Minnesota's experience with human and animal illness investigations and state interagency HAB workgroup collaboration

EPA Region 5 SWDA/CWA Workshop
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Minnesota Pollution Control Agency

MDH Minnesota Department *of* Health

State of Minnesota Roles

Pollution Control Agency

- Clean Water Act responsibilities
  - Ensuring the waters of the state are fishable and swimmable
  - Standards development
  - Monitoring and assessment
- Response to public complaints regarding nuisance conditions/spills

Department of Health

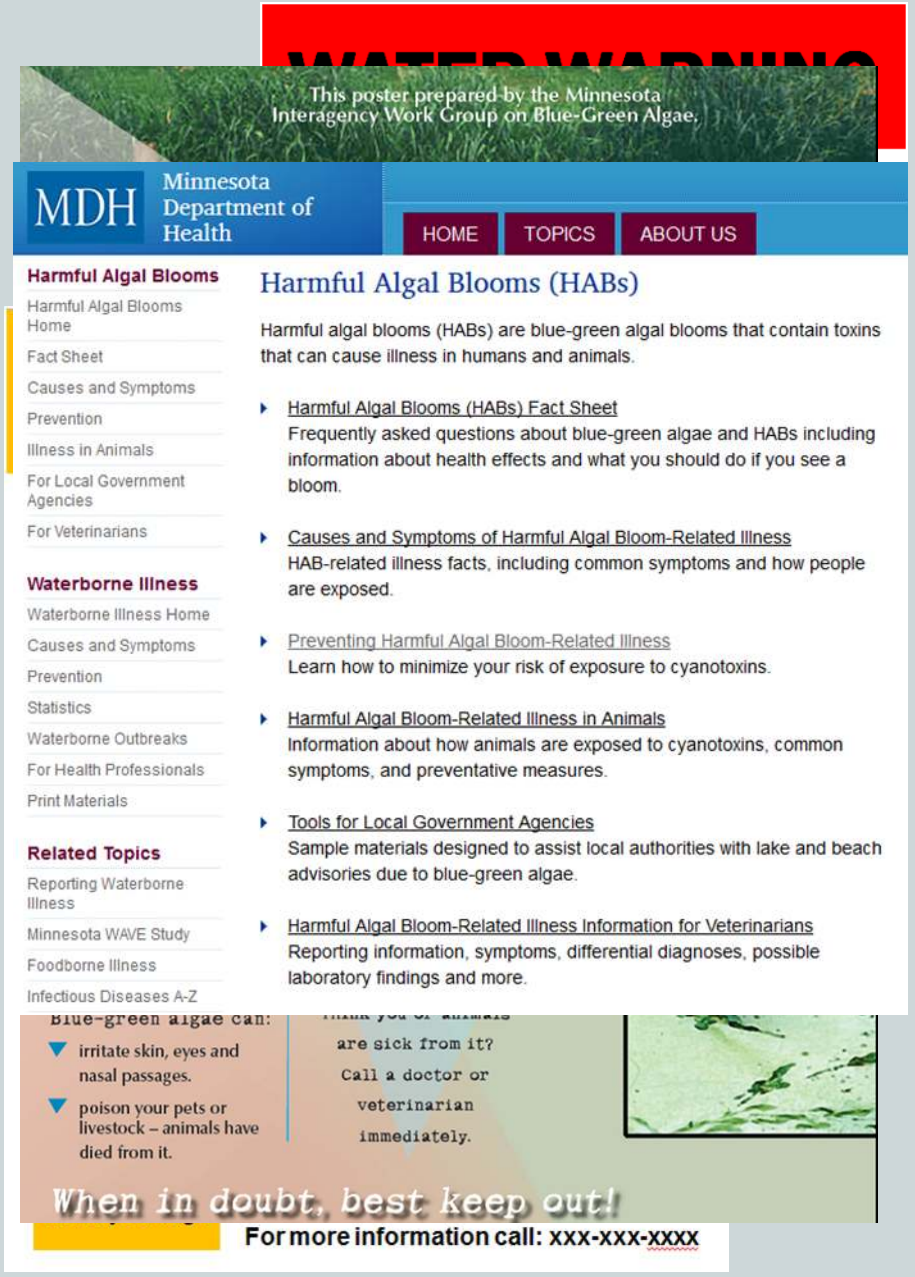
- Safe Drinking Water Act responsibilities
  - Ensuring a safe drinking water supply
  - Standards development
  - Monitoring, inspection, and design
- Response to public notifications of human illness

