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

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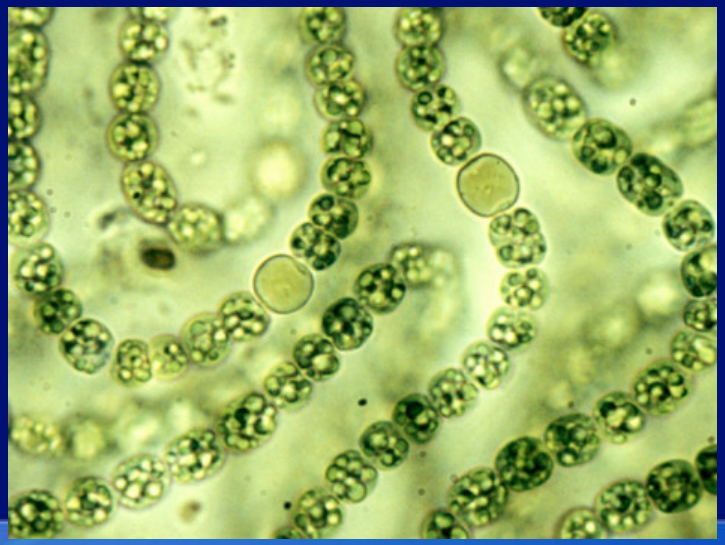
Division of Foodborne, Waterborne, and Environmental Diseases

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)



