

SUPPLEMENTARY MATERIAL

Recognition of the vibriosis risk in Polish coastal waters of the Baltic Sea and public engagement in its mitigation

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ANNEX 1. Survey template.

What group of stakeholder do you represent?

1. Accommodation provider and gastronomy (incl. house rental, summer house owners,)
2. Water related activities (surfing, sailing, equipment rentals, sports schools, scuba diving, fishers)
3. Trade related to tourist services
4. Local authorities
5. NGO's
6. Others – describe what:

Q1. Have you ever heard about potentially pathogenic *Vibrio* bacteria in the Baltic Sea water?

1. yes (=> go to question Q2)
2. no (=> go to vibrio explanation and start with Q19 and onwards)
3. not sure (=> go to vibrio explanation and start with Q19 and onwards)

Q2. Where have you heard about these potentially pathogenic *Vibrio* bacteria? Mark all relevant sources (local name of vibrio)

1. Alert issued by sanitary authorities
2. Classic mass media (newspapers, magazines, TV, radio)
3. Internet, social media
4. Scientific journals (peer-reviewed)
5. Project meeting, workshop, seminar
6. From friends
7. Own research
8. From another source – indicate which:

Q3. How important is – in your opinion – the threat from *Vibrio* bacteria in the [name of the case study or country]?

1. Very important
2. Rather important
3. Neither important nor irrelevant
4. Rather not important
5. Not important

Q4. Who (including economic and social sectors) is in your opinion mostly affected by the *Vibrio* outbreaks? (multiple choice up to 3 answers)

1. Health service
2. Tourism sector
3. Fishing

4. Gastronomy
5. Insurance
6. Other – what?
7. None

Q5. Have you ever heard *Vibrio* alert in your region/specific name

1. Yes: info at the beach
2. Yes: the beach closure
3. Yes: media coverage
4. Yes: other (specify)
5. No
6. Do not know

Q6. When did it occur or when did it occur for the first time?

1. Before 2019
2. In 2019
3. In 2020
4. In 2021

Q7. Do you know what health effects for humans were pointed out?

1. There were reported infections but no hospitalization
2. There were reported infections and hospitalization
3. There were fatalities
4. I don't know, I don't remember exactly

Q8. What were the immediate reasons for the alert – where were the potentially pathogenic *Vibrio* bacteria found?

1. Seafood from the Baltic Sea
2. Bathing waters
3. Other (specify):

Q9. Do you know the organization/agency responsible for monitoring and reporting of human health?

.....

Q10. Do you think the problem of *Vibrio* will increase in the future for your region coast?

1. Yes
2. No
3. I do not know

Q11. Who (including economic and social sectors) will potentially be mostly affected by the *Vibrio* outbreaks? (multiple choice up to 3 answers)

1. Health service
2. Tourism sector
3. Fishing
4. Gastronomy
5. Insurance
6. Other – what?
7. None

Q12. How will – in your opinion – the tourism sector be affected by excessive population of pathogenic *Vibrio*?

1. Increased costs of preparing the water recreation base
2. Change of business profile

3. Reduced activity during the *vibrio* season
4. Stagnation and degradation of the sector
5. General outflow of tourists from the region
6. Other – what?
7. Will not be affected

Q13. What should be the response to an increase in pathogenic vibrio abundance?

1. Administrative exclusion of areas
2. Support for the development of a hazard mitigation method
3. Leaving the problem without seeking a solution

Q14. Have you ever heard about nature-based solutions (NBS)?

1. Yes, I have heard about it
2. No, I have not heard about it

NBS

There are indications suggesting a positive effect of system agents (e.g. seagrass, macroalgae or mussels) in reducing the multiplication of *Vibrio* bacteria. The project will determine their real impact and applicability in specific locations. Such natural methods not only can contribute to the reduction of the threats posed by pathogenic *Vibrio* but also to the improvement of the environment. At the same time, as natural solutions occurring in the area, they should not cause negative side effects.

Q15. When using coastal waters, have you noticed the existence of seagrass, mussels, or macroalgae (not to be confused with microalgae, or suspended solids)?

1. Yes
2. No
3. It doesn't matter to me

Q16. Can natural based solutions as seagrass or mussels be disruptive to coastal water use?

1. If any structures are built, it may cause restriction of space use/closure of water basins
2. Yes, their presence will be a psychological barrier for tourists
3. Yes, because seagrass, algae and mussels are negatively associated with sea bathing
4. Will not affect tourism
5. No, awareness of an effective solution to a problem can be an effective marketing tool
6. I do not know

Q17. Could these NBSs influence the use of coastal waters?