Development of a collaborative workgroup

- After a string of animal deaths in 2004, state agencies and veterinary groups came together to form an interagency team.
- Focus was to communicate with each other, develop a shared understanding, and work to better educate the public

Collaboration & Public Outreach

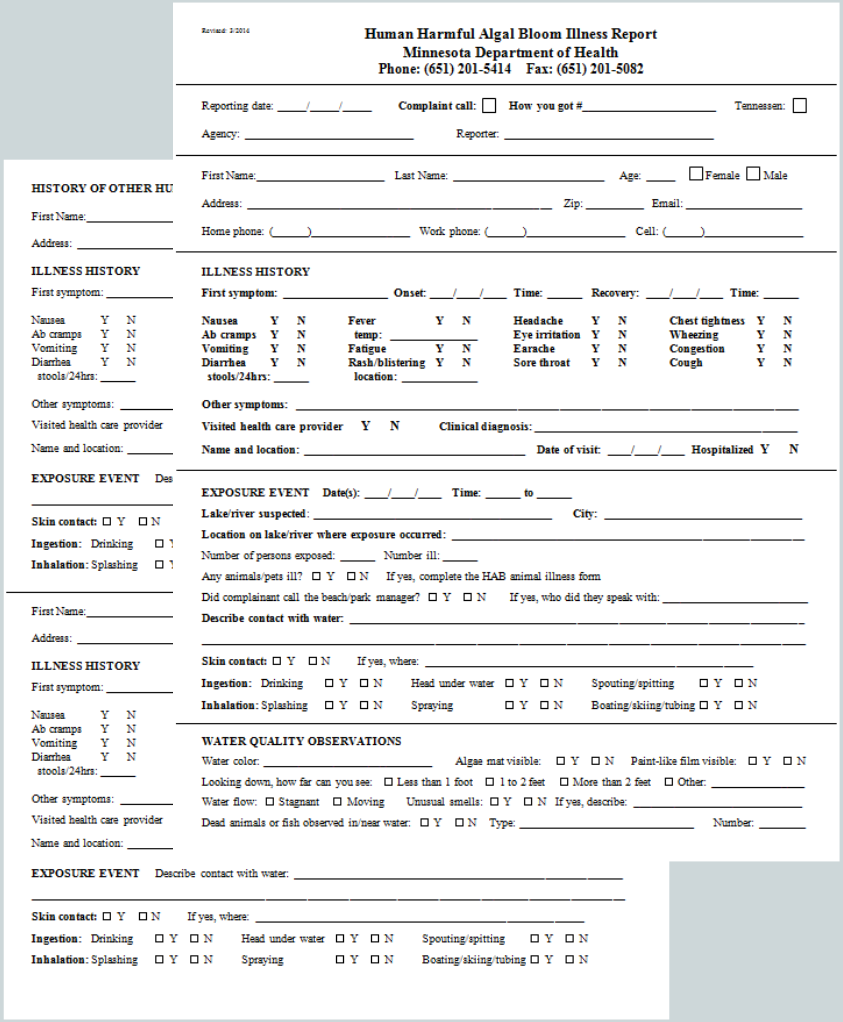
- Collaboration with Departments of Health, Pollution Control Agency and Natural Resources and the Minnesota Veterinary Medical Association, and Board of Animal Health
- Outreach included press releases in papers, radio and TV
- Updated web site for MDH & MPCA
- MPCA – lead in monitoring, public outreach, and technical studies
- MDH – lead in contacting veterinarians, has infrastructure for animal and human illness reporting & developed posters for beach managers to use;
- Goal: enhance awareness & coordinate public outreach



Surveillance Challenges

- Non-specific symptoms
- Lack of diagnostic tests and treatment
- Limited ability to test for toxins in waterbodies
- Changing environmental conditions between exposure, reporting, and site investigation
- Different toxins behave differently
  - No information on presence of toxin after obvious bloom conditions have dissipated

Human Case Reporting



Revised: 3/2014

Human Harmful Algal Bloom Illness Report
Minnesota Department of Health
Phone: (651) 201-5414 Fax: (651) 201-5082

Reporting date: ___/___/___ **Complaint call:** ☐ **How you got #**_____ Tennessen: ☐