Source: CA Water Boards - Cyanobacteria

Source: UCSB Biolum - Dinoflagellate

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.

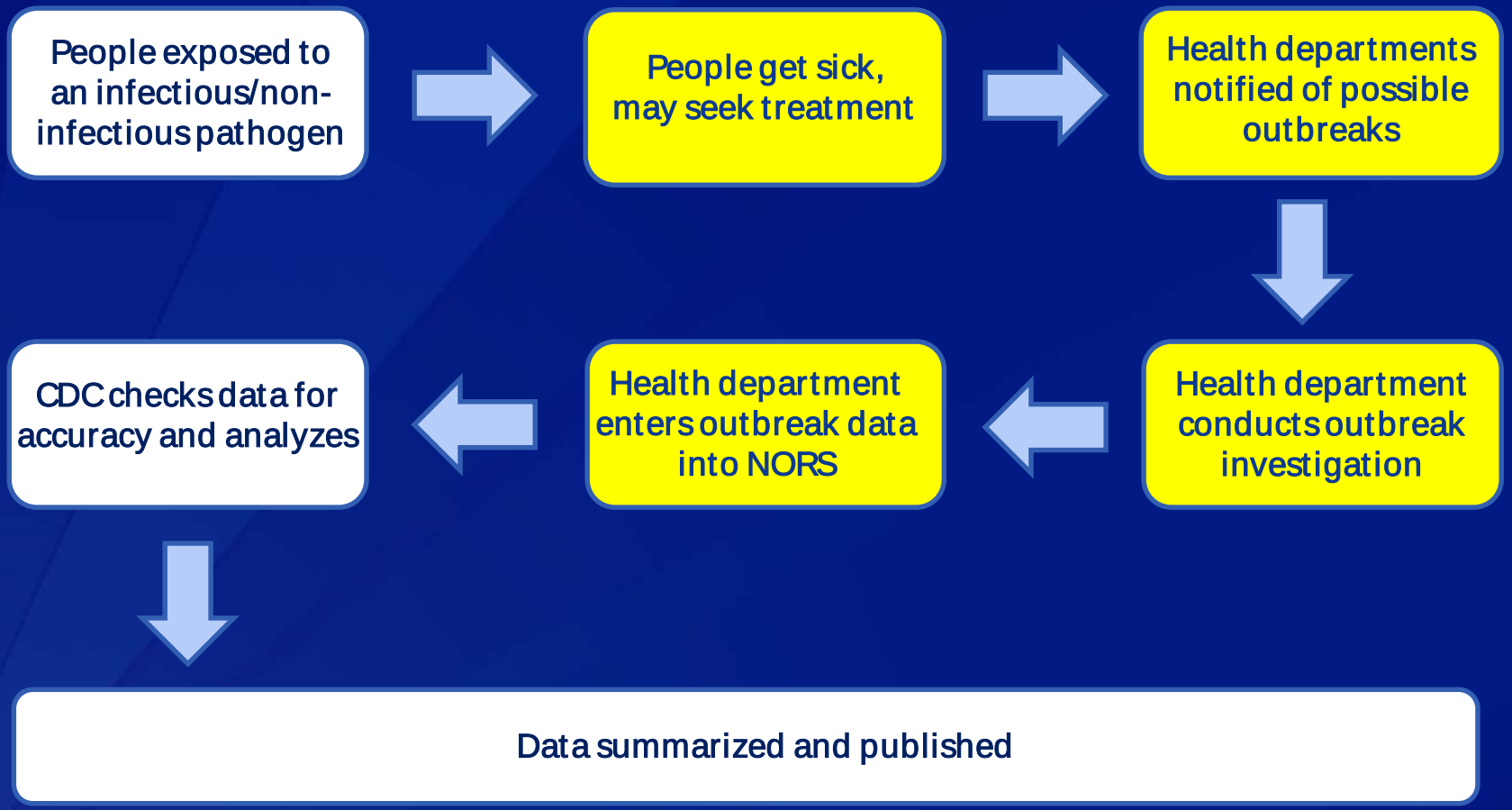
HAB-related Illness Reporting Systems in the U.S.

