

Data Based Determination of Optimal Micro Isolator (MI) Top Change Interval for Rat and Mice

Zach Freeman

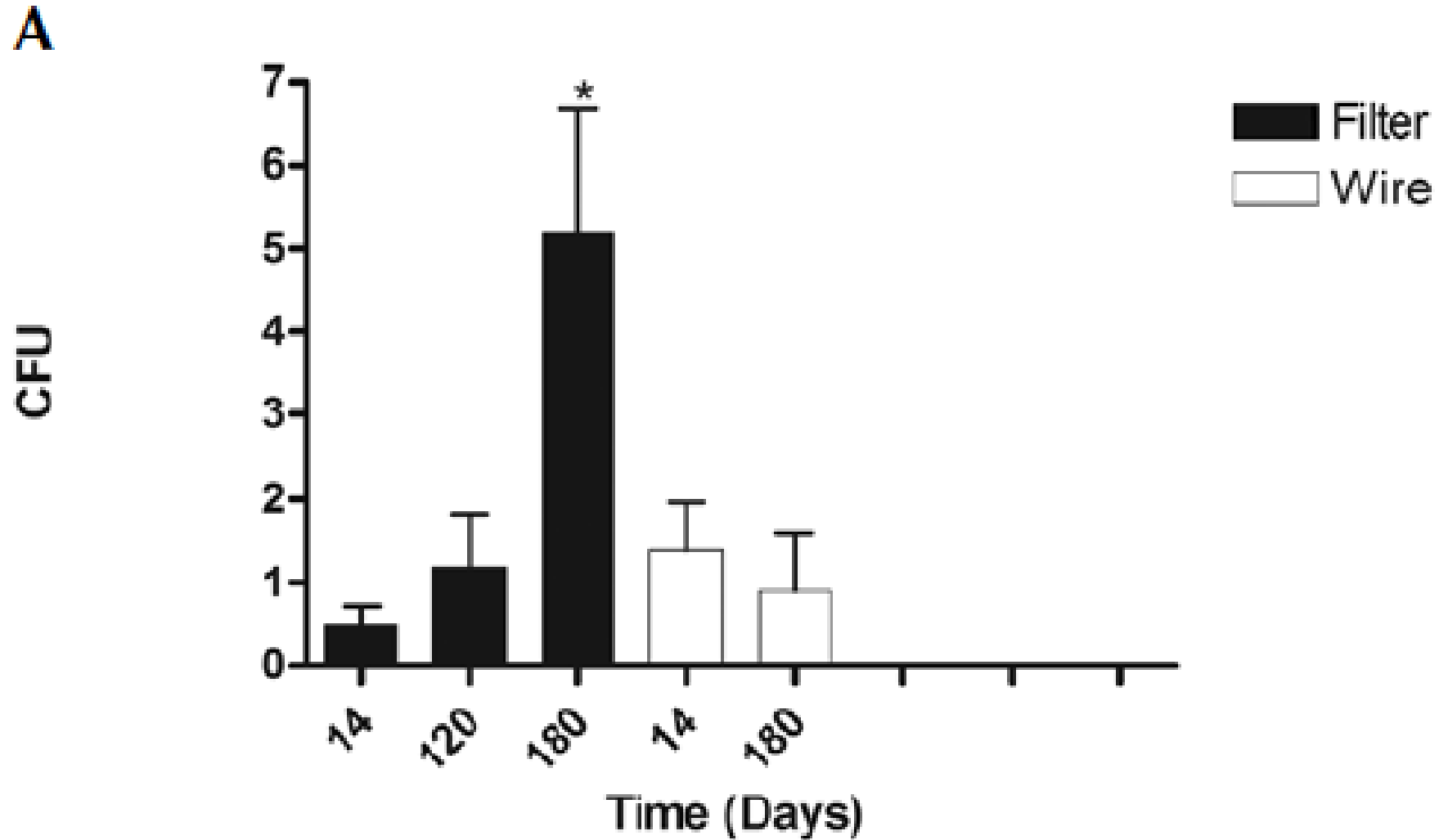
1/29/2018

The Guide 8th Edition p70

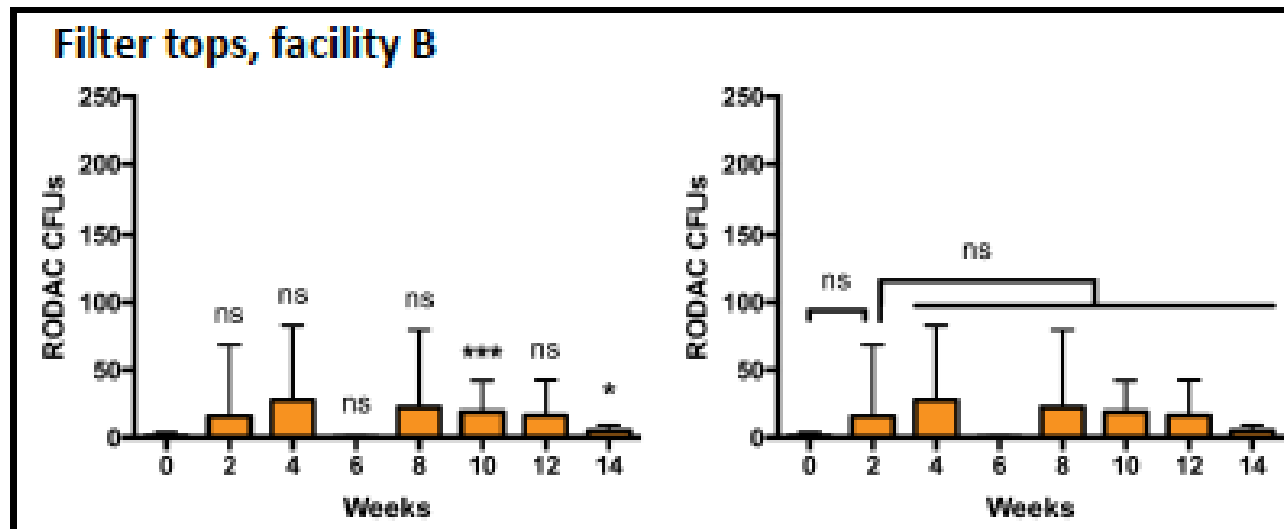
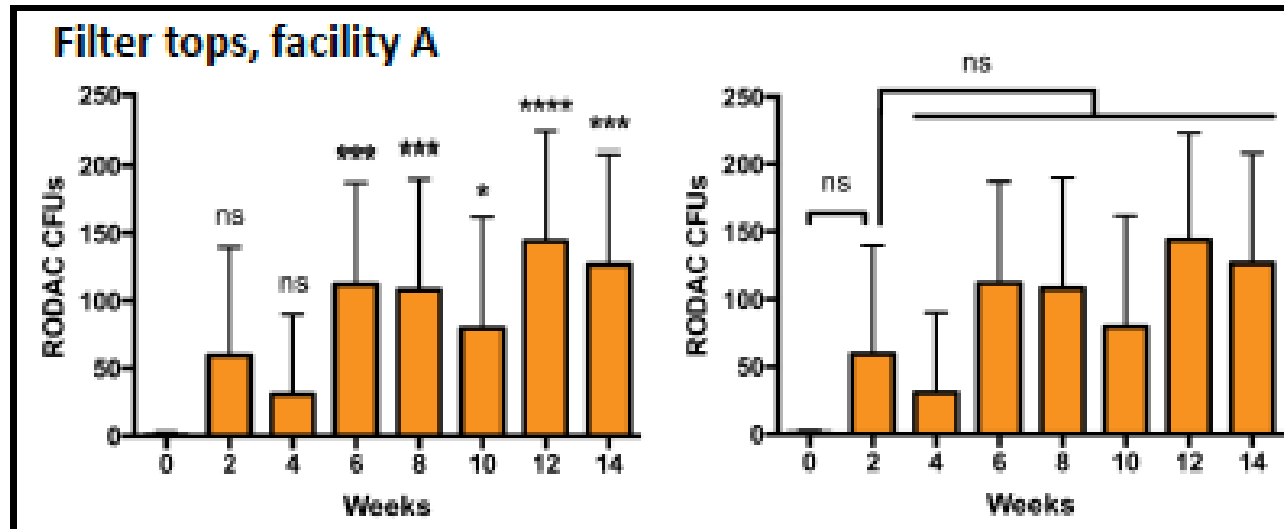
- “The frequency of sanitation of cages, cage racks, and associated equipment (e.g., feeders and watering devices) is governed to some extent by the types of caging and husbandry practices used, including the use of regularly changed contactor noncontact bedding, regular flushing of suspended catch pans, and the use of wire-bottom or perforated-bottom cages. In general, enclosures and accessories, such as **tops**, should be sanitized at least once every 2 weeks”

What evidence exists to support this?

