Dogs Sniffing Out Superbugs

Dogs can sniff out Clostridium difficile in stool samples and even in the air surrounding patients in a hospital with a very high degree of accuracy, finds a study in published in the *British Medical Journal*. The findings support previous studies of dogs detecting various types of cancer and could have great potential for screening hospital wards to help prevent C. difficile outbreaks, say the researchers. C. difficile infection most commonly occurs in older people who have recently had a course of antibiotics in a hospital, but it can also start in the community, especially in care homes. Symptoms can range from mild diarrhoea to a life-threatening inflammation of the bowel.

Early detection is vital to prevent transmission, but diagnostic tests can be expensive and slow, which can delay treatment for up to a week. Diarrhoea due to C. difficile has a specific smell, and dogs have a superior sense of smell compared with humans. This prompted researchers in the Netherlands to investigate whether a dog could be trained to detect C. difficile.

A two-year old male beagle (called Cliff) was trained by a professional instructor to identify C. difficile in stool samples and in patients with C. difficile infection. He was taught to indicate the presence of the specific scent by sitting or lying down. The dog had not been trained for detection purposes before. After two months of training, the dog's detection abilities were formally tested on 50 C. difficile positive and 50 C. difficile negative stool samples. He correctly identified all 50 positive samples and 47 out of 50 negative samples.

This equates to 100 percent sensitivity and 94 percent specificity (sensitivity measures the proportion of positives correctly identified, while specificity measures the proportion of negatives correctly identified). The dog was then taken onto two hospital wards to test his detection abilities in patients. He correctly identified 25 out of 30 cases (sensitivity 83%) and 265 out of 270 negative controls (specificity 98%). The researchers add that the dog was quick and efficient, screening a complete hospital ward for the presence of patients with C. difficile infection in less than 10 minutes.

They point to some study limitations, such as the unpredictability of using an animal as a diagnostic tool and the potential for spreading infections via the dog, and say some unanswered questions remain. However, they say their study demonstrates that a detection dog can be trained to identify C. difficile infection with a high degree of accuracy, both in stool samples and in hospitalised patients. "This could have great potential for C. difficile infection screening in healthcare facilities and thus contribute to C. difficile infection outbreak control and prevention," they conclude.

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