National Outbreak Reporting System (NORS)

- Web-based
- Outbreak data (≥2 human illnesses)
- Foodborne and waterborne HABs

2009-present

Overview of the NORS Reporting Process



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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

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One Health Harmful Algal Bloom System (OHHABS)

- HABs, human cases, & animal cases

2015-present (pilot)

2009-2013

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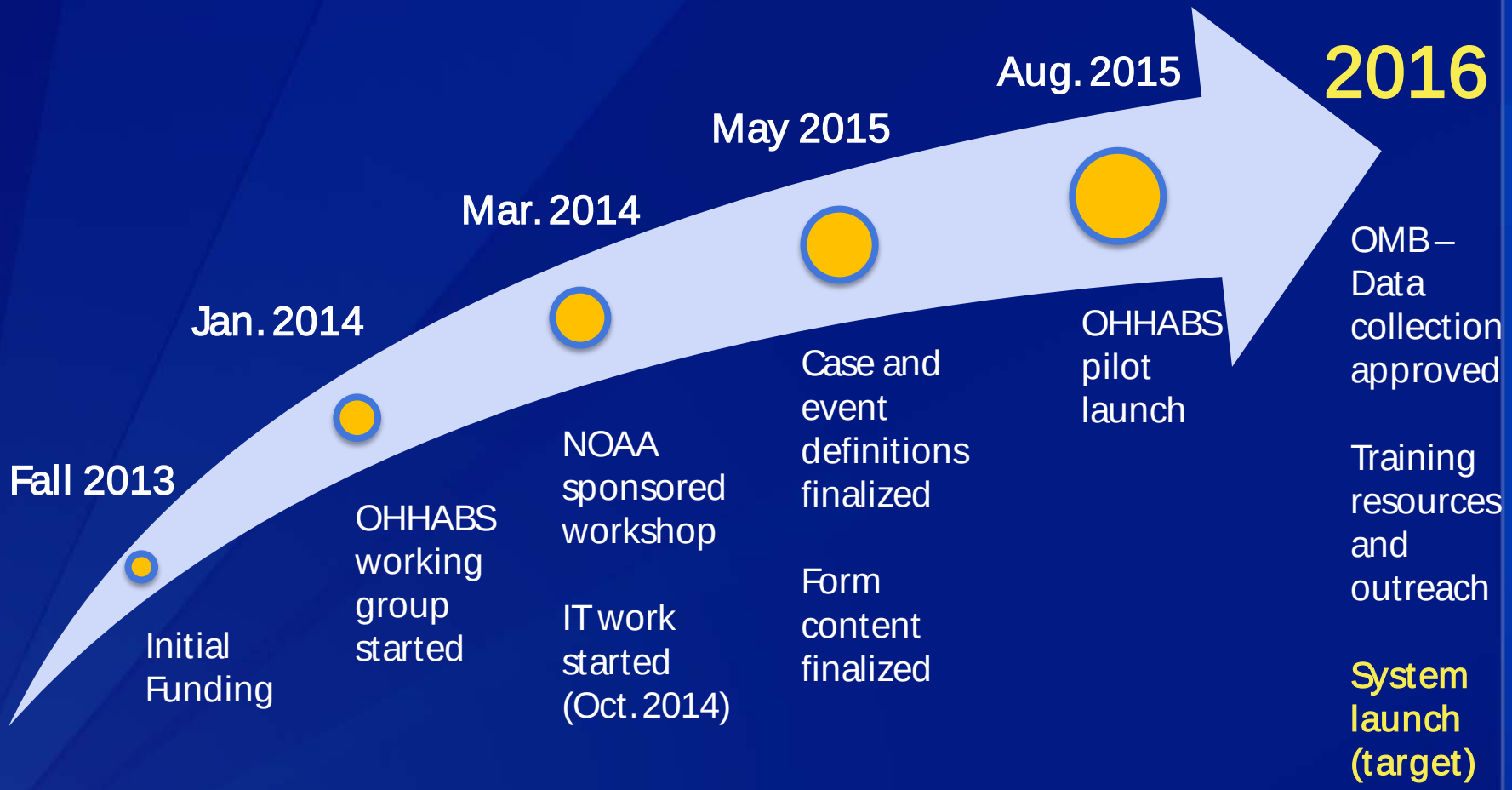
One Health Harmful Algal Bloom System (OHHABS)