MI tops accumulate gram negative bacteria by 180 days



MI tops accumulate gram positive bacteria by 6-10 weeks



Research questions

- How do mice and rats differ with respect to MI top bacterial accumulation?
- How does the ventilation system alter MI top bacterial accumulation over time?

Study design

- Study to determine based on microbiological loads to determine optimal time
 - MI tops sampled at Day 0, 14, 30, 60, 90, 120
 - Tested 5 different types of rack ventilation systems
 - Same racks
 - Mice and rats

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- **RODAC** plates used to sample bacteria from MI tops
 - Statistically significant change from 2 weeks
 - American Public Health Association
 - < 25 colony forming units (CFU) = Good
 - < 50 CFU = Fair
 - Too many to count = 250 CFU



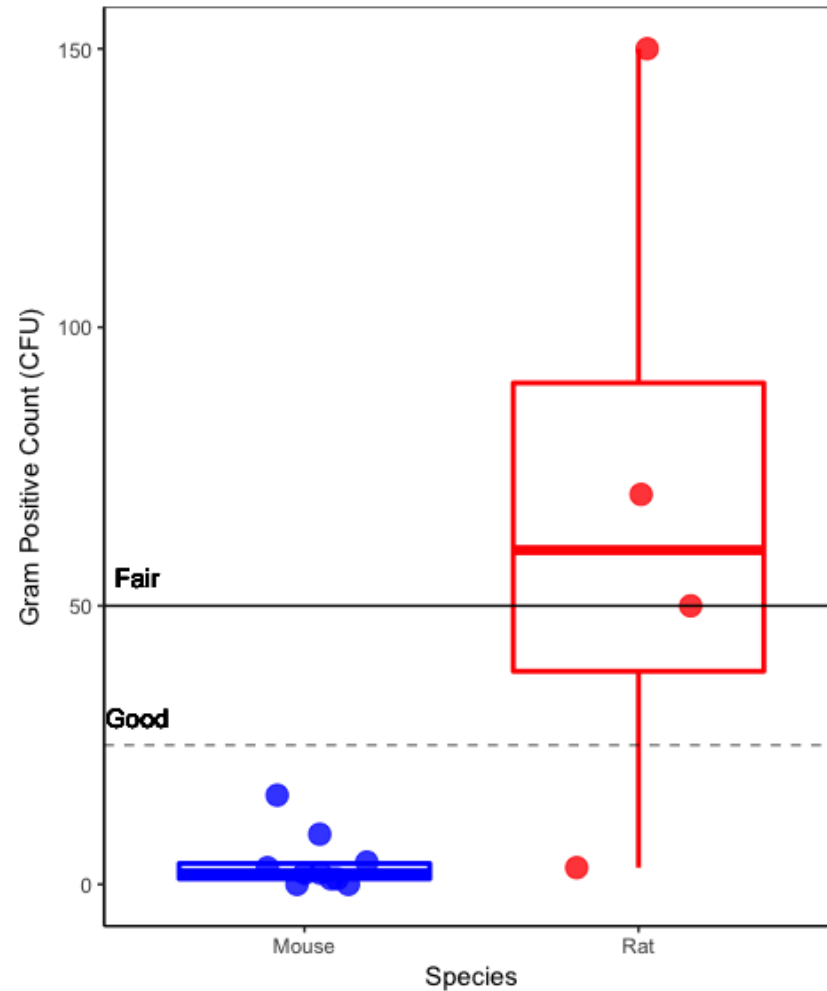
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- Sentinel animals used
 - Represents highest microbiological load potential

