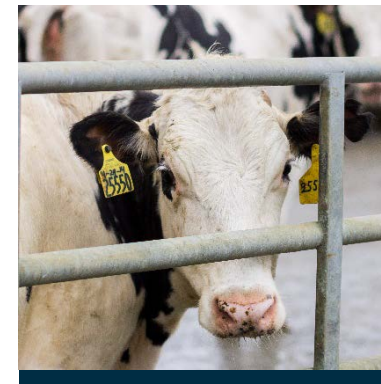
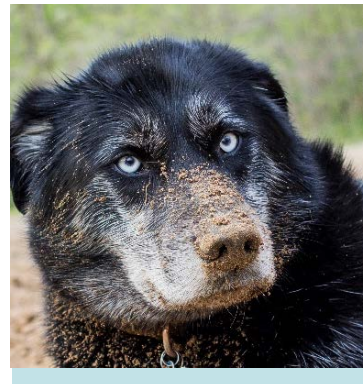


Bovine Tuberculosis 101



Rick Smith DVM
Peter Davidson PhD

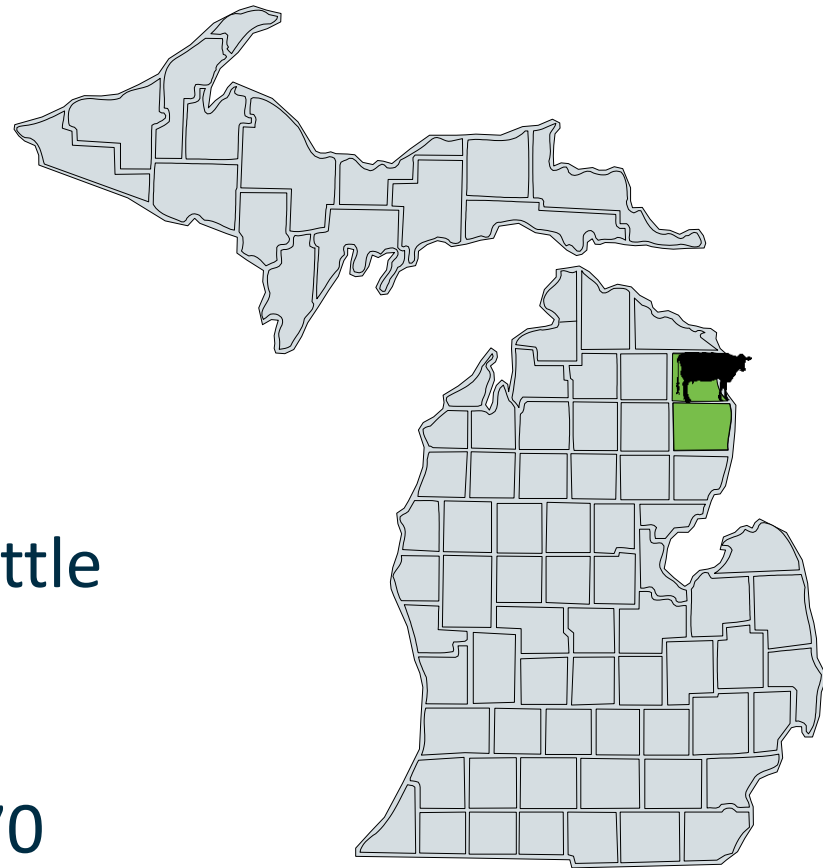
Cattle-Deer Interface

- Infected cattle in Alpena and Alcona area infected free-ranging white-tailed deer in early part of 1900s

