Response to Bovine Tuberculosis (TB) in Wisconsin

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Agenda

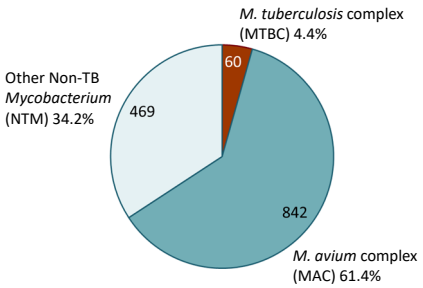
- Bovine tuberculosis (TB) in Wisconsin
- How does bovine TB spread?
- Contact investigations
- TB screening and testing
- Wisconsin One Health TB Response Plan
- Public Health Response to TB on a Dairy Farm

Tuberculosis in Wisconsin

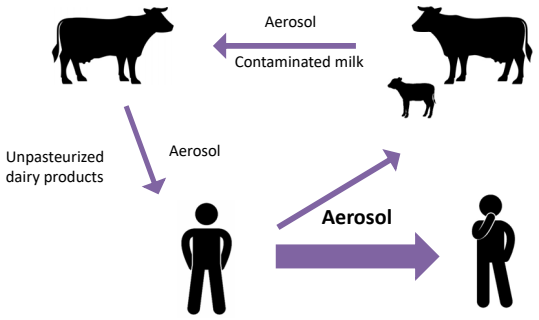
< 1 in 20 isolates were MTBC

One *M. bovis* isolated every 2 years

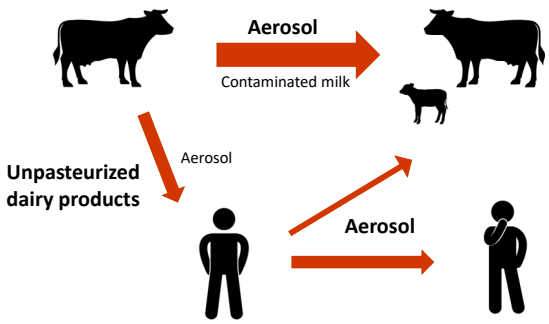
Number of Mycobacteria isolates identified by Wisconsin State Lab of Hygiene during 2015



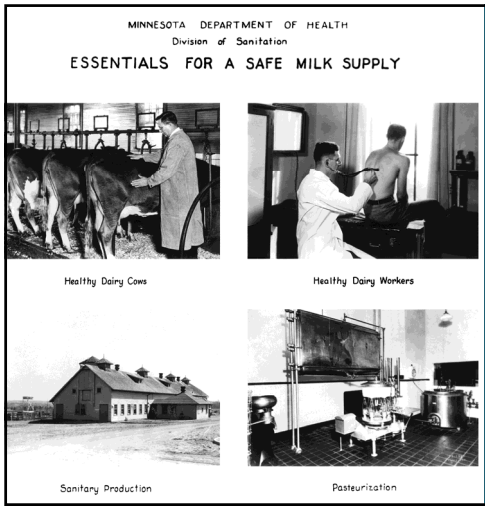
M. tuberculosis Transmission



M. bovis Transmission



M. bovis in Unpasteurized Dairy Products



Century of Bovine TB Eradication

Source: CDC

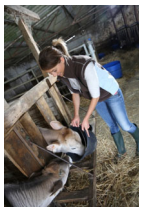
Animal to Human Aerosol Transmission of *M. bovis*

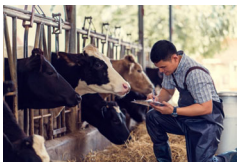
Farm Activities Posing Minimal Risk for Human *M. bovis* Infection

- 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.

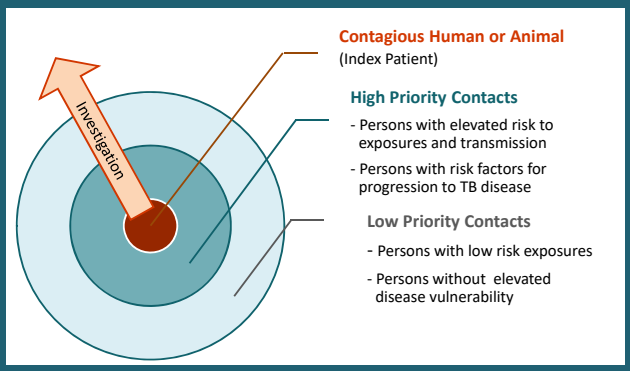


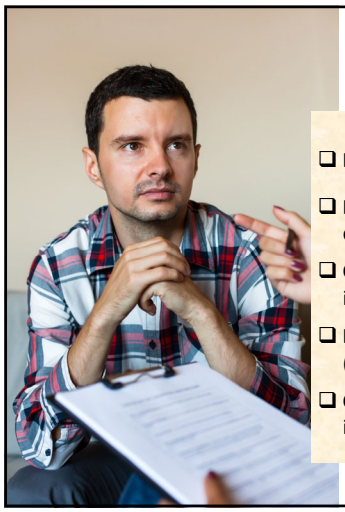


April, 2015: Wisconsin Case Study

- 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





- ❑ **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

Testing to Find TB Infection

If positive

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”.