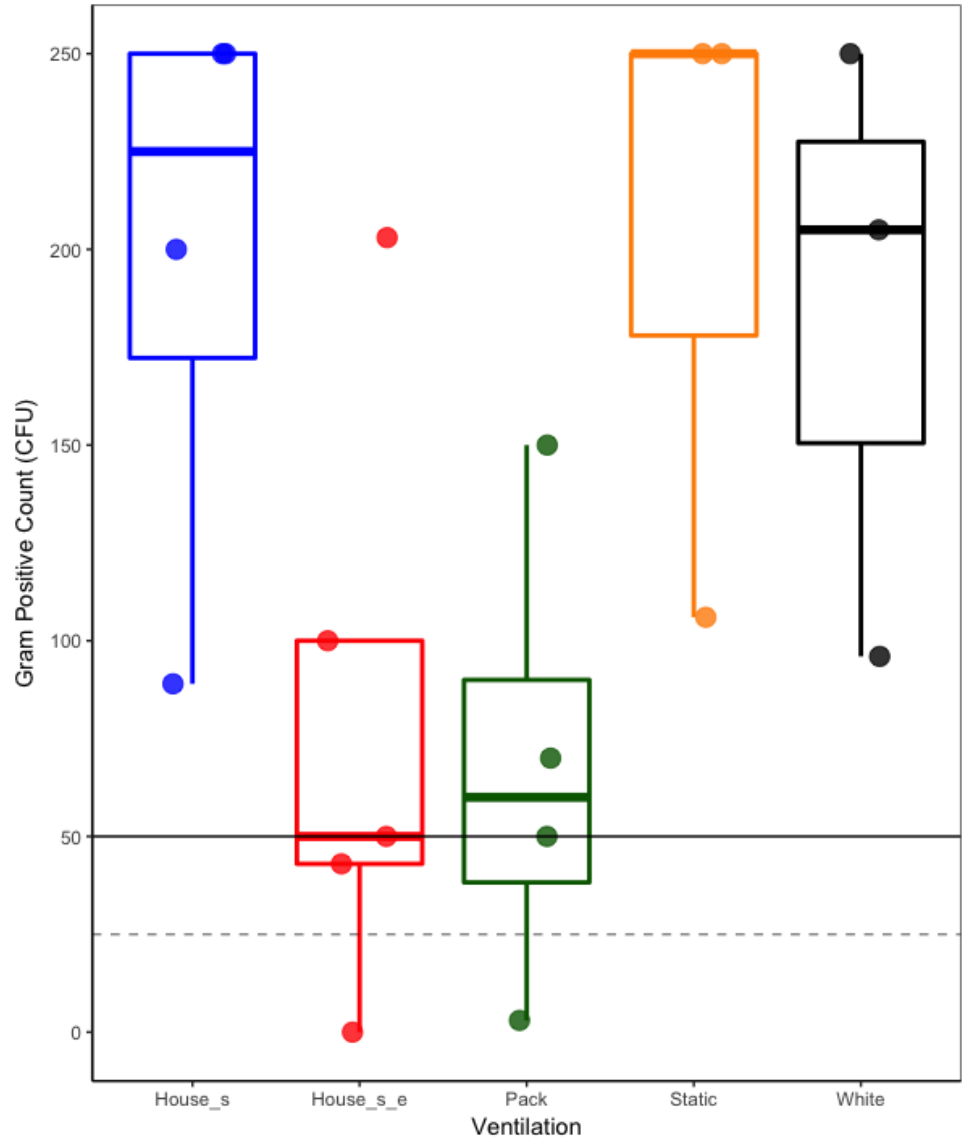
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Mouse and rat cages differ in MI top bacterial loads



