

A Beach Monitoring Program Should Include all Known Prevalent Pathogens Specially *Vibrio* Spp

Karlo Malavé-Llamas^{1*}, Erica Irizarry-Pagán², Rubén Suro-Valverdi² and Gladishka Delgado-Serrano²

¹Assistant Professor and PI-URGREAT-MBRS-RISE, School of Science and Technology, UAGM-Carolina Campus, Puerto Rico

²Undergraduate Student, School of Science and Technology, UAGM-Carolina Campus, Puerto Rico

***Corresponding Author:** Karlo Malavé-Llamas, Assistant Professor and PI-URGREAT-MBRS-RISE, School of Science and Technology, UAGM-Carolina Campus, Puerto Rico.

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Beaches are composed of non-consolidated sediment located at the junction between water and land; and are generally composed of sand, sediment or rocks. From a recreational point of view, sandy beaches or *balnearios* are the most frequented by bathers. A *balneario*, by definition, has amenities; it is a specific recreational destination with features such as bathrooms, lifeguards, changing rooms, picnic tables, gazebos among others. These conveniences make the *balnearios* very alluring to locals and tourists throughout the year especially on the tropics. Therefore, it is of vital importance to maintain strict vigilance of these areas (water and sand) in order to take preventive measures and public health actions due to the presence of fecal coliforms, total coliforms and other monitored and unmonitored quality indicator bacteria. On the tropics, bathers spend more time on beaches and microorganisms are a significant component of beach water, sand and seafood. Beach water with high turbidity, the sand and marine organisms can serve as natural reservoirs or vectors of pathogenic organisms. Because beaches are exposed to anthropogenic and natural influences special actions, with respect to pollution, health risks and recovery cannot be overlook and mitigation arrangements should be taken.

Vibrio spp (Vibrionaceae family) are well known to cause diseases that if not treated can be potentially deadly. These organisms are responsible for 80,000 infections and 100 deaths per year around the world. Research studies show that *Vibrio* spp mostly grows in warm water of coastal areas. The most common *Vibrio* spp. are *V. cholera*, *V. vulnificus*, *V. parahaemolyticus* and *V. alginolyticus*, among others. These bacteria may cause diseases in people exposed to contaminated recreational waters and non-swimmers can be exposed if they ingest contaminated, raw or poorly cooked seafood or by playing on the sand. Exposure can result in gastroenteritis, necrotizing wound infections, septicemia and seafood poisoning, that if not treated can be potentially deadly. Federal law does not obligate these microorganisms to be monitored and only some States are doing so creating a gap in information and knowledge for the public and government alike. This can lead to public health problems if an overgrowth of these microorganisms is present in the beaches used by locals and tourists. Since these microorganisms are not regulated or monitored by the appropriate environmental, federal, state or local, agencies an advisory for the public cannot be made. Individuals that enter these beaches without knowing if the water is contaminated or polluted with high concentration of these microbes can be at risk of getting infections. Additionally, it is important to take into consideration that a large number of different species of mollusks are eaten worldwide, either undercooked or raw, especially in tropical islands. The water quality directly affects these animals because they are obligate or facultative filter feeders. Therefore, the mollusks (bivalves) are going to be impacted by the microbes on the water they are harvest from. Molluscan shellfish for human consumption are harvested from coastal estuaries and many receive effluent containing fecal waste of residential, municipal, agricultural or wildlife origin. The influence of sewage, anthropogenic activities and industrial discharges increase nutrients levels stimulating bacterial proliferation on sand or water and consequently on the mollusk. Each year shellfish continue to be identified as vehicles of enteric pathogens. However, many countries that harvest bivalves for human consumption do not actively monitor surface waters for evidence of contamination. The consumption of raw oysters is specifically referred to as a risk within the recommendations of the authorities. If an infection occurs, after the consumption of

raw oyster's with high concentration of pathogenic bacteria, it manifests with symptoms of gastroenteritis, including vomiting, diarrhea and abdominal pain. In addition, many of these microbes are well known to be resistant to common antibiotics used for the treatment of infections. Therefore, it is critical to understand how important it is to monitor the *balnearios* that might harbor these microorganisms and are used for recreation and to harvest food sources (bivalves).

The goal of any beach monitoring program should be to determine if the beach (water/sand/food) is safe for recreational activities and minimize possible health risks associated or linked to the *balneario*. Beach goers should always be advised that water conditions can change promptly and that the results of the beach monitoring program are not always representative of current water conditions, at best, water quality sampling can only provide results of water conditions at the time of sampling. Therefore, it is of vital importance, and should be a long-term goal, to maintain strict vigilance of these areas (water, sand and food) in order to take preventive measures and public health actions, if necessary, due to the presence of monitored and unmonitored quality indicator bacteria.

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