Agency: _____ Reporter: _____

First Name:_____ Last Name: _____ Age: ____ ☐ Female ☐ Male

Address: _____ Zip: _____ Email: _____

Home phone: (____)_____ Work phone: (____)_____ Cell: (____)_____

ILLNESS HISTORY

First symptom: _____ **Onset:** ___/___/___ **Time:** _____ **Recovery:** ___/___/___ **Time:** _____

Nausea	Y N	**Fever**	Y N	**Headache**	Y N	**Chest tightness**	Y N
Ab cramps	Y N	**temp:** _____		**Eye irritation**	Y N	**Wheezing**	Y N
Vomiting	Y N	**Fatigue**	Y N	**Earache**	Y N	**Congestion**	Y N
Diarrhea	Y N	**Rash/blistering**	Y N	**Sore throat**	Y N	**Cough**	Y N
stools/24hrs: _____		**location:** _____					

Other symptoms: _____

Visited health care provider Y N **Clinical diagnosis:** _____

Name and location: _____ **Date of visit:** ___/___/___ **Hospitalized** Y N

EXPOSURE EVENT **Date(s):** ___/___/___ **Time:** _____ **to** _____

Lake/river suspected: _____ **City:** _____

Location on lake/river where exposure occurred: _____

Number of persons exposed: _____ Number ill: _____

Any animals/pets ill? ☐ Y ☐ N If yes, complete the HAB animal illness form

Did complainant call the beach/park manager? ☐ Y ☐ N If yes, who did they speak with: _____

Describe contact with water: _____

Skin contact: ☐ Y ☐ N If yes, where: _____

Ingestion: Drinking ☐ Y ☐ N Head under water ☐ Y ☐ N Spouting/spitting ☐ Y ☐ N

Inhalation: Splashing ☐ Y ☐ N Spraying ☐ Y ☐ N Boating/skiing/tubing ☐ Y ☐ N

WATER QUALITY OBSERVATIONS

Water color: _____ Algae mat visible: ☐ Y ☐ N Paint-like film visible: ☐ Y ☐ N

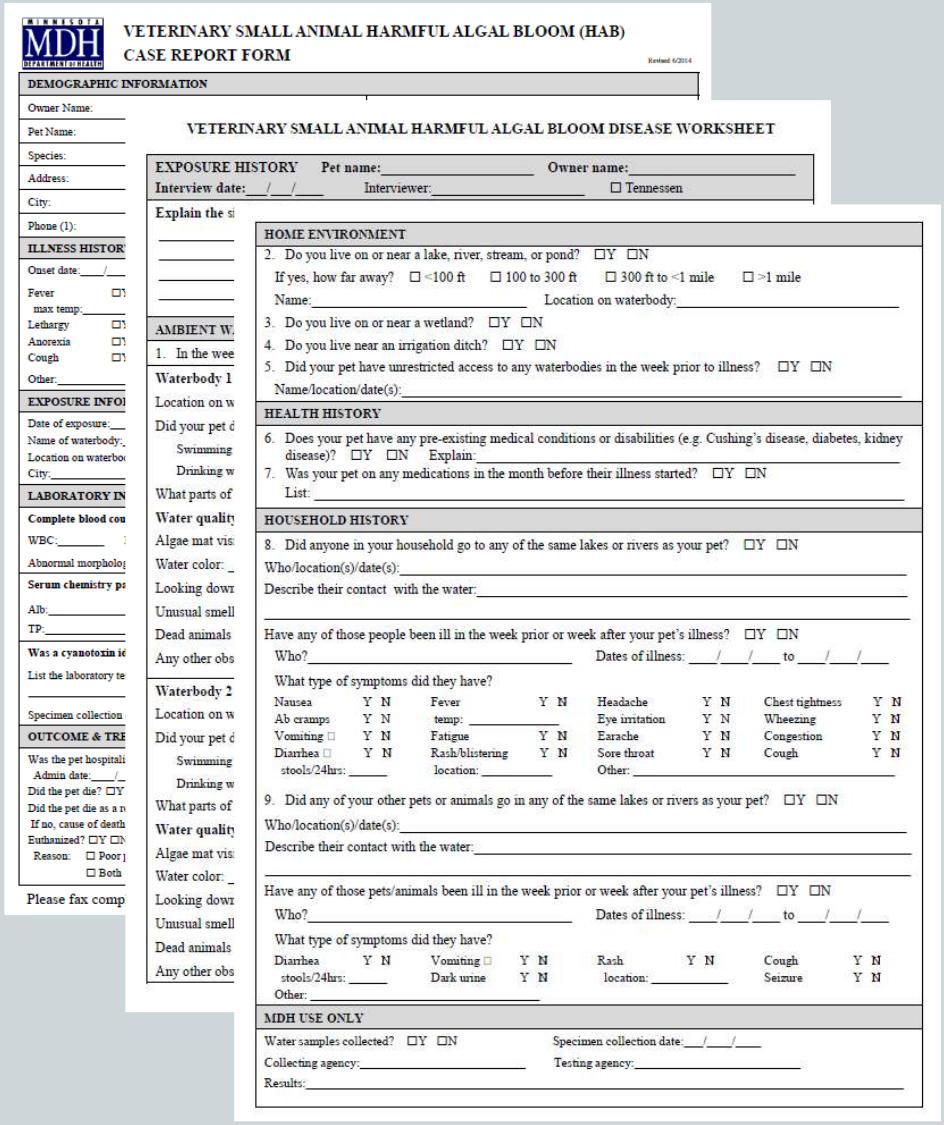
Looking down, how far can you see: ☐ Less than 1 foot ☐ 1 to 2 feet ☐ More than 2 feet ☐ Other: _____

