Karenia brevis Red Tides: Update on human health effects and what’s next

Lorraine C. Backer
Senior Environmental Epidemiologist

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CDC AND HABS: HOW DID WE GET INVOLVED?
Pfiesteria piscicida in Pokomoke River, MD

- October 1996: fish with lesions
- April 1997: Newly-identified alga blamed for fish kills and possibly human illness
  - Dr. Joanne Burkholder, NC State
- 1998: Congress funded NCEH
- 2003, 2014, 2018: Congress renewed funding
Legacy of *Pfiesteria piscicida*

- Raised awareness of the potential impacts from overgrowth of algae in all water bodies

**Legislation**
  - Provided NOAA with funding for grants
  - Required a number of interagency reports
KARENIA BREVIS RED TIDES AND HUMAN HEALTH: WHAT DO WE KNOW?
Karenia brevis red tide-related illnesses

- Foodborne
  - Neurotoxic shellfish poisoning
    - Self-limiting disease with GI and neurologic symptoms
    - Milder version of ciguatera fish poisoning?
  - Some evidence of accumulation in fin fish
What’s the risk?

• Risk for NSP is low because of ongoing monitoring
  – Victims likely to be visitors or non-English speakers
Brevetoxins: Airborne Public Health Risk

- Respiratory complaints during Florida red tides
  - Music (1972)
- 12 out of 15 asthmatics reported attacks after beach exposure
  - Asai et al. (1982)
- Scientists on red tide research cruise complained of shortness of breath and/or difficulty taking a deep breath
  - Kirkpatrick (2001)
Karenia brevis red tide-related illnesses

• Studies of aerosol exposures
  – Brevetoxin-induced respiratory irritation
    • Symptoms more severe in people with asthma

• People take action to protect themselves
What’s the risk?

• Risk for respiratory effects from aerosols ongoing during bloom events
  – People with asthma may experience lingering effects
Karenia brevis red tide-related illnesses—marine mammals

- Poisonings via food web
  - 2004 dolphin mortality in the Florida Panhandle
- Adverse respiratory effects
  - 2003 Florida manatee rescue

Courtesy of Florida Fish & Wildlife Conservation Commission

Courtesy of Lori Schwacke
*Karenia brevis* red tide-related illnesses—fish

- Poisonings

Photo by Lorrie Backer
What’s the risk?

• Loss of threatened and/or endangered animal populations
• Ecosystem damage
GAPS IN OUR KNOWLEDGE
What’s missing?

• Foodborne
  – What are the long-term health risks from NSP?
  – What are the health risks from eating contaminated finfish?
What’s missing?

• Aerosols
  – What are the long-term health risks?
    • Healthy populations
    • People with underlying conditions
      – Asthma
What’s missing?

- Contaminated recreational waters
  - Are there health risks?
  - Are there susceptible populations?
What’s missing?

• Regulatory requirements
  – How much brevetoxin in recreational waters is OK?
  – Are there susceptible populations?
OPPORTUNITIES
Interagency Actions

• Consider public health in local jurisdiction laws and regulations

• Community engagement in protecting resources
Public Health Actions

• Epidemiologic studies: CDC

• Aerosols from cyanobacterial blooms: Exposures and health effects in a highly exposed population
  • Biological specimens for exposure and effects
  • Symptom surveys for health outcomes
  • Environmental samples to assess exposure
Public Health Actions

• One Health Harmful Algal Bloom System (OHHABS)
  – Encourage states to report human and animal illnesses and environmental information about the bloom

www.cdc.gov/habs
Public Health Actions

• Other sources of health data
  – Sentinel animals
  – Hospital discharge data
  – National Poison Data System
Community Actions

- Community participation
- Citizen science
Analytic Methods

• Toxins in biological media
  – Animals and people
  – Bench studies
  – CLIA certification for clinical tests

• Toxins in environmental samples
  – Technology transfer to State Public Health Laboratories
Education and Outreach

Physician Reference

Blue-green Algae Blooms
When in doubt, it's best to stay out!

What are blue-green algae?
Cyanobacteria, sometimes called blue-green algae, are microscopic organisms that live in all types of water.

What is a blue-green algae bloom?
Blue-green algae grow quickly, often blooming when the water is warm, slow-moving, and full of nutrients.

What are some characteristics of blue-green algae blooms?
Algae usually bloom during the summer and fall. However, they can bloom anytime during the year. When a bloom occurs, scum might form on the water's surface. Blooms can be many different colors, from green or blue to red or brown. When the bloom dies off, you might smell something similar to rotten plants.

What is a toxic bloom?
Sometimes, blue-green algae produce toxins. The toxins can be present in the algae or in the water.

Other important things to know:
Swallowing water that has algae or algal toxins in it can cause serious illness. Dogs might have more severe symptoms than persons, including collapse and sudden death after swallowing the contaminated water while swimming or after licking algae from their fur.

To report a blue-green algae bloom or related health event:
Call your local or state health department.

For more information:
http://www.cdc.gov/hab/links.htm
Call the National Center for Environmental Health Harmful Algal Blooms Program (HABISS), Centers for Disease Control and Prevention: 866-550-6544

Veterinarian Reference

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You cannot tell if a bloom is toxic by looking at it.
Summary of Priorities

• Interagency actions
• Conduct epidemiologic studies
• Understand the public health implications
• Engage local communities
• Develop and enhance analytic methods
• Education and outreach
Thank you.