A serological investigation of the emergence of *Mycoplasma bovis* in North American bison

USDA United States Department of Agriculture
Agricultural Research Service
NADC National Animal Disease Center

Key Questions

Why has *M. bovis* only recently become a pathogen in bison?

Why is *M.* bovis a primary and highly virulent pathogen in bison?

What led to the relatively recent appearance of *M. bovis* as a highly virulent pathogen in bison?

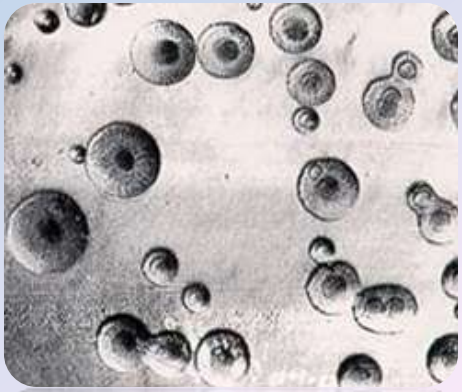
Changes in the environment / bison


Murray Woodbury, WCVM

- changes in management?
- new opportunities for transmission?
  - domesticated or wild animals?
  - fomites?

Changes in the bacterium

- evolution of a novel genetic variants?
- altered virulence potential?
- altered host specificity?

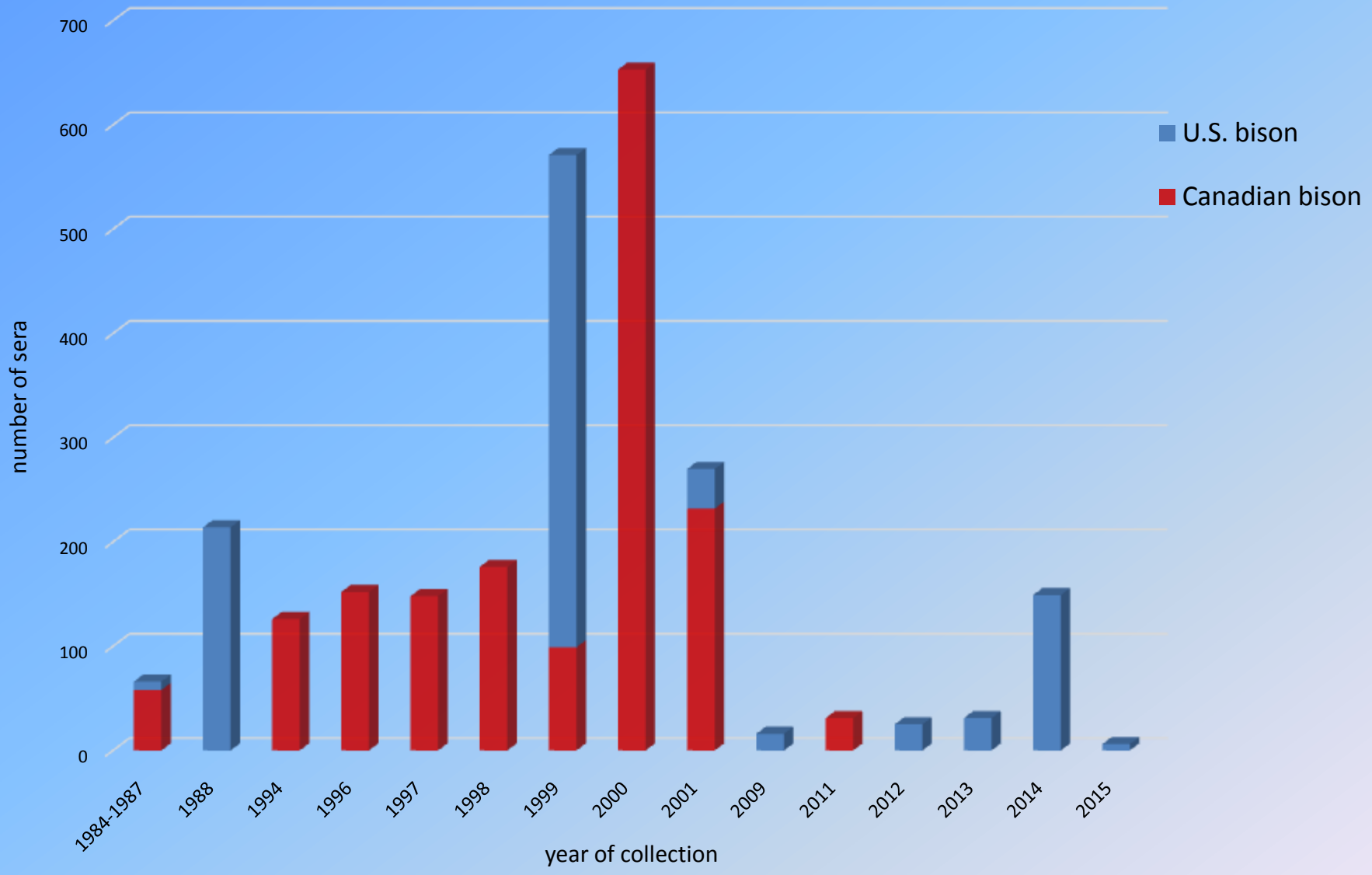


Study Goals

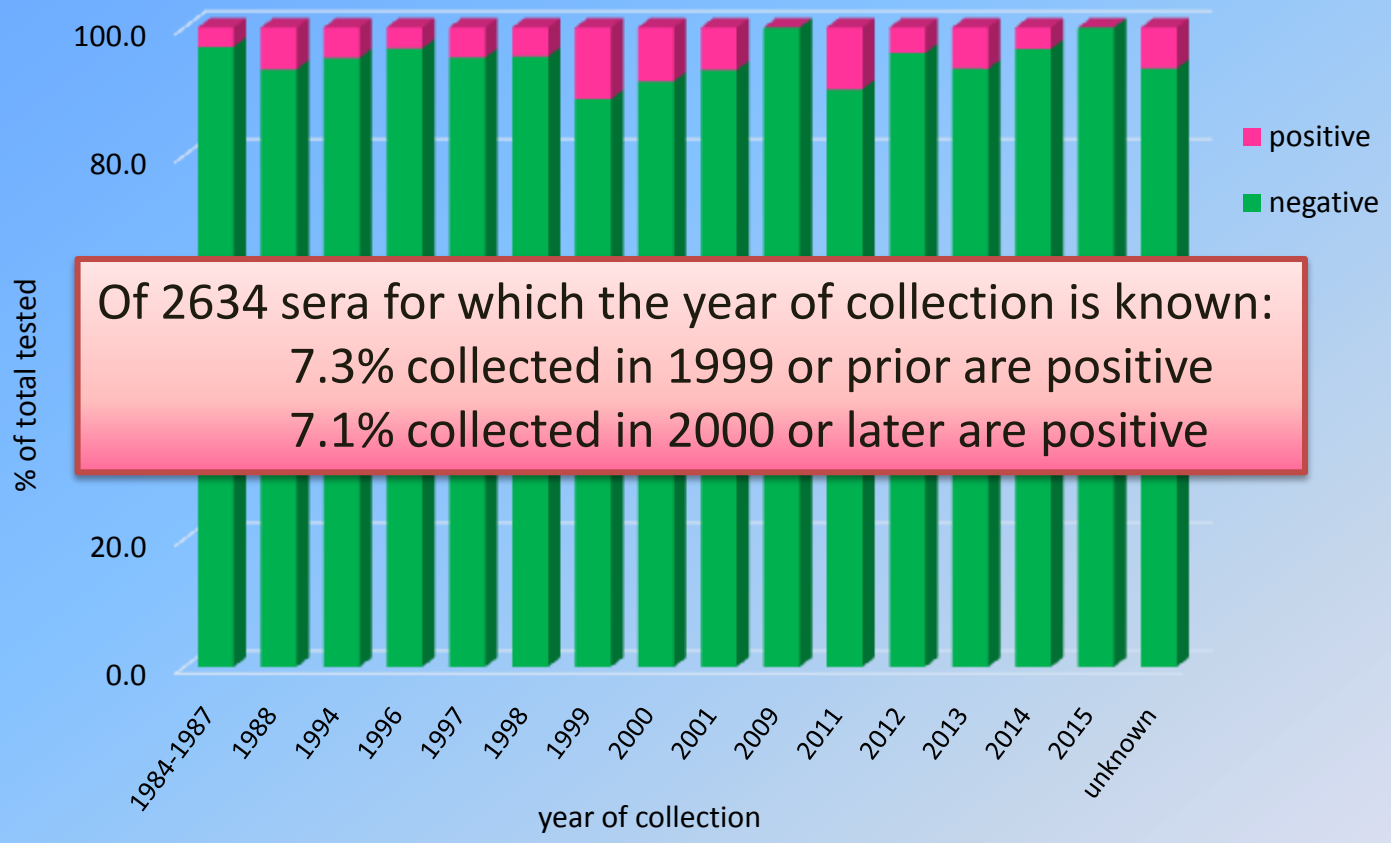
- Is there any evidence to suggest that healthy bison can be carriers of *M. bovis*?