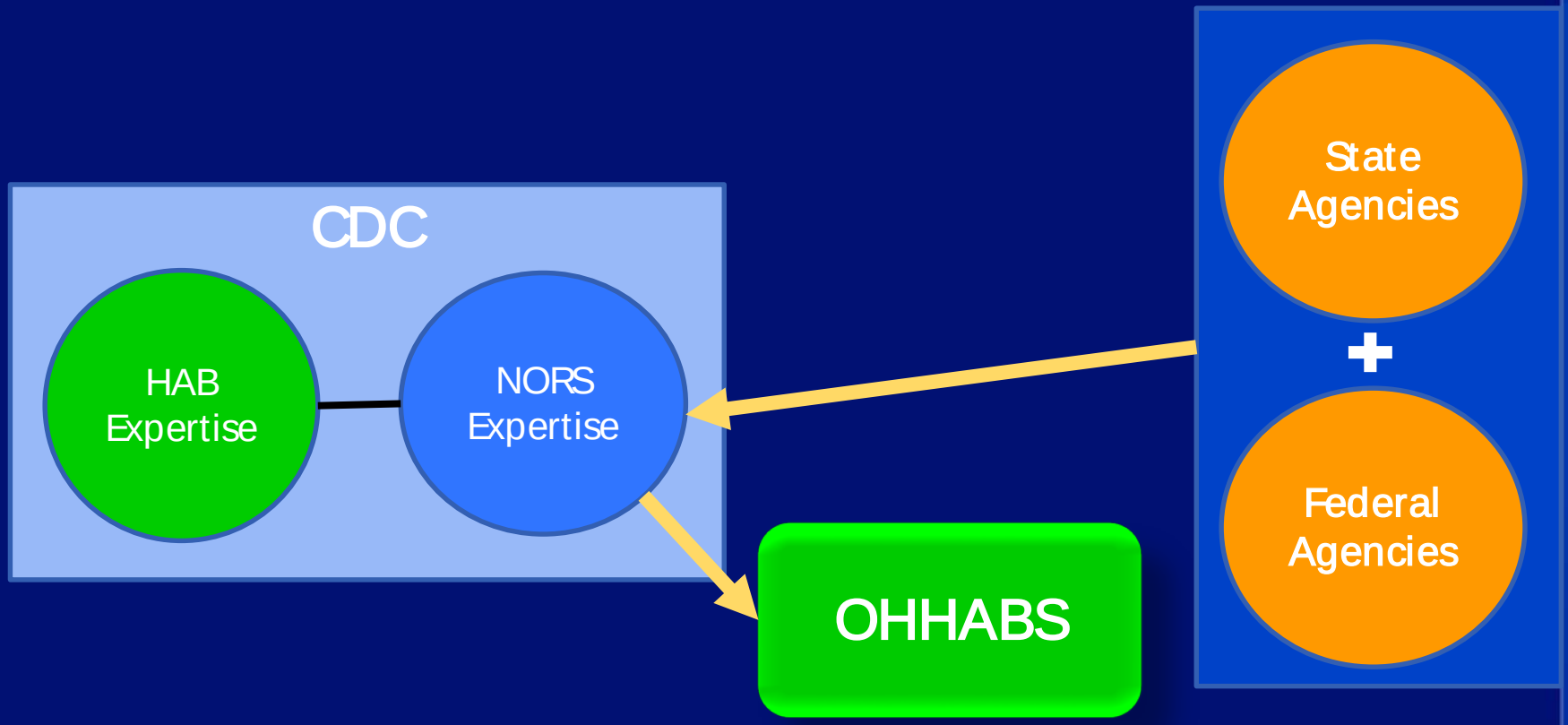
- Electronic web-based reporting system
  - Harnesses HABISS and NORS components
  - Voluntary reporting by states after investigation completed
  - Passive surveillance (no active search)
  - Event-based reporting (not routine water monitoring)
- One Health reporting – HABs, human cases, and animal 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

