

Abstract

Population Health Threat of Florida Red Tide: The Intersection of Nature and Human Action

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Background:

The most intense Florida red tide (*Karenia brevis*) algal bloom in ten years occurred in October 2017 along the state's southwest coastline. Since then, the harmful algal bloom (HAB) has persisted and even resurged in August 2018, delocalizing to some regions of the Panhandle, coastal Texas, and North Carolina.

Methods:

We conducted three rounds of PubMed literature searches for papers published in the past 5 years (third round: past 10 years) to examine the degree to which the scientific, healthcare, and legislative communities are addressing this challenging public health issue.

Results:

Researchers have identified risk factors that are believed to be instrumental for initiating and sustaining HABs. These include: uncontrolled usage of fertilizers, lack of proper oversight over mineral factories in Florida, and a warming planet. Research shows that the hazardous brevetoxins, dissolved in the algae's aquatic surroundings and released as aerosols, produce both acute and chronic health effects. Associated with toxin release, investigators documented both widespread red tide-induced mortality of fish and marine life and human clinical reports of neurotoxic shellfish poisoning (NSP) and respiratory irritation. An economic model developed in 2009 estimated that the cost of red tide-associated human illnesses in Sarasota County alone ranged from \$0.5 to \$4 million depending on bloom intensity.

Conclusions:

It is imperative that stakeholders examine this environmental threat to target modifiable casual risks and to plan for a healthier future. Fortunately, efforts have been made to understand Florida residents' knowledge and health risk perceptions regarding red tide. Advances have been made in our understanding of the biochemical nature of brevetoxins. Nevertheless, research initiatives to better delineate the short-term and long-term health and socioeconomic consequences of red tide toxin exposure are lacking yet critical. Current challenges faced by various stakeholders related to mitigating this public and environmental health threat will be discussed.

Basic medical science applied in public health Clinical medicine applied in public health Environmental health sciences Occupational health and safety Protection of the public in relation to communicable diseases including prevention or control Public health biology