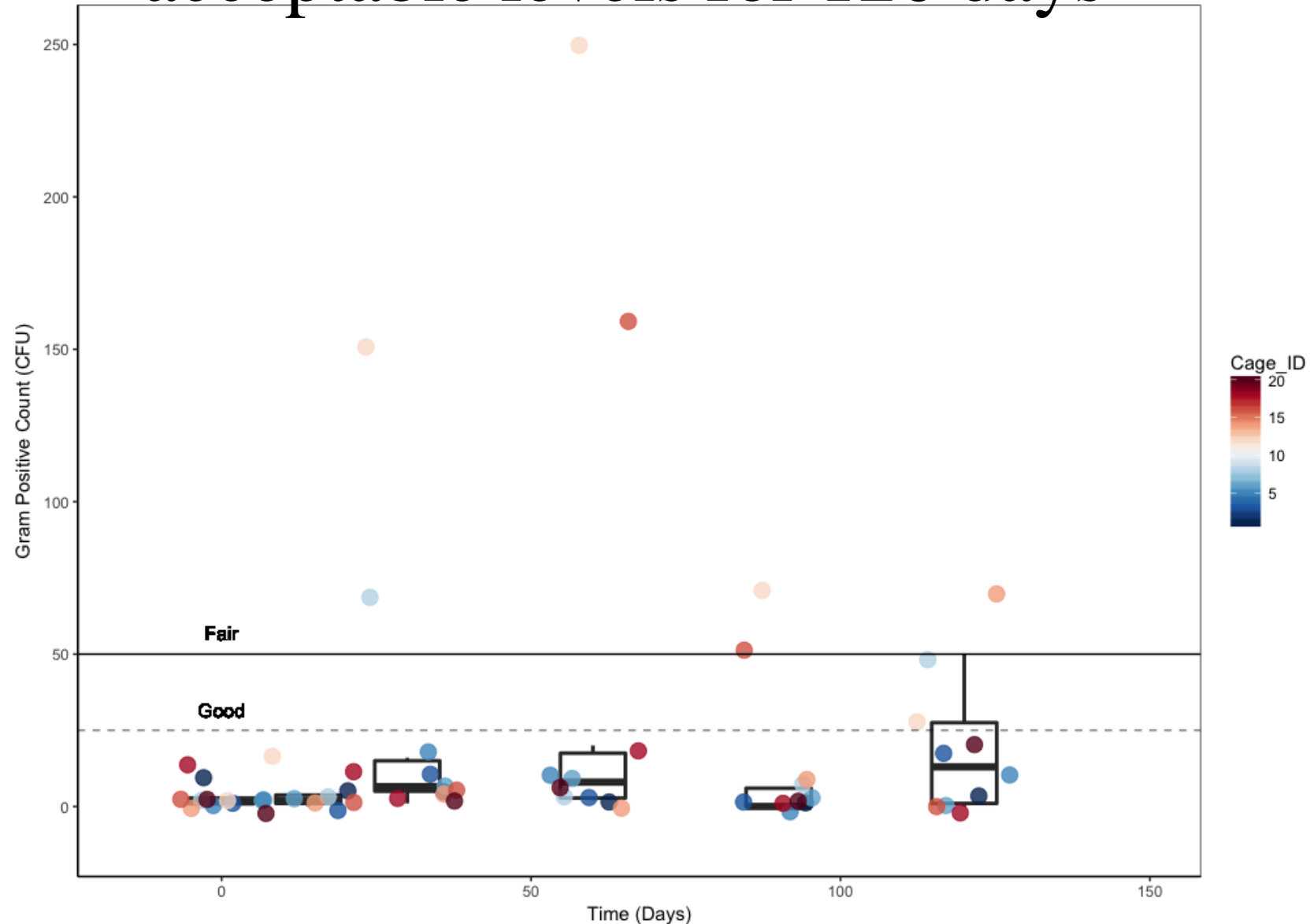
Rats have increased MI microbial loads on all ventilation types