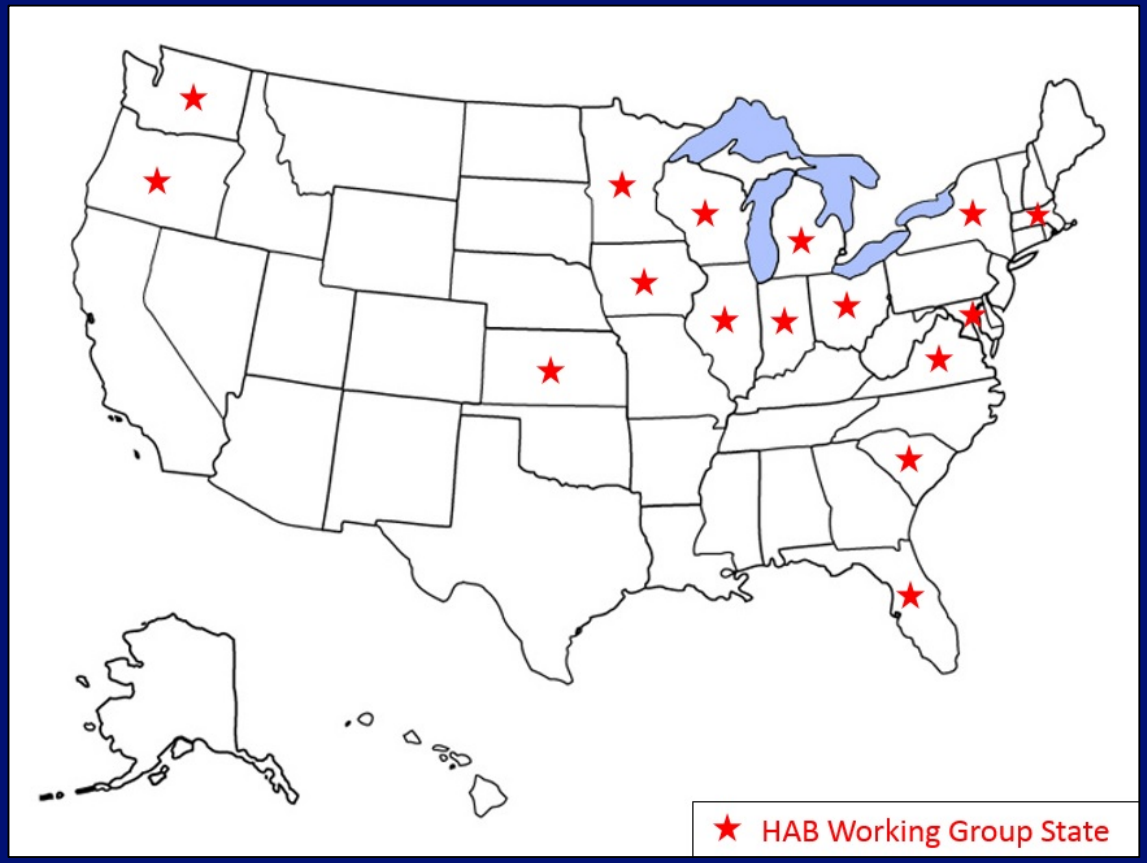


Surveillance Partnerships

- Internally at CDC
- Externally with state and federal partners



OHHABS Working Group

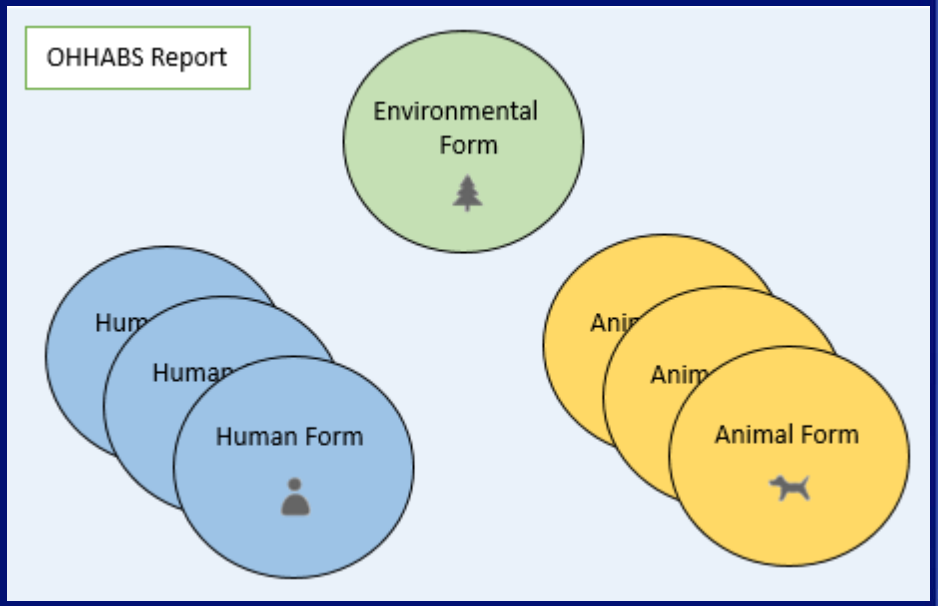


U.S. Department of Health and Human Services
Agency for Toxic Substances and Disease Registry