Animal Testing to Find TB Infection

If positive

Caudal fold tuberculin test (CFT)

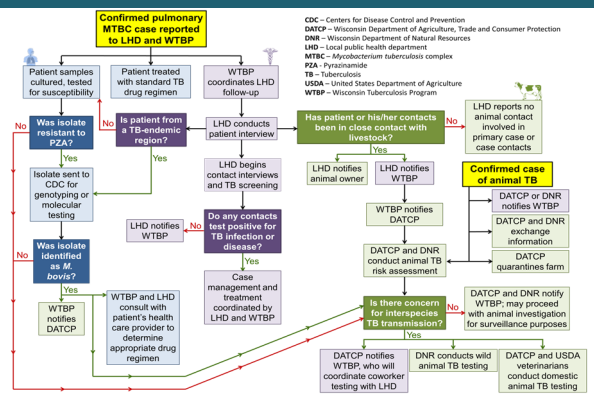
If positive

Comparative cervical tuberculin test (CCT)

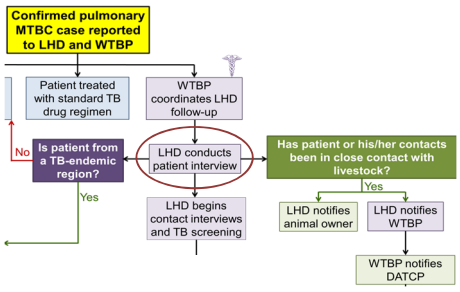
April, 2015: Wisconsin Case Study

- 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.

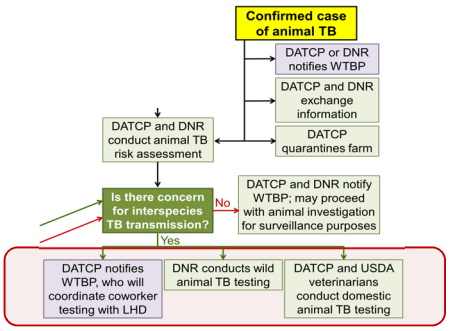
Wisconsin TB Response Plan



Wisconsin TB Response Plan



Wisconsin TB Response Plan



September 2018: Wisconsin Case Study

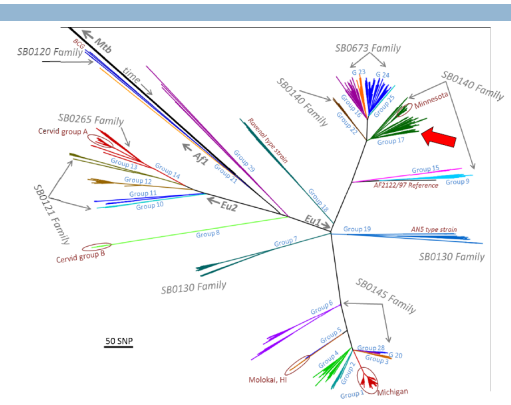
Three years later….

- 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.

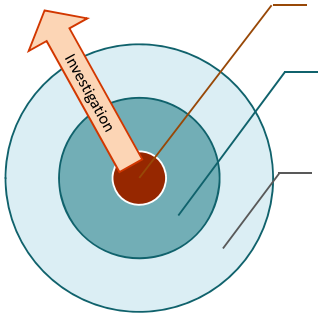
2018: Wisconsin Case Study

- 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.

M. bovis Phylogentic Tree



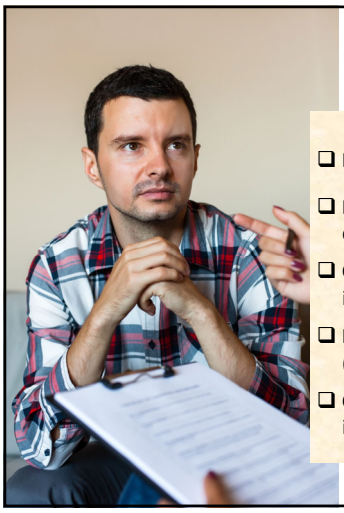
Public Health Contact Investigations



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



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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.

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

UW Eau Claire Nursing immersion program—YouTube

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

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

TB Prevention Policy Components

Considerations

- ☑ **What** Detect and treat TB infection or illness?
- ❑ **Who**
- ❑ **When**
- ❑ **Where**
- ❑ **How**

TB Prevention Policy Components

Considerations

- ☑ **What**
- ☑ **Who** Employees, contractors, all, or job specific?
- ❑ **When**
- ❑ **Where**
- ❑ **How**

TB Prevention Policy Components

Considerations

- ☑ **What**
- ☑ **Who**
- ☑ **When** Hire, periodic, travel, exposure, illness

  Body needs 8–12 weeks to make antibodies.
- ❑ **Where**
- ❑ **How**

TB Prevention Policy Components

Considerations

- ☑ **What**
- ☑ **Who**
- ☑ **When**
- ☑ **Where** Job site, health care provider, or local public health? Travel distance or transportation?
- ❑ **How**

TB Prevention Policy Components

Considerations

- ☑ **What**
- ☑ **Who**
- ☑ **When**
- ☑ **Where**
- ☑ **How** Confidentiality, cost, cultural and linguistic appropriateness, make routine, communication

Educational Materials Created

- Bovine Tuberculosis in Animals and Humans: https://datcp.wi.gov/Documents/BovineTB.pdf
- Biosafety Recommendations for Individuals Handling Carcasses from Animals Known or Suspected to have Tuberculosis: https://www.dhs.wisconsin.gov/publications/p02295.pdf

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

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