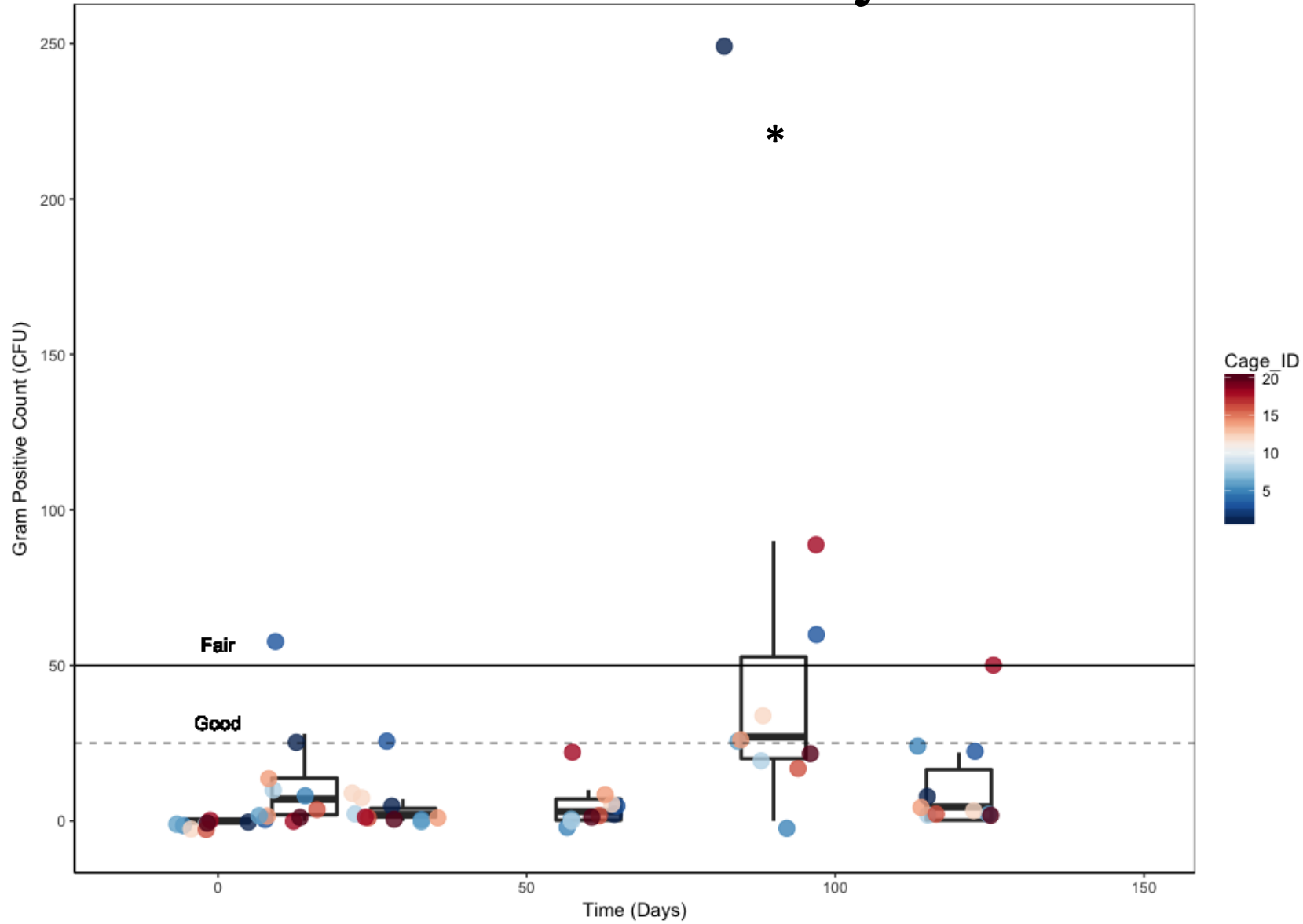
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Self contained ventilation system keep MI top bacterial at acceptable levels for 120 days

