillance	Year of introduction	Coverage	Data source	Reporting	Comprehensiveness	Design	Data reported by
Norway	Yes	2019	Na	Combined	Cp	Co	P	L; Ph; H

Coverage: Na – National, R – Regional
Data source (type of data used): Lab – Laboratory-based only, Combined – Combined clinical and laboratory data
Reporting: Cp – compulsory, V – voluntary
Comprehensiveness: Co – comprehensive, Se – sentinel
Surveillance design: A – active, P – passive
Data reported by: L – laboratories, Ph – physicians, H – hospitals

Table 5. Case definitions, as stated by responding countries, for reporting of *Shewanella* spp. infections in EU/EEA countries, 2025

EU/EEA country	Type of infection	Type of species	Case definitions
Norway	All	All *Shewanella* spp.	Laboratory detection of *Shewanella* spp. by isolation from a clinical specimen or a clinically compatible case with epidemiological association. The following clinical and epidemiological criteria apply in case where no laboratory evidence is available: - clinical criteria are severe infection with necrotising fasciitis or septicaemia; - By epidemiological link is meant exposure to a common source, exposure to contaminated food or water where *Shewanella* is detected or considered probable.

Among the EU/EEA countries that have not introduced an indicator-based surveillance, nine countries collect information on *Shewanella* infections through other systems. Czechia, Denmark, Finland, Iceland, Latvia, Slovenia, and Sweden rely on laboratory databases or other systems (Table 6). Ireland, Latvia and the Netherlands reported an event-based surveillance system, i.e. reporting of outbreaks. The remaining countries reported having no systems in place.

Table 6. Other systems in place for *Shewanella* spp. infections in nine EU/EEA countries, 2025

EU/EEA country	Other systems in place for Shewanella spp. infections	Description of other systems
Czechia	Other	Case-based data are collected by the electronic reporting system (ISIN), into which *Shewanella* are reported under different ICD-10 diagnose codes (e.g. B99 or A41).
Denmark	Laboratory databases	A national laboratory database is in place with data from 2014. Since 2024, surveying sea-bacteria has been permitted, and implementing a laboratory-based surveillance system for *Vibrio and Shewanella spp.* is planned.
Finland	Other	*Shewanella* spp. infections are not notifiable diseases. *Shewanella* infections have to be notified to the National Infectious Diseases Register only when the isolate is from blood.
Ireland	Event-based	NA
Iceland	Laboratory databases;	Laboratory information system (LIS) at the Department of Clinical Microbiology at Landspitali University Hospital includes information on *Shewanella* cases detected at the laboratory in the past years. Information on *Shewanella* cases is available and can be retrieved from the laboratory database, upon request. However, the data are not analysed routinely.
Latvia	Laboratory databases;	Epidemiological surveillance and laboratory investigation. However, *Shewanella* spp. infections are not reportable.
Netherlands	Event-based	NA
Slovenia	Laboratory databases	Each laboratory has its own database, but they also provide notifications to the National Institute of Public Health in case of sepsis caused by *Shewanella* spp.
Sweden	Other	Svebar, a system for surveillance of antibiotic resistance.

NA: not available

Discussion

The survey provides an updated overview of surveillance system for non-cholera *Vibrio* and *Shewanella* infections in EU/EEA countries. Five countries – Estonia, Germany, Norway, Slovenia, and Sweden – reported national indicator-based surveillance covering multiple non-cholera *Vibrio* species, while Finland reported mandatory indicator-based surveillance limited to *V. parahaemolyticus*. Denmark and Romania reported plans to introduce surveillance within the next one or two years. Indicator-based surveillance for *Shewanella* infections was reported only by Norway, while Denmark and Estonia reported plans to introduce surveillance within the next one or two years.

The scope and implementation of surveillance activities for non-cholera *Vibrio* and *Shewanella* infections are heterogeneous across the EU/EEA, reflecting diverse public health needs, priorities, and resource allocation. Some countries, particularly in the Northern European region, operate comprehensive surveillance systems that require mandatory notification, while other countries rely on less systematic approaches, such as laboratory reporting, event-based surveillance or registry surveillance based on ICD-10 diagnose codes. The ability of the systems to differentiate between locally acquired domestic and imported infections may also vary across EU/EEA countries and type of systems. No mandatory surveillance or harmonised case definitions are currently implemented at EU level.

The public health risk for non-cholera *Vibrio* and *Shewanella* infections may also vary considerably among different EU/EEA countries. The majority of domestic infections in the European Nordic and Baltic regions are related to ear and wound infections linked to recreational activities and only occasionally are gastrointestinal cases reported (7,12]. France on the other hand reported an increasing number of *Vibrio parahaemolyticus* infections associated with moderate forms of gastrointestinal infections following seafood consumption, as well as cases of non-O1/non-O139 *Vibrio cholerae* with a significant proportion of imported cases [10,24].

