Florida Red Tide Exposure: Systematic Review analyzing the respiratory effects experienced by the Gulf Coast population

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METHODS: NAVIGATION GUIDE

Data Sources
- PubMed
- Scopus
- Greenfile
- CINAHL
- Agricultural & Environmental Science Database

Exclusion Criteria
- the report did not contain original data
- the report did not quantify the brevetoxin exposure of human study populations
- the study did not speak to inhalation as the primary route of exposure for Florida red tide brevetoxin
- there was no comparator-control group
- the study did not evaluate the negative respiratory health effects experienced by the study population
- the study only analyzed respiratory effects in animal subjects.

Quality of Evidence
- Upgrading factors: Confounding minimizes effect
- Downgrading factors: Risk of bias, Imprecision

Overall Quality of Evidence: Low

Strength of Evidence
- Strength considerations: quality, direction of and confidence in effect estimate, additional compelling evidence

Overall Strength of Evidence: Inadequate

Background
- Florida red tide is a harmful algal bloom that annually occurs in the Gulf of Mexico.
- Red tide is caused by a marine dinoflagellate called Karenia brevis (K. brevis), which emits brevetoxins that can cause mass fish kills.
- Human health impacts: respiratory irritation from brevetoxin inhalation and neurotoxic poisoning from ingestion of tainted seafood.
- Agricultural runoff into the Gulf of Mexico has exacerbated this naturally occurring event.
- 4 billion people die from chronic respiratory conditions annually, of these, 180,000 of them contributed to asthma.

Study Selection
- Open cohort of asthmatics (≥ 12 years of age, history of smoking ≤ 10 years; able to walk on the beach continuously for at least 30 min; and at least 6 months residence in the Sarasota area)
- Open cohort of non-asthmatics
- Study inclusion criteria: Florida Red Tide Exposure: Systematic Review analyzing the respiratory health effects of the Gulf Coast population.
- Full text articles assessed: 129
- Records identified through database searching: 330
- Records after duplicates removed: 129
- Records screened: 129
- Records included: 97
- Reports rejected: 32

Conclusions/Recommendations
Based on our application of the Navigation Guide, we conclude that there is an inadequate evidence of correlation between red tide exposure and respiratory effects. There may be existing uncertainty, as studies did include an increase in self-reported symptoms and 2 populations who experienced decreased pulmonary function. However, the size and strength of the included studies do not independently support a significant correlation. We do not discourage further expert judgment and recommend additional research on the true short- and long-term effects of red tide on both asthmatic and non-asthmatic populations.

Limitations
- All studies conducted in a short time frame
- Same cohort of researchers conducted all studies
- Lack of diversity in study design

Strengths
- Ability to quantify respiratory effects through pulmonary function tests
- Correlation of greater risks of respiratory effects for those with asthma
- Consistency of studies

Knowledge Gaps
- Impact of regular red tide exposure over time
- Chronic diseases potentially associated with red tide exposure

Recommendations
- Future long term prospective studies
- More thoughtful management of the increased nutrients that run off into Florida waterways
- Reduce red tide presence to begin with

References
*indicates studies included in systematic review

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