

Use of a Trained Canine to Detect *Clostridioides difficile* in the Hospital Environment

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1. Introduction

Clostridioides difficile infection (CDI) is the most common nosocomial infection in this country. We know spores contribute to spread of infection. How do we know that all the *C. difficile* spores have been eradicated after a patient's room is cleaned? Currently we have no validated method.

Current literature has demonstrated that canines have high levels of sensitivity and specificity for detecting the odor produced by *C. difficile* and its spores.

2. Methods

Harley's training:

- Included positive and negative culture plates containing *C. difficile*.
- When 2 years old she was taught by a professional trainer to sit when she detected *C. difficile* and to not sit when *C. difficile* was not found. She was rewarded with treats when *C. difficile* was found.
- She was able to identify positive stool samples with near 100% accuracy.

Harley in the hospital setting:

- Once proficient, Harley was used to sniff rooms at Vidant Medical Center occupied by, or previously occupied by, patients with CDI as well as cleaning carts.

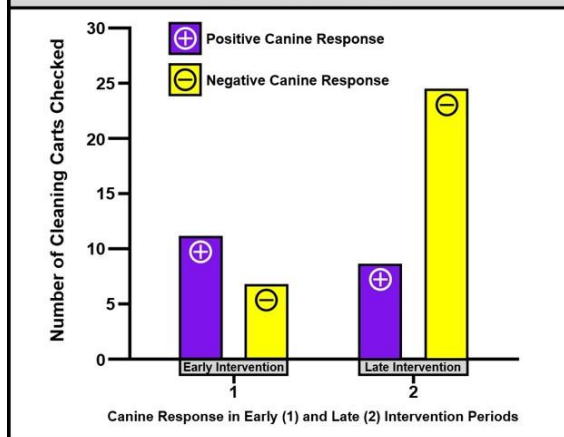
Early intervention: October to January 2019

- Number of carts sniffed positive and negative by Harley were measured.
- The cleaning staff were instructed on how to clean their carts with bleach wipes.

Meet Harley!



Cleaning Carts Sniffed by Harley for *C. difficile*



Late intervention: February to March 2020

- Again, the number of carts sniffed positive and negative by Harley were measured.
- A Fisher's exact test was used to determine differences between early and late testing.

The study was approved by the Animal use and Care Committee at ECU.

3. Results

- Harley detected *C. difficile* in **51% (24/45) of rooms** inhabited with patients positive for CDI. Harley detected *C. difficile* (or its spores) in **46% (13/28) of rooms** previously inhabited by patients with CDI.
- We observed a statistically significant decline in positive carts and an increase in negative carts during the late intervention period ($p = 0.017$).
- Harley did not detect *C. difficile* in any positive areas after they had been cleaned with bleach wipes.

4. Conclusions

- Hospital cleaning carts are commonly contaminated with *C. difficile* spores.
- Training a canine to detect *C. difficile* and its spores is an effective means of detecting the organism in the hospital environment.
- Use of a trained canine appears to be effective in validating the cleaning process of rooms that have been previously occupied by patients with CDI.

5. References

1. M Bomers, M Agtmael, H Luik, M Veen, C Vanderbroucke, Y Smulders "Using a dog's olfactory sensitivity to identify *C. difficile* in stools and patients: proof of concept study" *BMJ* 2012;345:e7396
2. CDC "C.diff Guidelines and Prevention Resources"
3. "C. difficile Canine Scent Detection at Vancouver Coastal Health" – www.vch.ca/your-care/your-safety-privacy/infection-