During recent decades, reported non-cholera *Vibrio* and *Shewanella* infections have increased in several European settings, including during the exceptionally warm summer of 2018 in northern Europe [7,12]. Increases in non-cholera *Vibrio* infections were also reported in Spain during 2012–2022 [25], and invasive infections were reported in northern Italy following the flooding in 2023 [26]. These observations illustrate how warm temperatures and extreme weather events can create environmental conditions favourable for pathogenic aquatic bacteria and can increase opportunities for human exposure. However, trends in reported infections can also be influenced by changes in diagnostic testing, clinical awareness and reporting practices.

The EFSA Scientific Opinion on 'Public health aspects of *Vibrio* spp. related to the consumption of seafood in the EU' highlights that warming coastal waters have expanded the areas in Europe where *Vibrio* spp. can proliferate. This expansion is not expected to occur uniformly: areas with brackish or low-salinity waters, including the Baltic Sea, transitional waters of the Baltic and North Seas, the Black Sea and coastal areas with substantial riverine inputs, are considered particularly suitable [10]. Since 2013, ECDC has supported preparedness through the Vibrio suitability tool [28], which uses near-real-time remote-sensing data, including sea-surface temperature and salinity, to identify environmental conditions suitable for *Vibrio* spp. [27]. Further work is ongoing to improve the tool. As it was primarily calibrated for the Baltic region in northern Europe [22], its performance should be validated for other EU/EEA marine areas, including the Mediterranean Sea. ECDC is also setting up voluntary EU/EEA surveillance of vibriosis after agreement with the FWD network. A dedicated working group on vibriosis, coordinated by ECDC, has developed surveillance objectives, a case definition, and established the metadata needed to fulfil the surveillance objectives. The voluntary surveillance will begin in 2027, following a pilot phase in late 2026.

Conclusions and potential implications

- The results of this survey are valuable for EU/EEA countries that are planning to establish surveillance systems for non-cholera *Vibrio* and/or *Shewanella* infections in the future or are considering revising case definitions within existing systems.
- The introduction or implementation of new surveillance systems for these pathogens should be evaluated based on scientific evidence, risk assessments, and public health priorities at national level.
- Surveillance or enhanced seasonal monitoring of non-cholera *Vibrio* infections can support timely risk assessment and public health action and may therefore be particularly beneficial for countries with favourable environmental conditions for *Vibrio* spp. growth and occurrence of severe cases or increasing numbers of locally acquired infections. The added value of EU-wide surveillance for *Shewanella* infections is yet to be assessed considering that only a few countries have a detection system in place. Surveillance information may also support targeted public health advice during heatwaves and other periods of increased environmental suitability. Furthermore, such information can be valuable for advising travellers about potential health risks.
- The results of the survey were presented to the FWD Network at its annual meeting in 2025. The majority of participants were in favour of establishing voluntary EU/EEA surveillance for vibriosis with a harmonised EU case definition. ECDC is taking this work further.
- Continued interdisciplinary research on non-cholera *Vibrio* and *Shewanella* spp. infections is important for improving understanding of their epidemiology, environmental drivers and burden as food- and waterborne diseases in Europe. Climate-related changes in marine and coastal ecosystems may alter the geographical distribution and seasonality of these infections. The extent to which this results in more reported cases will also depend on human exposure, population susceptibility, diagnostic practices and surveillance sensitivity.

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Annex 1. Questionnaire

Surveillance of Non-cholera *Vibrio* & *Shewanella* infections - Survey 2025

Thank you for your interest in participating in this survey. The purpose of this survey is to provide an overview of vibriosis and *Shewanella* spp. infection surveillance systems in EU/EEA countries, focusing on system characteristics, data collection practices, and case definitions. Your responses are entirely voluntary and will be kept confidential. You may withdraw from the survey at any time by contacting the survey owner, and any data collected up to that point will be removed upon request.

By selecting "**Yes**" below, you consent to participate in this survey, acknowledging that you understand the study's purpose and your rights as a participant.

☐ Yes, I agree to participate

Contact Information

Please select your country:

[Dropdown menu listing EU/EEA countries]

Contact details (e.g. email address)

Non-cholera *Vibrio* Infections

Note: All questions in this section pertain to the surveillance of non-cholera *Vibrio* infections, known as vibriosis. Therefore, cholera infections caused by toxin-producing *Vibrio cholerae* serogroups O1 and O139 are excluded.

Q1. Does your country have an indicator-based/case-based surveillance system for non-cholera *Vibrio* infections?

☐ Yes

☐ No

[If Q1 'Yes']

When was the indicator-based surveillance system established? (year) - Please enter "NA" if the data is not available.

Data source, type of surveillance and reporting practices

Coverage of surveillance system: Is it a national or regional surveillance system?

☐ National

☐ Regional

☐ I do not know

Data Source: What type of data source is used for the surveillance of non-cholera *Vibrio* infections?

- ☐ Laboratory-based only
- ☐ Combined clinical and laboratory
- ☐ Other
- ☐ I do not know

Reporting: Is the reporting of non-cholera *Vibrio* infections compulsory or voluntary?

- ☐ Compulsory
- ☐ Voluntary
- ☐ I do not know

Comprehensiveness: Is your country's non-cholera *Vibrio* infections surveillance system comprehensive or sentinel? (Note: Comprehensive covers all cases nationwide. Sentinel covers only selected locations or populations).