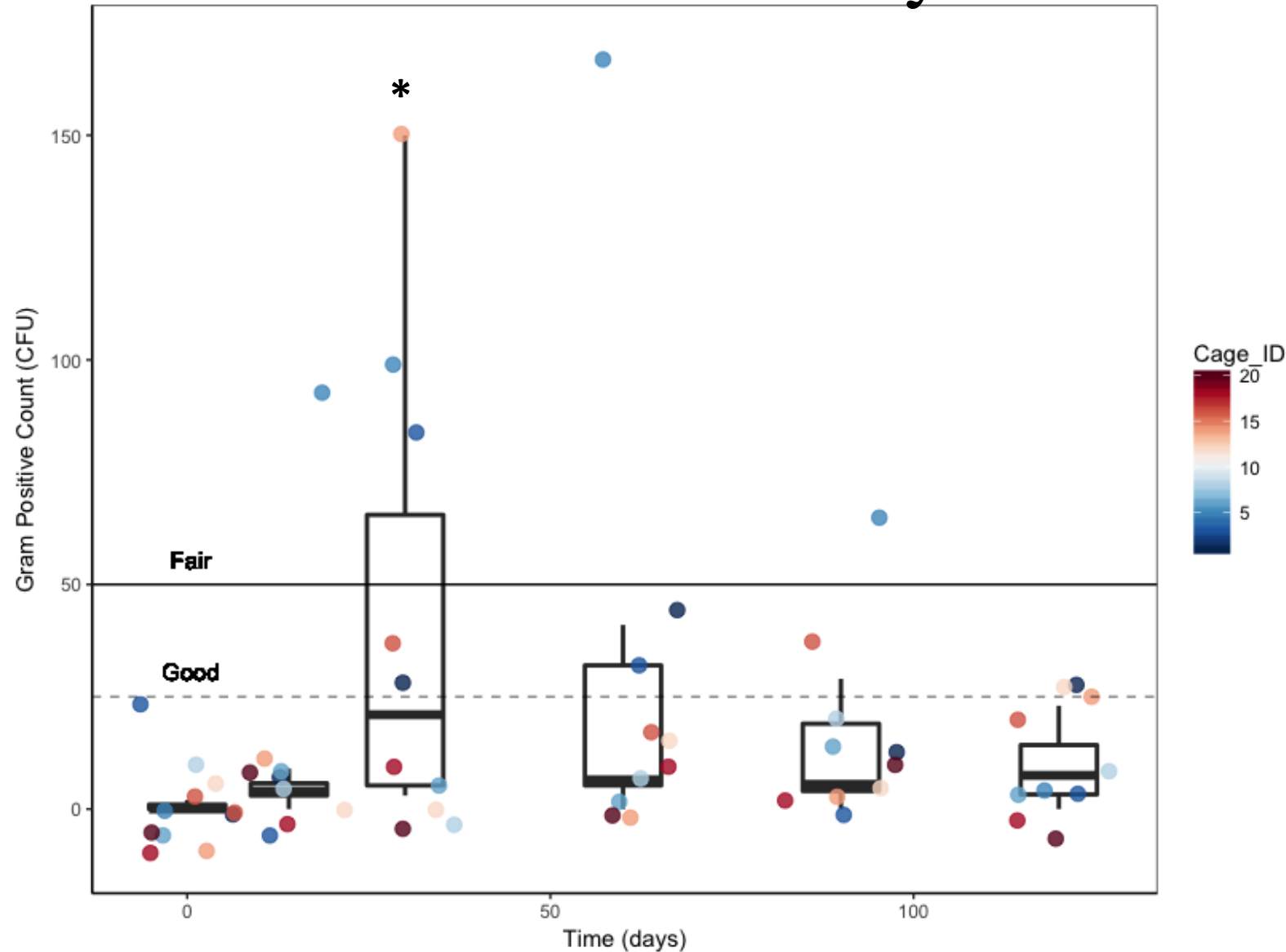


House ventilation system keep MI top bacterial at acceptable levels for 90 days



* $P < 0.05$

Different house ventilation system had increased MI top bacterial at 30 days



Recommend changing MI tops at 90 day interval for mice:

- Exceptions:
 - Rats
 - All blower types
 - 14 days
 - Mice
 - Some blower types
 - 30 days

Impact:

- 2 technicians, 3 cage wash FTE Savings/ year
 - 50,000 cages

Future directions

- Other cage components
 - Feeders
 - Wire bars
- Validation of ATP luminometer

Acknowledgments

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VOEN Analytics Conference 2018

Impact Summary



Title: ***Data-based Determination of Optimal Micro Isolator Top Change Interval for Rat and Mice Across Five Types of Ventilation Systems***

Problem and analysis method: Microbial loads (RODAC plates, measured as colony forming units (CFU)) were analyzed on MI tops from different ventilation systems (n=5) for mice and rats (n=10 cages/ventilation system) over 120 days (T= 0,14,30,60,90,120 days).

Summary: We found that the time to unacceptable microbial loads on MI tops from rat and mouse colonies was 14 and 90 days respectively. We also found that there was a variation in time require to change for MI tops from mouse cages that varied from 14 days to 120 days depending on the ventilation system used.

Impact of the analytics study

Decisions made/Actions Taken: For the majority of mouse housing systems we now change MI tops at a 90 day interval.

Calculated or actual Improvements:

5 FTE /50,000 cages/year (2 technicians, 3 cage wash) in savings