- Is there any evidence that *M. bovis* infected healthy bison prior to the time it emerged as a disease problem?

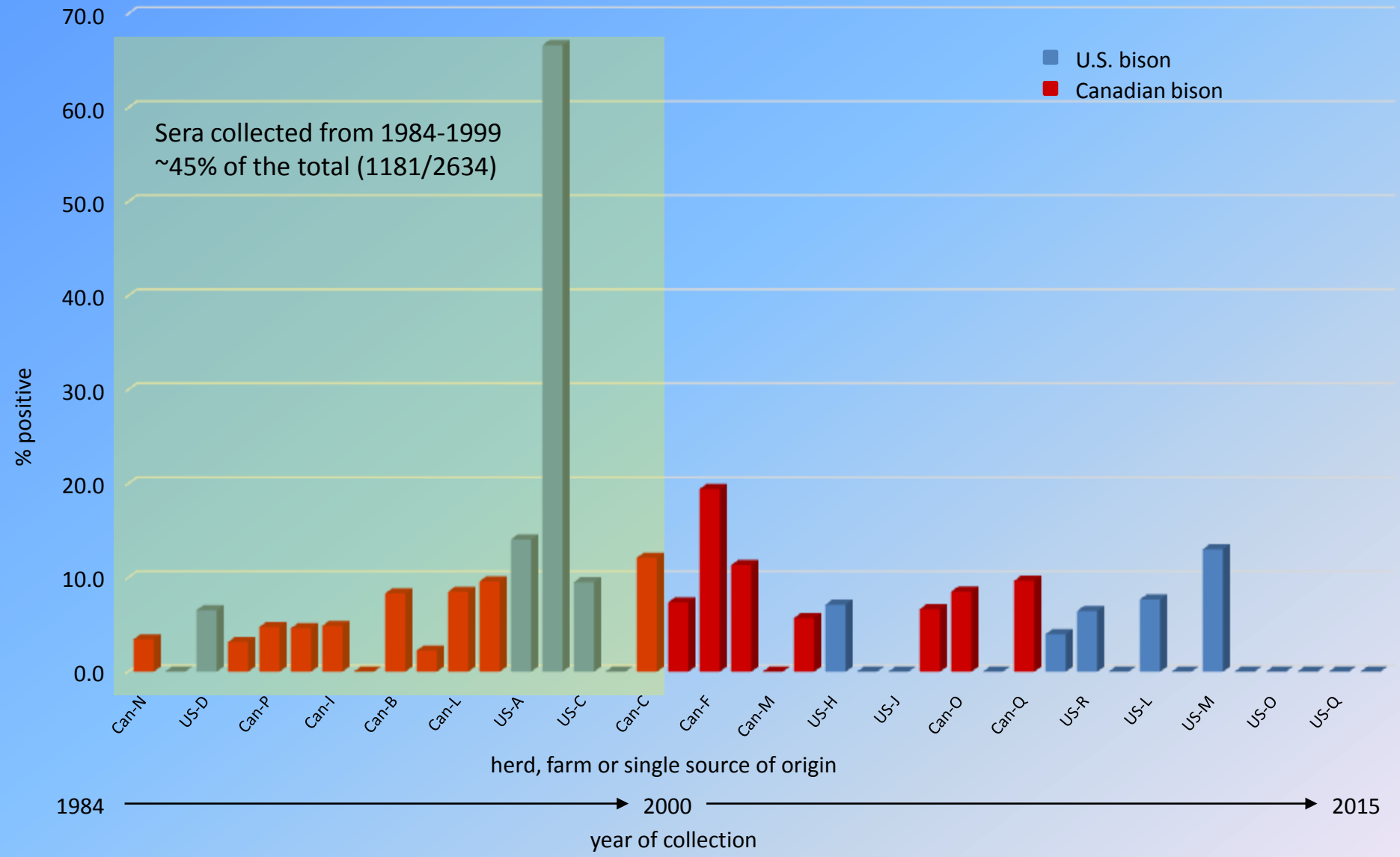
  - If so, how does the prevalence of infection in the pre-disease era compare to current prevalence in healthy bison?