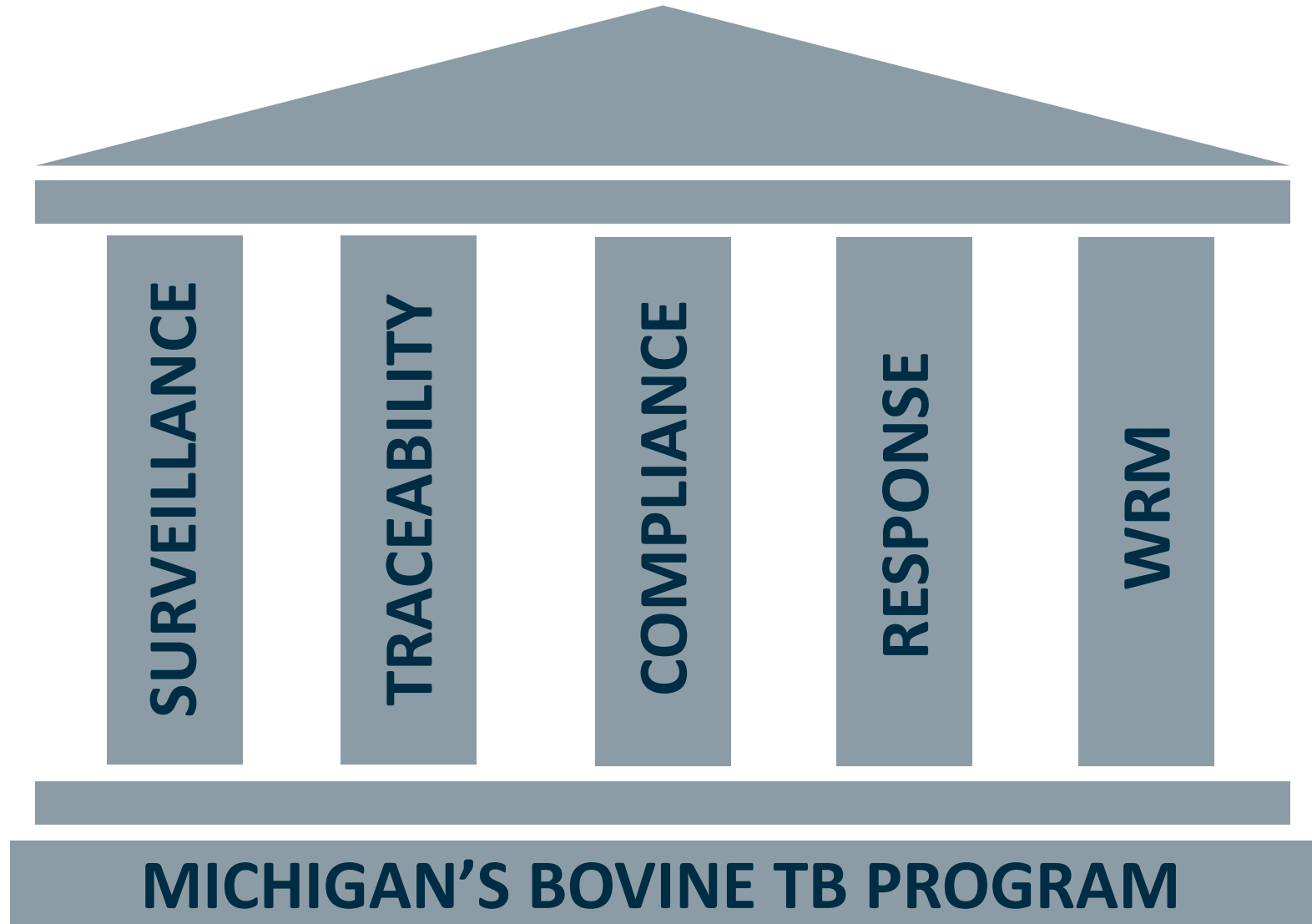


Bovine TB in Michigan

- 1975 - first bovine TB positive deer found in Alcona County
- 1994 - second bovine TB deer found in Alpena County
- 1998 - first bovine TB positive cattle herd in Alpena County
- Since 1998, bovine TB found in 70 cattle herds and five feedlots