- ☐ Comprehensive
- ☐ Sentinel
- ☐ I do not know

Design: Is your country's non-cholera *Vibrio* infections surveillance system active or passive? (Note: Active surveillance involves the proactive collection of data (e.g., through field investigations, surveys), whereas passive surveillance relies on the routine reporting of data by healthcare providers and laboratories).

- ☐ Active
- ☐ Passive
- ☐ I do not know

Reporting roles: Which roles are required to report data to the non-cholera *Vibrio* infections surveillance system?

- ☐ Laboratories
- ☐ Physicians
- ☐ Hospitals
- ☐ Others
- ☐ I do not know

Type of infection: Which types of infections for non-cholera *Vibrio* are monitored by your surveillance system?

- ☐ Gastrointestinal infections
- ☐ Ear infections
- ☐ Wound infections
- ☐ Skin and Soft Tissue infections
- ☐ Bloodstream infections
- ☐ Other infections
- ☐ All type of infections
- ☐ I do not know

Type of species: Which types of non-cholera *Vibrio* species are monitored by your surveillance system?

- ☐ *Vibrio vulnificus*
- ☐ *Vibrio parahaemolyticus*
- ☐ *Vibrio cholerae* non-O1/O139
- ☐ All non-cholera *Vibrio* spp.
- ☐ Other
- ☐ I do not know

Case definition used: What **case definition** is employed in your country for the surveillance of non-cholera *Vibrio* infections? (Please note that ECDC has not established a definition for non-cholera Vibrio infections; the EU case definition from 2018 applies only to cholera).

[If Q1 'No']

Does your country have **other systems in place** collecting information on non-cholera *Vibrio* infections?

- ☐ Laboratory databases
- ☐ Even-based surveillance/outbreak reporting systems
- ☐ None
- ☐ Other
- ☐ I do not know

Could you please briefly describe the system?

Plan to Introduce Surveillance: Does your country intend to introduce a surveillance system for non-cholera *Vibrio* infections?

- ☐ Yes, within one year
- ☐ Yes, within two years
- ☐ Not at all
- ☐ I do not know

Shewanella Infections

All questions in this section pertain to the surveillance of *Shewanella* infections.

Q2. Does your country have an indicator-based/case-based surveillance system for *Shewanella* infections?

- ☐ Yes
- ☐ No

[If Q2 'Yes']

When was the indicator-based surveillance system established? (year) - Please enter "NA" if the data is not available.

Data source, type of surveillance and reporting practices

Coverage of surveillance system: Is it a national or regional surveillance system?

- ☐ National
- ☐ Regional
- ☐ I do not know

Data Source: What type of data source is used for the surveillance of *Shewanella* infections?

- ☐ Laboratory-based only
- ☐ Combined clinical and laboratory
- ☐ Other
- ☐ I do not know

Reporting: Is the reporting of *Shewanella* infections compulsory or voluntary?

- ☐ Compulsory
- ☐ Voluntary
- ☐ I do not know

Comprehensiveness: Is your country' *Shewanella* infections surveillance system comprehensive or sentinel? (Note: Comprehensive covers all cases nationwide. Sentinel covers only selected locations or populations).

- ☐ Comprehensive
- ☐ Sentinel
- ☐ I do not know

Design: Is your country's *Shewanella* infections surveillance system active or passive? (Note: Active surveillance involves the proactive collection of data (e.g., through field investigations, surveys), whereas passive surveillance relies on the routine reporting of data by healthcare providers and laboratories).

- ☐ Active
- ☐ Passive
- ☐ I do not know

Reporting roles: Which roles are required to report data to the *Shewanella* infections surveillance system?

- ☐ Laboratories
- ☐ Physicians
- ☐ Hospitals
- ☐ Others
- ☐ I do not know

Type of infection: Which types of infections for *Shewanella* are monitored by your surveillance system?

- ☐ Gastrointestinal infections
- ☐ Ear infections
- ☐ Wound infections
- ☐ Skin and Soft Tissue infections
- ☐ Bloodstream infections
- ☐ Other infections

☐ All type of infections

☐ I do not know

Type of species: Which types of *Shewanella* species are monitored by your surveillance system?

☐ *Shewanella putrefaciens*

☐ *Shewanella algae*

☐ All *Shewanella* spp.

☐ Other

☐ I do not know

Case definition used: What **case definition** is employed in your country for the surveillance of *Shewanella* infections?

[If Q2 'No']

Does your country have **other systems in place** collecting information on *Shewanella* infections?

☐ Laboratory databases

☐ Even-based surveillance/outbreak reporting systems

☐ None

☐ Other

☐ I do not know

Could you please briefly describe the system?

Plan to Introduce Surveillance: Does your country intend to introduce a surveillance system for *Shewanella* infections?

☐ Yes, within one year

☐ Yes, within two years

☐ Not at all

☐ I do not know

Comments

If you have additional information or would like to clarify your answers, please leave your comments here:

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