Water flow: ☐ Stagnant ☐ Moving Unusual smells: ☐ Y ☐ N If yes, describe: _____

Dead animals or fish observed in/near water: ☐ Y ☐ N Type: _____ Number: _____

- Illness history
- Exposure location, date, time
- Water activities
- Water quality observations
- Other human and animal exposures

Veterinary Case Reporting



VETERINARY SMALL ANIMAL HARMFUL ALGAL BLOOM (HAB)
CASE REPORT FORM

DEMOGRAPHIC INFORMATION

Owner Name:
Pet Name:
Species:
Address:
City:
Phone (1):

ILLNESS HISTOR
Onset date:
Fever
Lethargy
Anorexia
Cough
Other:

EXPOSURE INFO
Date of exposure:
Name of waterbody:
Location on waterbo
City:

LABORATORY IN
Complete blood cou
WBC:
Abnormal morpholo
Serum chemistry pa
Alb:
TP:
Was a cyanotoxin id
List the laboratory te
Specimen collection

OUTCOME & TRE
Was the pet hospitali
Admin date:
Did the pet die?
Did the pet die as a r
If no, cause of death
Euthanized?
Reason:
Poor
Both

Please fax comp

VETERINARY SMALL ANIMAL HARMFUL ALGAL BLOOM DISEASE WORKSHEET

EXPOSURE HISTORY Pet name:_____ Owner name:_____
Interview date:___/___/___ Interviewer:_____ ☐ Tennessen

Explain the si

AMBIENT W
1. In the wee
Waterbody 1
Location on w
Did your pet d
Swimming
Drinking w
What parts of
Water quality
Algae mat vis
Water color:
Looking down
Unusual smell
Dead animals
Any other obs

Waterbody 2
Location on w
Did your pet d
Swimming
Drinking w
What parts of
Water quality
Algae mat vis
Water color:
Looking down
Unusual smell
Dead animals
Any other obs

HOME ENVIRONMENT

2. Do you live on or near a lake, river, stream, or pond? ☐Y ☐N
If yes, how far away? ☐ <100 ft ☐ 100 to 300 ft ☐ 300 ft to <1 mile ☐ >1 mile
Name:_____ Location on waterbody:_____
3. Do you live on or near a wetland? ☐Y ☐N
4. Do you live near an irrigation ditch? ☐Y ☐N
5. Did your pet have unrestricted access to any waterbodies in the week prior to illness? ☐Y ☐N
Name/location/date(s):_____

HEALTH HISTORY

6. Does your pet have any pre-existing medical conditions or disabilities (e.g. Cushing's disease, diabetes, kidney disease)? ☐Y ☐N Explain:_____
7. Was your pet on any medications in the month before their illness started? ☐Y ☐N
List: _____

HOUSEHOLD HISTORY

8. Did anyone in your household go to any of the same lakes or rivers as your pet? ☐Y ☐N
Who/location(s)/date(s):_____
Describe their contact with the water:_____
Have any of those people been ill in the week prior or week after your pet's illness? ☐Y ☐N
Who?_____ Dates of illness: ___/___/___ to ___/___/___
What type of symptoms did they have?