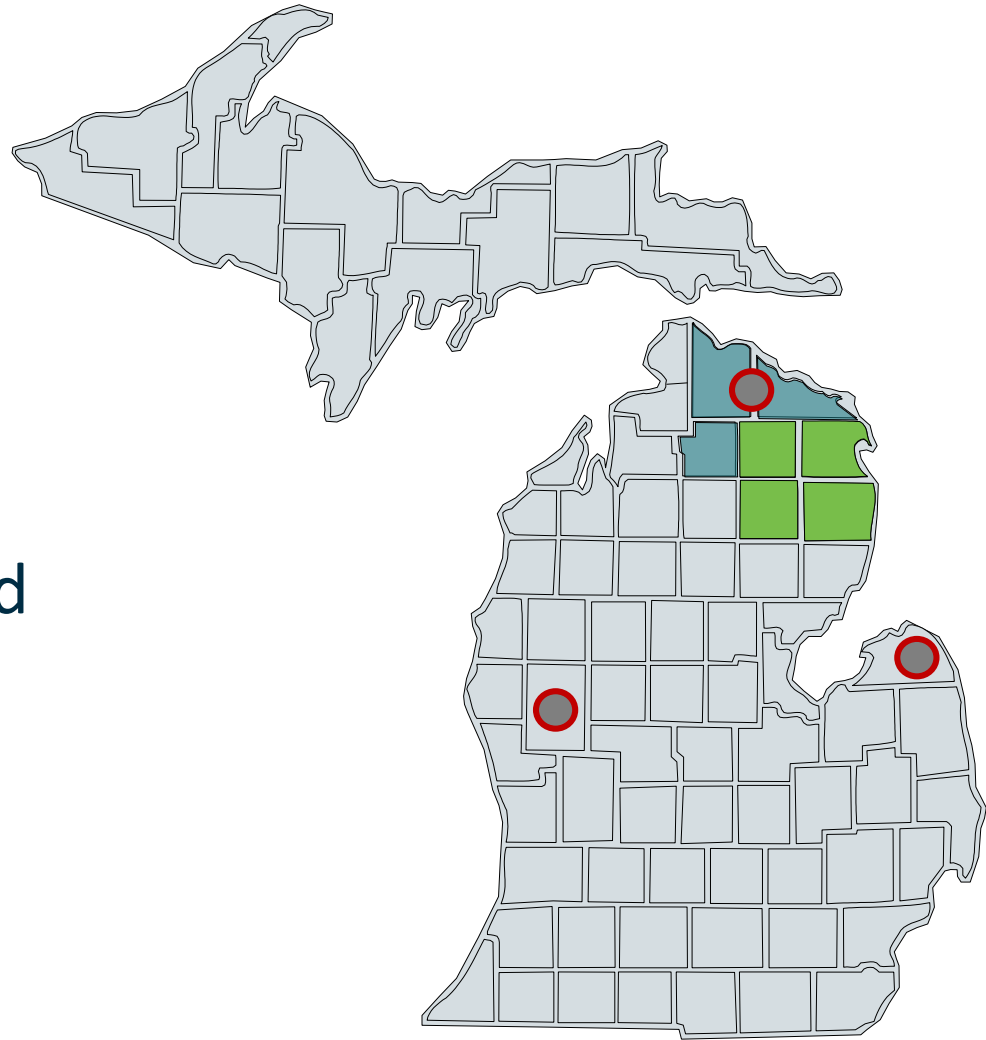


Five Pillars of Michigan's Bovine TB Program



Cattle Surveillance Program

- Annual TB testing in four county high risk zone
- Random testing in three adjacent counties
- Circle testing when infected deer or cattle herds found outside of high risk zone
- Trace testing – source, exposed, slaughter



Test 1: Caudal Fold Testing

- The veterinarian will examine the injection site for a “response”
 - Swelling, redness or hardness
- 5-7% will respond - animal may have been exposed to another disease like bird TB or Johne’s Disease
- Animals that respond (suspects) will need further testing



Test 2: Gamma Interferon

- The gamma interferon test is the second test, for suspect animals
- Test distinguishes between bovine TB and bird TB
- Blood for test is drawn on the same day the CFT injection site is examined