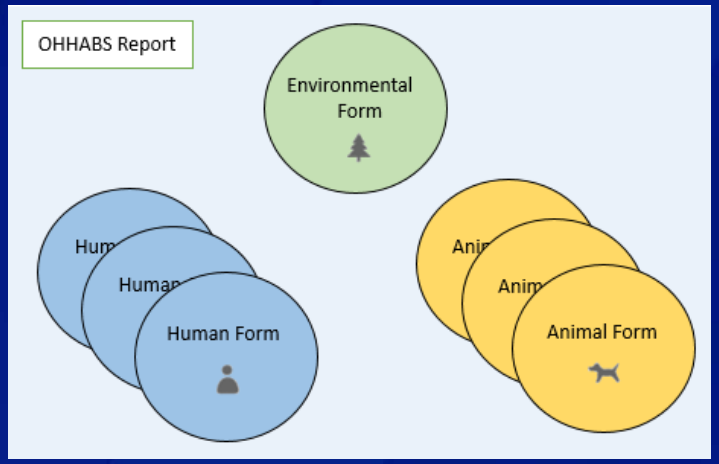
science for a changing world

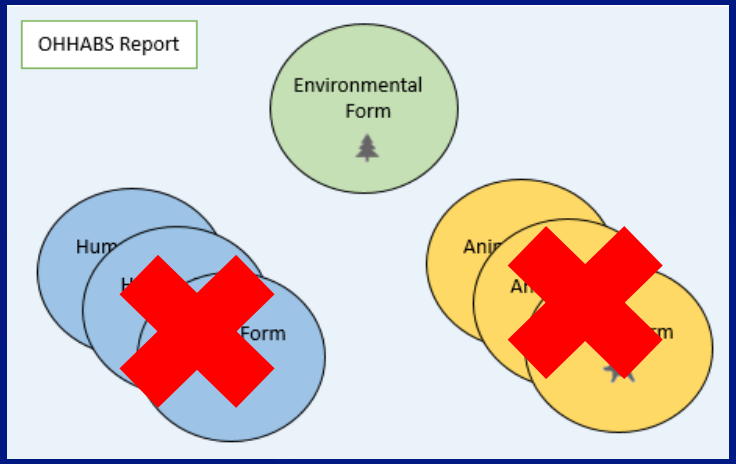
OHHABS Working Group Surveillance Materials

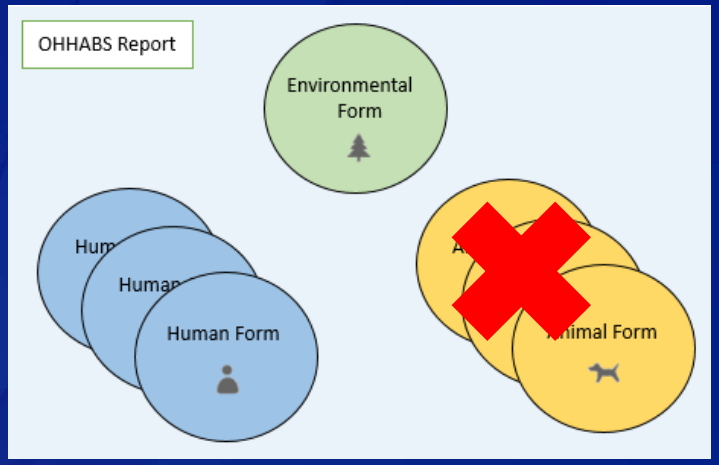
- **Reporting Criteria**
  - HAB event definition (suspected, confirmed)
  - Human case definition (suspected, probable, confirmed)
  - Animal case definition (suspected, probable, confirmed)
- **Reporting Forms**
  - Environmental form
  - Human case form
  - Animal case form
- **Reporting guidance**
  - (in draft)

