Response to Bovine Tuberculosis (TB) in Wisconsin

Suzanne Gibbons-Burgener, DVM, PhD
Julie Tans-Kersten, MS, BS-MT (ASCP)
Wisconsin Department of Health Services
November 2, 2021

Agenda

- Bovine tuberculosis (TB) in Wisconsin
- How does bovine TB spread?
- Contact investigations
- TB screening and testing
- Wisconsin One Health TB Response Plan
- Public Health Response to TB on a Dairy Farm

Tuberculosis in Wisconsin

< 1 in 20 isolates were MTBC

One M. bovis isolated every 2 years

Number of Mycobacteria isolates identified by Wisconsin State Lab of Hygiene during 2015

- M. tuberculosis complex (MTBC): 4.4%
- M. avium complex (MAC): 63.4%
- Other Non-TB Mycobacterium (NTM): 34.2%

M. tuberculosis Transmission

Aerosol
Contaminated milk

Aerosol
Unpasteurized dairy products

Aerosol
**M. bovis Transmission**

Unpasteurized dairy products → Aerosol → Contaminated milk → Aerosol → Person

**M. bovis in Unpasteurized Dairy Products**

Unpasteurized dairy products → Aerosol → Person

**Animal to Human Aerosol Transmission of M. bovis**

Health care workers, dairy farmers, and cattle handlers are at risk for exposure to M. bovis through inhalation of aerosolized bacteria from contaminated dairy products.

**Century of Bovine TB Eradication**

Healthy dairy cows and farms are the goal of TB eradication efforts.
Farm Activities Posing Minimal Risk for Human M. bovis Infection

- Handling calves < 2 months of age
- Handling manure and urine
- Milking
- Feeding
- Cleaning
- Maintenance

Human to Animal Aerosol Transmission of M. bovis

Worker with pulmonary TB disease can generate droplet nuclei that can infect any age cattle in ideal conditions.

April, 2015: Wisconsin Case Study

- A TB patient presented with 4+ smear positive, cavitary TB disease.
- The initial interview indicated that the patient had been working on a dairy farm (“Dane County Dairy”) since January.
- Per existing protocol, Wisconsin Department of Health Services (DHS) notified the Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP) regarding possible herd exposure.

Public Health Contact Investigations

Contagious Human or Animal (Index Patient)

High Priority Contacts
- Persons with elevated risk to exposures and transmission
- Persons with risk factors for progression to TB disease

Low Priority Contacts
- Persons with low risk exposures
- Persons without elevated disease vulnerability
Testing to Find TB Infection

- Recent TB symptoms
- Born, traveled, or resided in a country with high TB prevalence
- Close contact to someone with infectious TB disease
- Human immunodeficiency virus (HIV) Infection
- Current or planned immunosuppression

April, 2015: Wisconsin Case Study

- Infectious period included the entire time that the patient worked on the farm.
- Nine close contacts were evaluated, including roommates, co-workers and relatives.
- Two had known positive tuberculin skin tests and refused testing or treatment.
- T-SPOT testing was performed on 4/16 and 7/22.
- Three contacts were not tested in the second round.
- There were no additional patients with active TB and no known conversions.

April, 2015: Wisconsin Case Study

- The isolate was identified as M. bovis.
- The patient was treated for a full year with TB medications (no PZA).
- The patient likely was infected previously, when living in a Latin-American country.
- After treatment, the patient did not return to “Dane County Dairy”.
### April, 2015: Wisconsin Case Study

- In May, 2015, herd testing was performed (1,500 head).
- No infected animals were detected.
- In September, 2015, the herd was tested a second time and no infected animals were detected.
- Two whole herd tests were negative for TB in 2015, investigation was concluded.
Three years later....

- September 28, 2018: National Veterinary Services Laboratory (NVSL) notified DATCP of a bovine TB positive cow at slaughter. A lymph node was PCR positive.
- The animal was traced back to “Dane County Dairy.”
- DATCP notified WTBP about cattle investigation.
- “Dane County Dairy” was quarantined, whole herd TB testing of all animals over 2 months of age was performed to confirm whether herd was infected.

2018: Wisconsin Case Study

- DATCP conducted whole herd testing using CFT and CCT beginning in October 2018.
- 12 cows total were identified as infected with *M. bovis*, all within the adult lactating herd.
- The isolates from cattle were within 1-4 single nucleotide polymorphisms (SNPs) from the original human isolate from 2015.
- Wildlife surveillance was also conducted.
Public Health Contact Investigations

Contagious Human or Animal (Index Patient)

High Priority Contacts
- Persons with elevated risk to exposures and transmission
- Persons with risk factors for progression to TB disease

Low Priority Contacts
- Persons with low risk exposures
- Persons without elevated disease vulnerability

Additional Screening for M. bovis Exposure Risk

- Consumed unpasteurized milk or dairy products made outside U.S.
- Close contact to an animal known or suspected to have TB disease
- Handled carcass of an animal suspected to have TB infection
- Performed an invasive procedure on an animal suspected to have TB infection

If yes:
- Sustained a cut or puncture during animal or carcass contact
- Did not use sufficient personal protective equipment (PPE)

2018: Wisconsin Case Study

- 66 individuals were evaluated.
- Employees and family were tested.
- There were no contacts with active TB and no known conversions.
- Challenges:
  - There was unnecessary testing of individuals with little or no risk.
  - Agriculture responders needed proper personal protective equipment.