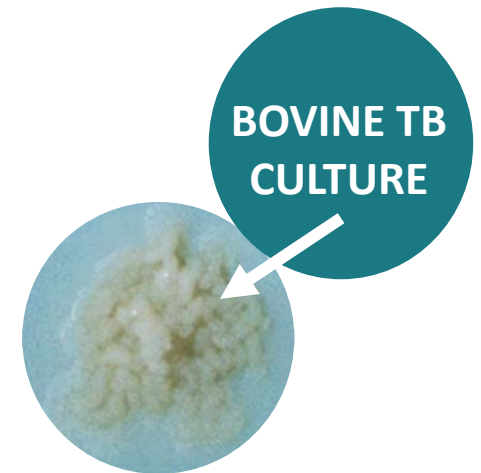
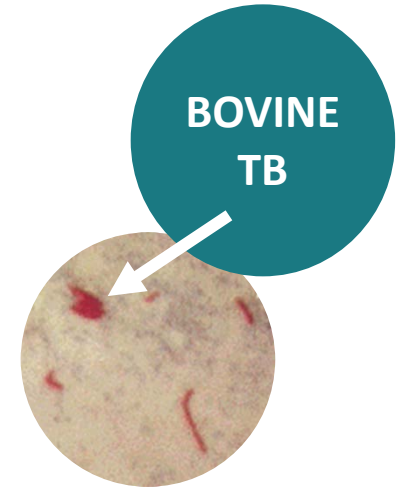
Laboratory Testing

- Suspect animals are taken for necropsy where veterinarians look for:
 - Internal lesions, swollen lymph nodes and other signs of disease



Laboratory Testing

- When signs of bovine TB are found, samples are collected and a microscopic lab test is conducted
- Simultaneously, the lab will also start a culture and attempt to “grow” the bovine TB
- The culture will only “grow” if it is bovine TB positive
 - If nothing has grown after two months the culture is negative



Human Health Concerns

- New TB affected cattle herd identified
 - Kim Signs at MDHHS notified
 - Producer is given contact information of how to contact local public health office for TB testing
 - Producer is encourage to have exposed people tested by Bovine TB Program staff

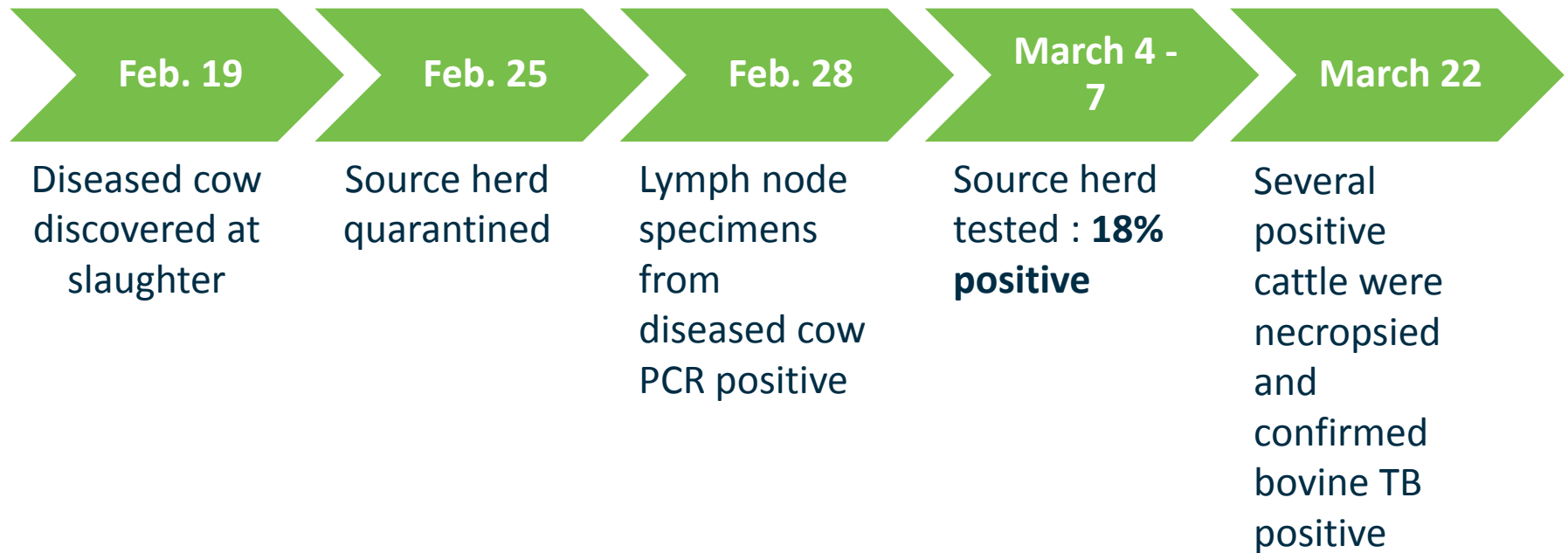
Local Public Health Involvement

- Almost always simple and low-key
- Kim Signs (MDHHS) shares producer contact info with LHD
- LHD talks with producer and offers/encourages exposed people to get tested
- Usually no positives