Year of collection for 2635 sera acquired from bison in the U.S. (n = 959) or Canada (n = 1675). Not represented are 155 sera from Canadian bison known only to have been collected between either 1996 and 1998 or 2002 and 2006.

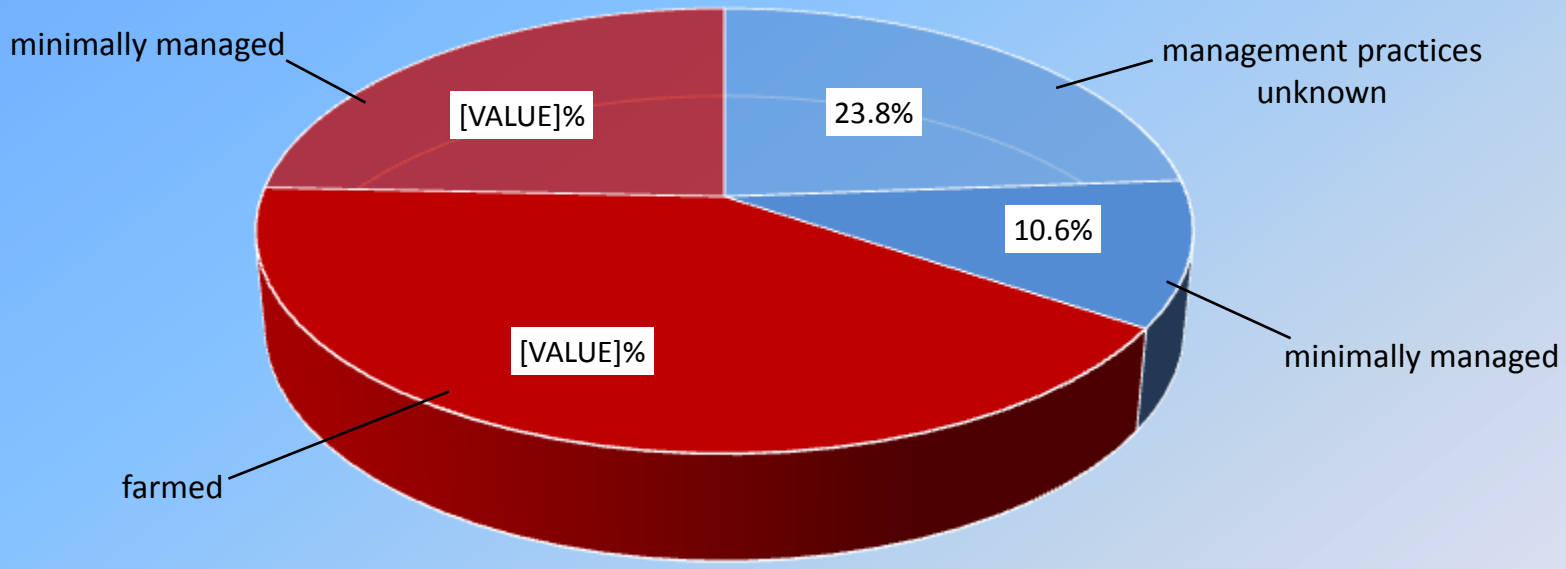


Proportion of 2790 sera that tested positive and negative for anti-*M. bovis* antibodies, sorted by year of collection. The group designated "unknown" was collected between either 1996 and 1998 or between 2002 and 2006.



Proportion of sera that tested positive for anti-*M. bovis* antibodies, sorted by herd, farm or single source of origin and collection date. Not represented are 155 sera from Canadian bison in the Hook Lake herd (Can-O, 5.8% positive) known only to have been collected between either 1996 and 1998 or 2002 and 2006. Note that one Canadian herd (Can-O) was sampled on three different occasions while one Canadian herd (Can-P) and three U.S. herds (US-M, US-N and US-O) were sampled on two different occasions.

Management Practices Used at the Location of Origin



Proportion of the 2790 sera in this study collected from U.S. bison (blue segments) or Canadian bison (red segments), further categorized according to management practices at the location of origin. No sera in the study are known to have originated from farmed bison in the U.S.

Effect of Management Practices on Seroprevalence

Management practice, year collected	% pos
Minimally managed, all (n=974)	4.6
Farmed, all (n=1152)	7.7

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Farmed, 1999 or earlier (n=526)	5.3
Minimally managed, 2000 or later (n=553)	4.2
Farmed, 2000 or later (n=626)	9.7

Collaborators:

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Steven Sweeney – USDA/CEAH/VS
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Bill Boatwright - USDA/ARS/NADC