Recent TB symptoms
- Born, traveled, or resided in a country with high TB prevalence
- Close contact to someone with infectious TB disease
- Human immunodeficiency virus (HIV) Infection
- Current or planned immunosuppression
### Additional Public Health Response

- Partners in Health and Safety
- Mini grants to increase screening and testing for migrant livestock workers
- Employee Health Policies for Agriculture Employees
  - TB Screening and testing upon hire
  - Other medical services available
- Educational materials created

### Partners in Health and Safety / Compañeros en Salud y Seguridad

**Coordinator:** Lisa Schiller, PhD, APNP, FNP-BC

**Partnerships:**
- University of Wisconsin Eau Claire – College of Nursing and Health Sciences
- Buffalo County Public Health
- Pepin County Public Health
- Puentes/Bridges Inc.
- Dairy producers
- Chippewa Valley Free Clinic

### Mini Grants: Targeted Screening and Testing

- Wisconsin Tuberculosis Program (WTBP) offered local health departments a mini-grant opportunity in 2018 to increase TB screening and testing and employee health efforts for livestock workers.
- Mini-grants were funded through the WTBP cooperative agreement with the Centers for Disease Control and Prevention (CDC).
- Mini-grants were awarded to Buffalo, Madison/Dane, and St. Croix County health departments.

### Mini Grants: Employee Health

- Tuberculosis infection screening and testing
- Health education
- Diabetes and cholesterol screening
- Blood pressure and vision screening
- Vaccinations
**Mini Grants: Farm Employee Clinics**

<table>
<thead>
<tr>
<th>Health Department</th>
<th>Number of Clinics</th>
<th>Participated in Clinics</th>
<th>Screened or Tested for TB Infection</th>
<th>Positive or Borderline T-SPOT® Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buffalo Co.</td>
<td>21</td>
<td>119</td>
<td>24</td>
<td>1</td>
</tr>
<tr>
<td>Madison/Dane Co.</td>
<td>5</td>
<td>65</td>
<td>60</td>
<td>4</td>
</tr>
<tr>
<td>St. Croix Co.</td>
<td>1</td>
<td>15</td>
<td>15</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>27</td>
<td>195</td>
<td>97</td>
<td>8</td>
</tr>
</tbody>
</table>

**TB Prevention Policy for Agriculture Employees**

**Goal:** To prevent TB illness in workers and animals

**TB Prevention Policy Components**

- **Considerations**
  - **What**
  - Detect and treat TB infection or illness?
  - **Who**
  - Employees, contractors, all, or job specific?
  - **When**
  - **Where**
  - **How**
### TB Prevention Policy Components

<table>
<thead>
<tr>
<th>Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ What</td>
</tr>
<tr>
<td>✓ Who</td>
</tr>
<tr>
<td>✓ When  Hire, periodic, travel, exposure, illness</td>
</tr>
</tbody>
</table>

**Body needs 8–12 weeks to make antibodies.**

<table>
<thead>
<tr>
<th>Where</th>
</tr>
</thead>
<tbody>
<tr>
<td>What</td>
</tr>
<tr>
<td>Who</td>
</tr>
<tr>
<td>When</td>
</tr>
<tr>
<td>How</td>
</tr>
</tbody>
</table>

### Educational Materials Created

- Bovine Tuberculosis in Animals and Humans:  
  [https://datcp.wi.gov/Documents/BovineTB.pdf](https://datcp.wi.gov/Documents/BovineTB.pdf)

- Biosafety Recommendations for Individuals Handling Carcasses from Animals Known or Suspected to have Tuberculosis: 
2021: Wisconsin Case Study Update

- In August 2021 the farm was released from quarantine.
- Three annual wildlife screens have been negative.
- Human testing continues (8-10 weeks from last positive animal testing).

Acknowledgements

- Public Health of Madison and Dane County
  - Kate Louther
  - Erin Polkinghorn
  - Brian Odegaard
- Sauk County Public Health Department
- Dr. Elisabeth Patton, Wisconsin Department of Agriculture, Trade and Consumer Protection

Resources and Contacts

- Wisconsin TB Program:
  www.dhs.wisconsin.gov/tb/index.htm
- CDC bovine TB:
  www.cdc.gov/tb/publications/factsheets/general/mbovis.htm

Suzanne Gibbons-Burgener, DVM, PhD
suzanne.gibbonsburgener@dhs.wi.gov

Julie Tans-Kersten, MS, BSMT(ASCP)
julie.tanskersten@dhs.wi.gov