- But it can be more complicated

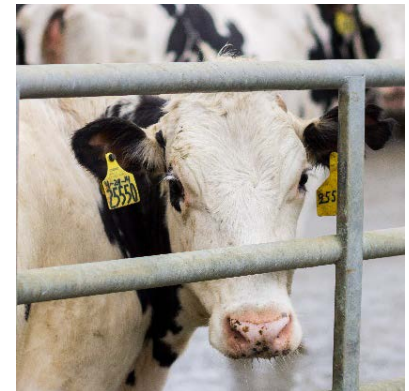
February – March, 2013

Outside of high-risk zone....



About That Herd...

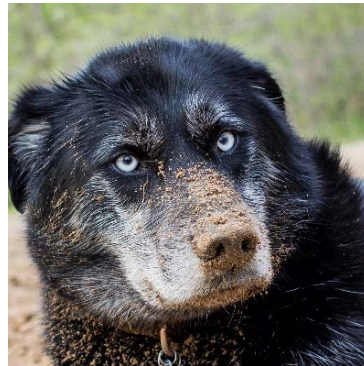
- 451 cattle – all tested and culled
- 80 reactors total (CFT and IGRA)
 - 18% response rate (vs 5-7% usually)
- All 80 reactors were necropsied
 - 30 (48%) had gross lesions
 - 44 (55%) were histologically positive for TB
 - 44 (55%) were culture positive for bovine TB
 - 39 isolates (89%) were collected from thorax or lung
- 3 non-reactor cattle were histologically and culture positive at slaughter.
- Total = 48 (11%) culture positive cattle in source herd including index cow.



“Bessie” & friends in respiratory isolation

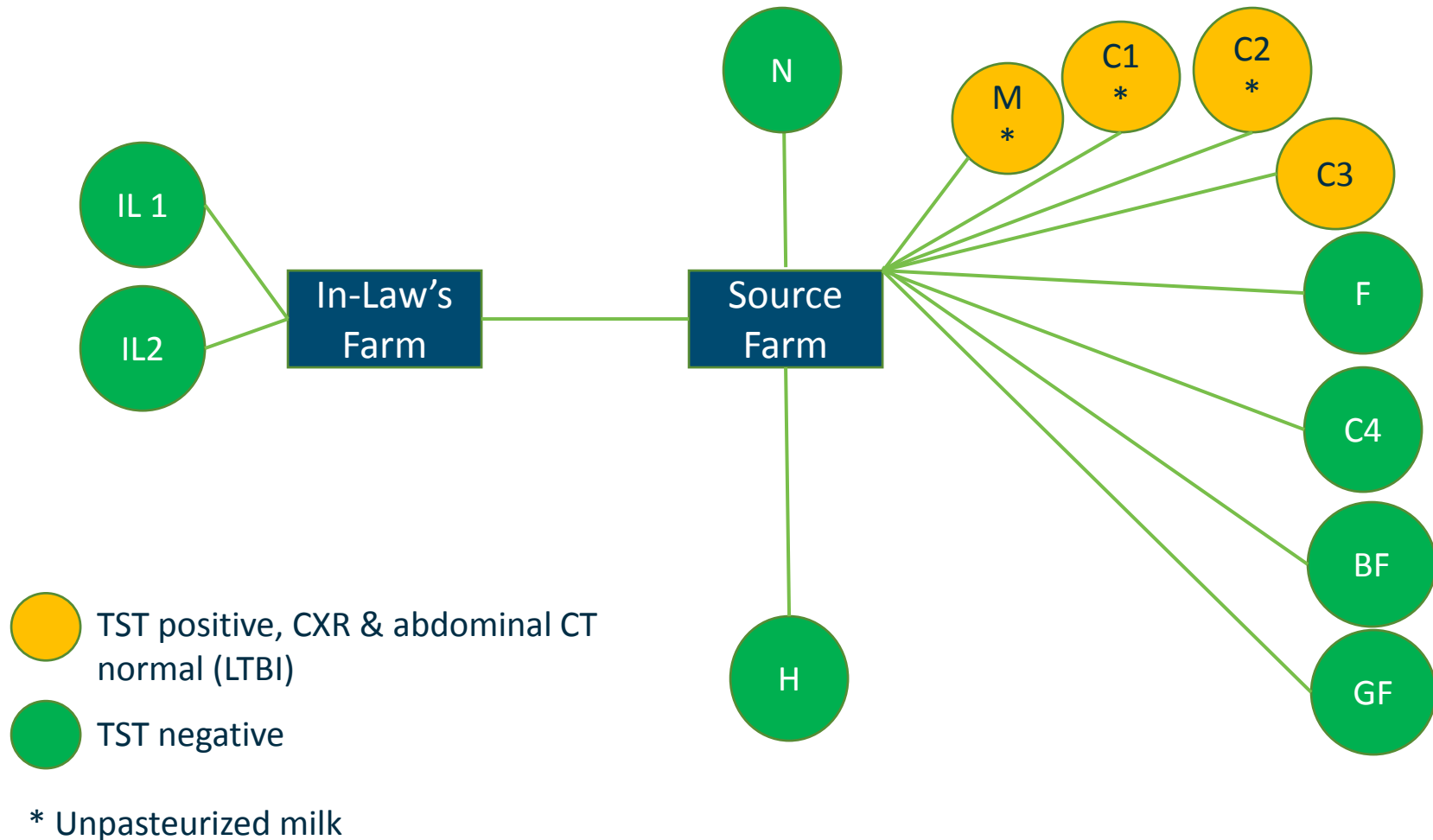
And About the Family...

- During site-visit to the farm, MDARD epi team learned that some of the family consumed unpasteurized milk from their cattle.



Tell me you didn't really do that....

Summary of Human Exposures and Testing



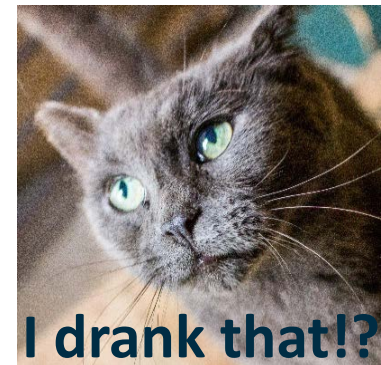
Evaluation and Treatment of LTBI

- All TST positive individuals were evaluated with CXR, abdominal CT scan and sign/symptom review including “classic” TB symptoms as well as gastric or intestinal symptoms.
- All 4 family members diagnosed with LTBI completed treatment with isoniazid for 9 mos.

Contact Investigation! (aka Summary of Animal Testing)

- Cattle
 - 5 counties (including source)
 - 143 herds; 18,483 cattle tested
- Other animals near or on source farm

	# Tested	# TB Positive
White-Tailed Deer	81	0
Raccoons	16	0
Opossums	7	0
Cats	21	11
Dog	1	0



How This Herd May Have Been Infected

- Genetic testing linked infection to bovine TB found in wildlife (deer, raccoons, opossums) and cattle in NE Lower Peninsula's high-risk zone
 - Wildlife testing surrounding farm was all negative
 - Three source herds that provided this herd with bulls were TB tested - 6,085 head of cattle all tested negative
- Most likely source of infection was from a cow purchased in mid-1990s, perhaps from dispersal sale in TB zone

Factors Contributing to TB Transmission in This Herd

- “Creative” use of space
 - Calving and newborns in same barn
 - Hutches used for calves
 - Calves housed in areas that had been sick pens
 - Neighbor’s facility used for yearlings
- Majority of transmission appeared to occur during summer, 2012
 - Heat and drought
 - Stress of calving
 - Spatial stress, tight quarters
 - Feeding unpasteurized milk to calves.



Summary & Lessons Learned

- Evidence of animal-to-human transmission in 4/12 humans from 2 farms
- No evidence of transmission between affected cattle herds and proximate white-tailed deer
- *M. bovis* infection is a health risk of consuming unpasteurized milk
- Unpasteurized milk should not be shared among farms
- USDA slaughter inspection remains an important tool in zoonotic disease surveillance