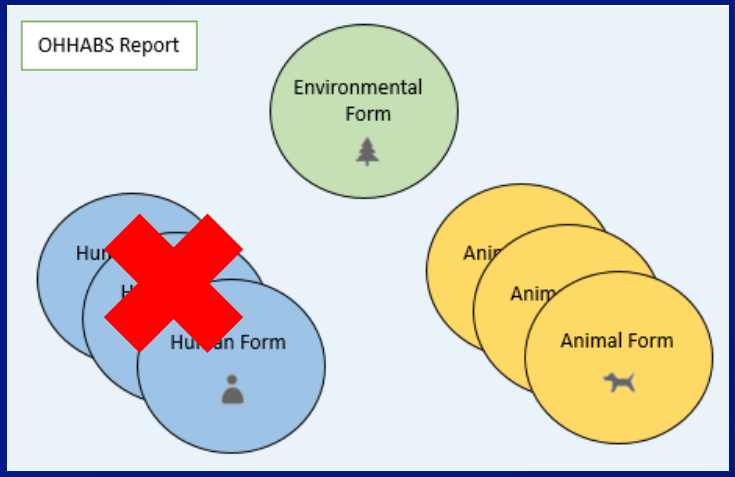


What Can Be Reported to OHHABS

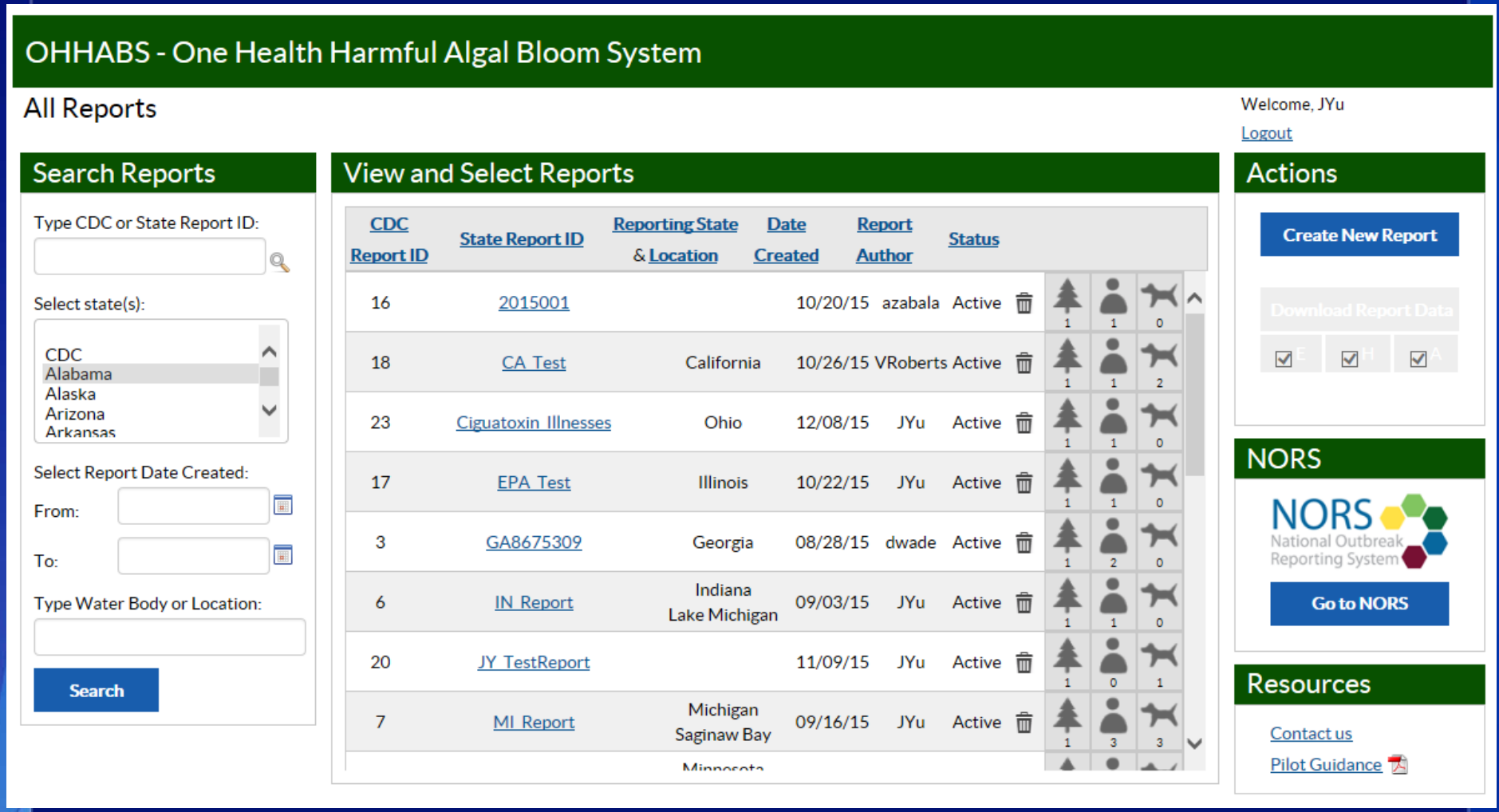




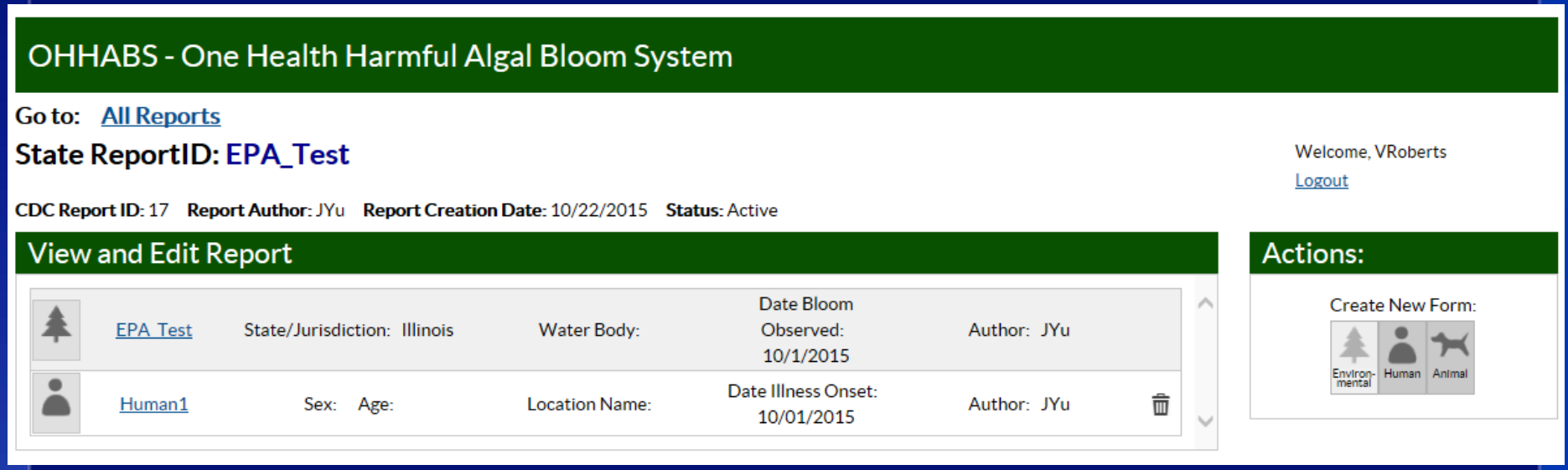




OHHABS Pilot Interface—Home Page



OHHABS Pilot Interface—Report Summary Page



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  - 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

CDC Website

CDC Centers for Disease Control and Prevention
CDC 24/7: Saving Lives, Protecting People™

SEARCH

CDC A-Z INDEX

Harmful Algal Bloom-Associated Illnesses

Coming Soon!

Harmful algal blooms (HA[illegible]) are the [illegible] of algae that can cause harm to animals, people, or the local ecology. A HAB can look like foam, scum, or mats on the surface of 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.

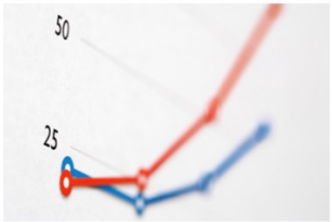
GENERAL INFORMATION

ILLNESS & SYMPTOMS

SOURCES OF EXPOSURE & RISK FACTORS

PREVENTION & CONTROL

Publications, Data, & Statistics



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Thank you!

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