Nausea	Y N	Fever	Y N	Headache	Y N	Chest tightness	Y N
Ab cramps	Y N	temp: _____		Eye irritation	Y N	Wheezing	Y N
Vomiting ☐	Y N	Fatigue	Y N	Earache	Y N	Congestion	Y N
Diarrhea ☐	Y N	Rash/blistering	Y N	Sore throat	Y N	Cough	Y N
stools/24hrs: _____		location: _____		Other: _____			

9. Did any of your other pets or animals go in any of the same lakes or rivers as your pet? ☐Y ☐N
Who/location(s)/date(s):_____
Describe their contact with the water:_____
Have any of those pets/animals been ill in the week prior or week after your pet's illness? ☐Y ☐N
Who?_____ Dates of illness: ___/___/___ to ___/___/___
What type of symptoms did they have?

Diarrhea	Y N	Vomiting ☐	Y N	Rash	Y N	Cough	Y N
stools/24hrs: _____		Dark urine	Y N	location: _____		Seizure	Y N

Other: _____

MDH USE ONLY

Water samples collected? ☐Y ☐N Specimen collection date:___/___/___
Collecting agency:_____ Testing agency:_____
Results:_____

- Illness history
- Test results, treatment, outcome
- Ambient water exposures
- Water quality observations
- Other human or animal exposures

Investigation Steps

- Exposure, incubation period, and symptoms – do they fit together?
- Contact investigation partners
  - MPCA (environmental investigation)
  - MDH (human investigation)
  - Veterinarian, Veterinary Diagnostic Laboratory (animal investigation)
- Contact local public health partners
- Provide recommendations to prevent further exposure

Summary of 2015 Investigations

- Three dog deaths
  - June: confirmed anatoxin-a death associated with Red Rock Lake
  - August: suspect HAB-related death associated with Lake of the Woods
  - August: exposure to Frontenac Lake 5 days prior to illness onset; unlikely to be HAB-related

Summary of 2015 Investigations

- Two human illnesses
  - June: child hospitalized with HAB-related illness associated with Lake Henry
  - July: suspect HAB-related illness in a child associated with West Olaf Lake
    - Fatigue, abdominal pain, vomiting, and rash on trunk
    - Lake was “murky” – Anabaena spp. and *Microcystis* spp. present
    - Microcystin present at 2.5 and 5.0 ppb

Case Study – Human Illness

- Jun 4, 2015: Child swam at Lake Henry
- Jun 5: Developed headache, abdominal and chest pain, vomiting, diarrhea
- Jun 6: Presented to ER with fever, diffuse red rash, red eyes, swollen lips, hypotension. Transferred to Twin Cities hospital. Toxic shock syndrome considered, tests negative
- Jun 8: Condition rapidly improved, discharged from hospital

Case Study – Human Illness

- Jun 15: Illness reported to MDH
- Jun 16: Parent interviewed; called MPCA to discuss environmental testing
- Jun 17: MPCA took pictures and water samples from lake

Case Study – Human Illness

- Results:
  - *Anabaena* spp. and *Microcystis* spp.
  - Microcystin: 2.5-5.0 µg/L
- Illness suspected to be due to cyanotoxin exposure
- Beach manager contacted and sign posted at beach

Case Study - Dog Death

- June 4 - Dog death reported to Douglas Co. Sheriff's office;
- Dog had been in water short time, distressed when coming out, owner drove to vet but dog died on the way – Vet believed this was consistent with HAB toxicity *[a neighbor's dog was sick on same date but did recover]*
- MPCA contacts MDH to initiate follow up with pet owner
- Water sample collected by owner day of the incident; given to MPCA for analysis June 8
  - Anabeana spp. and Microcystis spp.
  - Microcystins < 1µg/L
- MDH arranged for U of M VDL to necropsy dog; they sent gastric contents to UC Davis
- June 24 – UC Davis reported anatoxin-a was found at >10 ppm – considered very high; likely cause of death

Case Study – Dog Death

- Generated interest from veterinary partners
- Potentially explains previous sudden dog deaths following exposure to seemingly bloom-free lakes
- Speaks to the need for refined public outreach
  - The water isn’t always green and scummy

What's Next

- MN Participating with other states work on HAB response for the Upper Mississippi River (work coordinated by UMRBA)
- Interagency HAB group is currently working on how to communicate with MN non-community water suppliers and with community water suppliers in the event of a known/reported bloom

Wrap - Up

- Developed and continue to refine how we communicate across agencies
- Improved products for public outreach/messaging
- Working with research partners on ways to improve prediction, come up with recreational thresholds, and better understand different toxins