1. Yes, people usually don't want to bath with seagrass or mussels on the bottom
2. It is possible, that for some it may be a barrier
3. It is natural and people should get used to it
4. It may be a proof that the water is clean
5. Your expression:

Q18. What do you think about special zones excluded from use for tourism to protect coastal waters from excessive concentrations of *Vibrio* bacteria?

1. I'm against them. Too many areas are excluded right now
2. I understand that this may be a "sad need"
3. Clean environment is most important
4. Your expression:

Final. Thank you for your effort!

***Vibrio* spp. (If the answer to Q1 is NO or NOT SURE start here)**

Vibrio bacteria are present in all marine ecosystems and are found in coastal, estuarine, brackish and fresh waters, as well as in sediments, often in association with higher organisms. Most important potentially pathogenic *Vibrio* species are the “big four” species: *V. cholerae*, *V. vulnificus*, *V. parahaemolyticus*, and *V. alginolyticus*. These organisms are common pathogens in marine and estuarine waters, sediments or plankton, and can cause infections in humans, usually via consumption of raw or undercooked shellfish or by direct contact with marine or brackish water. Recently observed increase in water temperature in the Baltic Sea can lead to a general increase in the population density of *Vibrio* species, especially pathogenic ones. In this context, special attention should be paid to *Vibrio vulnificus*, which can cause skin infections and sepsis in humans. Although only a small number of infections are associated with *V. vulnificus*, these infections are particularly dangerous for humans as they carry one of the highest mortality rates of any bacterial pathogen.

Q19. After reading the information provided, do you think that the pathogenic *Vibrio* bacteria can currently or in the future be a problem in [name of the case study area]?

1. Yes (go to question Q20)
2. No (go to Q24)
3. I do not know

Q20. Who (including economic and social sectors) is or will potentially be most affected by the *Vibrio* outbreaks? (multiple choice up to 3 answers)

1. Health service
2. Tourism sector
3. Fishing
4. Gastronomy
5. Insurance
6. Other – what?
7. None

Q21. In your opinion how the tourism sector will be affected by excessive population of pathogenic *Vibrio*?

1. Increased costs of preparing the water recreation base
2. Change of business profile
3. Reduced activity during the *Vibrio* season
4. Stagnation and degradation of the sector
5. General outflow of tourists from the region
6. Other – what?
7. None

Q21. Do you think the problem of pathogenic *Vibrio* bacteria will increase in the future as an effect of the climate change?

1. Yes (go to Q22)
2. No (go to Q23)
3. I do not know

Q22. How important, do you think, the problem of pathogenic *Vibrio* bacteria will become in the future?

1. Very important
2. Rather important
3. Neither important nor irrelevant
4. Rather not important

5. Not important

Q23. What should be the response to an increase in pathogenic vibrio abundance?

1. Administrative exclusion of areas
2. Support for the development of a hazard mitigation method
3. Leaving the problem without seeking a solution

Q24. Do you know the organization/agency responsible for monitoring and reporting of human health?

.....

Q25. Have you ever heard about nature-based solutions (NBS)?

1. Yes, I have heard about it
2. No, I have not heard about it

NBS

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Q26. When using coastal waters, have you noticed the existence of seagrass, mussels, or macroalgae (not to be confused with microalgae, or suspended solids)?

1. Yes
2. No
3. It doesn't matter to me

Q27. Can natural based solutions as seagrass or mussels be disruptive to coastal water use?

1. If any structures are built, it may cause restriction of space use/closure of water basins
2. Yes, their presence will be a psychological barrier for tourists
3. Yes, because seagrass, algae and mussels are negatively associated with sea bathing
4. Will not affect tourism
5. No, awareness of an effective solution to a problem can be an effective marketing tool
6. I do not know

Q28. Could these NBSs influence the use of coastal waters?

1. Yes, people usually don't want to bath with seagrass or mussels on the bottom
2. It is possible, that for some it may be a barrier
3. It is natural and people should get used to it
4. It may be a proof that the water is clean
5. Your expression:

Q29. What do you think about special zones excluded from use for tourism to protect coastal waters from excessive concentrations of *Vibrio* bacteria?

1. I'm against them. Too many areas are excluded right now
2. I understand that this may be a "sad need"
3. Clean environment is most important
4. Your expression:

Final. Thank you for your effort!

NOTE:

Do you agree to be contacted during the implementation of the BaltVib project? If so, please provide contact details.

1. No, I do not want to
2. Use my e-mail for further contact:
3. Use my mobile for further contact: