Harmful Algal Blooms and Public Health Surveillance: The One Health Harmful Algal Bloom System (OHHABS)

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Harmful Algal Blooms (HABs)

- **Algal bloom** – visible colony of photosynthetic organisms
  - Occur in warm, nutrient-rich waters
  - Emerging public health and environmental issue

- **HABs** – adversely affect humans, animals, and the environment
  - Economic (e.g., beach closures, shellfish harvest closures)
  - Ecologic (e.g., oxygen depletion, sunlight deprivation)
  - Health (e.g., human and animal illnesses)
HABs are a One Health Issue

- **One Health**
  - Human health is connected to animal health and the environment
  - Animals are also susceptible to HABs, and animal illnesses can serve as early indicators of algal bloom toxicity
  - Cooperation among human health, animal health, and environmental health communities will be critical
HABs as an Emerging Public Health Issue

Questions include:

- Frequency and geographic distribution
  - How many cases of illness annually? Where? When?
- Case definitions
  - What are the symptoms of HAB-related illness?
  - How to interpret the clinical, epidemiological, and environmental data?
- Risk factors
  - How do factors such as age, route of exposure, and immune status affect susceptibility?
- Prevention efforts—needs? impacts?

Surveillance can help to answer these questions

- The ongoing, systematic collection, analysis, and interpretation of outcome-specific data for use in the planning, implementation, and evaluation of public health practice.
HAB-related Illness Reporting Systems in the U.S.

National Outbreak Reporting System (NORS)
- Web-based
- Outbreak data (≥ 2 human illnesses)
- Foodborne and waterborne HABs

2009-present
Overview of the NORS Reporting Process

1. People exposed to an infectious/non-infectious pathogen
2. Health departments notified of possible outbreaks
3. People get sick, may seek treatment
4. CDC checks data for accuracy and analyzes
5. Health department enters outbreak data into NORS
6. Health department conducts outbreak investigation
7. Data summarized and published
HAB-related Illness Reporting Systems in the U.S.

**National Outbreak Reporting System (NORS)**
- Web-based
- Outbreak data (≥2 human illnesses)
- Foodborne and waterborne HABs

**2009-present**

**2009-2013**

**Harmful Algal Bloom-related Illness Surveillance System (HABISS)**
- HABs, human cases, & animal cases
- Enhanced surveillance in select number of states
- System is no longer open to receive data
Great Lakes Restoration Initiative (GLRI)

- CDC funded since 2013 by the Great Lakes Restoration Initiative (GLRI) to expand public health surveillance
  - Build state and regional public health capacity related to harmful algal blooms & ambient waterborne disease in the Great Lakes
  - Engage in state and federal partnerships, data and information sharing
  - Collect better data to assess Great Lakes ecosystem health & GLRI project impacts

- Project activities include building a web-based reporting system for harmful algal bloom-related health events
<table>
<thead>
<tr>
<th>System</th>
<th>Period</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Outbreak Reporting</td>
<td>2009-present</td>
<td>Web-based, outbreak data (≥ 2 human illnesses), foodborne and waterborne</td>
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<tr>
<td>System (NORS)</td>
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<td>HABs</td>
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<td></td>
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<td>Harmful Algal Bloom-related Illness Surveillance System (HABISS)</td>
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<td></td>
<td>2009-2013</td>
<td>HABs, human cases, &amp; animal cases, enhanced surveillance in select number</td>
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<tr>
<td></td>
<td></td>
<td>of states, system is no longer open to receive data</td>
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<tr>
<td>One Health Harmful Algal Bloom</td>
<td>2015-present</td>
<td>HABs, human cases, &amp; animal cases</td>
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<tr>
<td>System (OHHABS)</td>
<td>(pilot)</td>
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</table>
One Health Harmful Algal Bloom System (OHHABS)

- Electronic web-based reporting system
  - Harnesses HABISS and NORS components
  - Voluntary reporting by states after investigation completed
  - Passive surveillance (no active search)
  - Event-based reporting (not routine water monitoring)

- One Health reporting – HABs, human cases, and animal cases
  - HABs: (e.g., location, bloom information, health advisories, sample testing)
  - Human and animal cases: (e.g., exposure, symptoms, clinical testing)

- Multiple Scenarios
  - Waterborne and foodborne illnesses
  - Fresh water and marine water settings

- Great Lakes focus → NORS platform → nationally available
OHHABS Development Timeline

Fall 2013
- Initial Funding

Jan. 2014
- OHHABS working group started
- NOAA sponsored workshop
- IT work started (Oct. 2014)

Mar. 2014
- Case and event definitions finalized

May 2015
- Form content finalized
- OHHABS pilot launch

Aug. 2015
- OMB – Data collection approved
- Training resources and outreach

2016
- System launch (target)
Surveillance Partnerships

- Internally at CDC
- Externally with state and federal partners

HAB Expertise
NORS Expertise

CDC

State Agencies
Federal Agencies

OHHABS
OHHABS Working Group

[Map of the United States with stars marking HAB Working Group States]

Logos of various organizations including FDA, EPA, NOAA, CDC, ATSDR, and USGS.
OHHABS Working Group Surveillance Materials

- **Reporting Criteria**
  - HAB event definition (suspected, confirmed)
  - Human case definition (suspected, probable, confirmed)
  - Animal case definition (suspected, probable, confirmed)

- **Reporting Forms**
  - Environmental form
  - Human case form
  - Animal case form

- **Reporting guidance**
  - (in draft)
What Can Be Reported to OHHABS

- Human Form
- Animal Form
- Environmental Form

- Crossed out to indicate unreportable or non-reportable categories.
OHABS Pilot Interface—Home Page

OHABS - One Health Harmful Algal Bloom System

All Reports

Search Reports

Type CDC or State Report ID: 
Select state(s):
CDC
Alabama
Alaska
Arizona
Arkansas
Select Report Date Created:
From: 
To: 
Type Water Body or Location: 

Search

View and Select Reports

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<tr>
<th>CDC Report ID</th>
<th>State Report ID</th>
<th>Reporting State &amp; Location</th>
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<th>Report Author</th>
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<td>11/09/15</td>
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<td>Michigan Saginaw Bay</td>
<td>09/16/15</td>
<td>JYu</td>
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Actions

Create New Report
Download Report Data

NORS

Go to NORS

Resources

Contact us
Pilot Guidance
OHHABS Pilot Interface—Report Summary Page

OHHABS - One Health Harmful Algal Bloom System

Go to:  All Reports
State Report ID: EPA_Test

CDC Report ID: 17  Report Author: JYu  Report Creation Date: 10/22/2015  Status: Active

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<tr>
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<th>Author:</th>
<th>Actions:</th>
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<td>EPA_Test</td>
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<td>10/1/2015</td>
<td>JYu</td>
<td>Create New Form:</td>
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<tr>
<td>Human1</td>
<td></td>
<td>10/01/2015</td>
<td>JYu</td>
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Welcome, VR Roberts
Logout
HABs are a One Health Issue

- **One Health**
  - Human health is connected to animal health and the environment
  - Animals are also susceptible to HABs, and animal illnesses can serve as early indicators of algal bloom toxicity
  - Cooperation among human health, animal health, and environmental health communities will be critical
  - Health surveillance for HAB-related illness relies on more than traditional infectious disease or human illness surveillance partnerships
Challenges=Opportunities

- Include
  - Local and state resources/capacity for surveillance, water monitoring, investigation, and reporting
  - Clinical diagnostic tests for algal toxin exposures (e.g., urine)
  - Refined case definitions (clinical and environmental data)
  - Increased awareness of HAB-related illnesses (e.g., general public, clinicians)
  - National health-based regulations and guidelines for drinking water and recreational water exposures
  - New and improved tools to facilitate data collection and analysis
  - Optimization of environmental and health databases (e.g., data linkages)
  - Multidisciplinary partnerships, training and communication resources
Next Steps

- OHHABS launch
- New CDC Harmful Algal Bloom informational website
- For more information about OHHABS
  - NORSWater@cdc.gov
Harmful algal blooms (HABs) are the result of certain aquatic organisms becoming too abundant in water bodies, often due to excessive nutrients from runoff. These blooms can affect humans, animals, and the local ecology. A HAB can look like foam, scum, or mats on the surface of the water and can be different colors. HABs can produce toxins that have caused a variety of illnesses in people and animals. HABs can occur in warm fresh, marine, or brackish waters with abundant nutrients and are becoming more frequent with climate change.

GENERAL INFORMATION

ILLNESS & SYMPTOMS

SOURCES OF EXPOSURE & RISK FACTORS

PREVENTION & CONTROL

Coming Soon!
Acknowledgements

- Great Lakes Restoration Initiative (GLRI)
- HAB Working Group
  - States
    - AZ, FL, IL, IN, IA, KS, MD, MA, MI, MN, NY, OH, OR, SC, VA, WA, WI
  - Federal Partners & Other
    - ATSDR, EPA, FDA, IJC, NOAA, NPS, USGS
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  - Mary Wikswo
- Northrop Grumman
  - Brian Gress
  - Beatrice Kiwanuka
  - Irina Pyrkh
  - Don Wade
  - LaRae White
Thank you!

NORSWater@cdc.gov

For more information please contact Centers for Disease Control and Prevention

1600 Clifton Road NE, Atlanta, GA 30333
Telephone: 1-800-CDC-INFO (232-4636)/TTY: 1-888-232-6348
Visit: www.cdc.gov | Contact CDC at: 1-800-CDC-INFO or www.cdc.gov/info

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