

## LECTIO PRÆCURSORIA

### *On the Trail with a Disease Detection Dog: Collaborations at the Edges of Medical Research*

23 February 2024, University of Helsinki

Honoured Custos, honoured Opponent,  
members of the audience,

Many of you here today likely have a dog or you have had a dog at some point in your life. Or, if you have not had your own dog, you probably know a friend who does. Many of you with a dog in your life might have encountered an intriguing phenomenon. For example, you have a knee ache or a sore toe or a wound on your skin. For some reason, your dog begins to show a peculiar interest in that specific area of your body, smelling it, perhaps trying to lick it insistently despite you trying to stop them from doing so.

In 1989, two British doctors (Williams and Pembroke 1989) wrote to the prestigious medical journal *The Lancet* about their patient. She arrived at the clinic describing how her pet dog had shown a recurrent interest in a lesion on her leg, repeatedly licking it. The lesion on the owner's leg turned out to be skin cancer (Williams and Pembroke 1989). This, and similar anecdotes since then, gave rise to an emerging research field that explores the use of dogs in detecting different types of diseases, such as cancers, bacterial infections, and, most recently, COVID-19. In more recent times, a growing number of research articles has, thus, suggested that dogs can detect diseases through their olfactory sense—that is, through their sense of smell. This led to considerations about

the potential of using disease detection dogs as part of medical scientific research, diagnostics, and clinical health care.

The thesis that I defend here today, titled ‘On the Trail with a Disease Detection Dog: Collaborations at the Edges of Medical Research’, explores the use of scent detection dogs in medical research and diagnostics. In my thesis, I ask the following: How are dogs made into medical devices? How is medical knowledge produced about, through, and with disease detection dogs? And, what kinds of networks are created around and through dogs to introduce them to the context of medical research? To answer these questions, I followed one particular research project here in Helsinki which focused on training dogs to smell different types of cancer and, later, COVID-19. Some of you might remember the ‘corona dogs’ at the Helsinki-Vantaa Airport at the beginning of the pandemic. These dogs smelled COVID-19 infections in passengers arriving to Finland as a part of the health security measures. I return to this experimental diagnostic service later in this lectio.

Throughout my thesis, I bring forth the argument that harnessing the olfactory skills of dogs for use in medical research and diagnostics is a complex process that requires bringing together many different kinds of actors, entities, and practices. Rather than concentrating on the dog as a particular kind

of organism, I emphasise the importance of analysing the surroundings and structures through which medical knowledge about and with disease detection dogs becomes possible and is produced. In this process, it is important to establish collaborations and work across differences—whether epistemological, methodological, institutional, personal or between species. Despite the popular narratives of dogs as ‘naturally’ suitable for scent work, making dogs into medical devices requires infrastructural support, development, and maintenance across institutional divides.

Let me go back for a moment and recount the first steps in my research process.

It was summer 2018, and I was at a party, casually conversing with someone who mentioned a research project in which they were training dogs to smell cancer. This instantly piqued my curiosity and I asked more about the project to which he was referring. The initial moment of my surprise indicated that there might be something interesting going on here, although it was difficult to pinpoint exactly what it was.

Quite soon after, I found myself standing in a parking lot in front of a commercial office space, waiting to meet the project leaders, ready to hear more about the phenomenon. As I stood there, a white van pulled up next to me. A woman in her late 40s jumped from the driver’s seat and let a mixed-breed greyhound out from the passenger side door. The woman came towards me, shook my hand, and introduced herself as Leena. Then, she said, gesturing towards the dog, ‘don’t mind that one’ (*älä välitä tuosta*), as the dog squirrelled around the parking lot. The two of them went for a short walk to the nearby trees; when they returned, Leena explained how her dog, Kössi, needed to ‘scan’ people first before he became acquainted with them. Soon, Kössi approached

me, coming close and pressing himself against my legs. I had read about him in the news and knew that he had already been trained as a cancer detection dog as a part of the research project Leena was coordinating. I wondered what he might smell or sense from me. I had just had a benign tumour surgically removed a week earlier, and I thought he might not be able to smell it. Regardless, it seemed that we had already become friends.

Meeting Kössi in that parking lot that summer was the first time I encountered a disease detection dog. Before that meeting, I had browsed through the website of Pro-Sniff, the association that was doing research with disease detection dogs and of which Kössi was a part as well. The website presented stylish photos of dogs sniffing laboratory test tubes with colourful liquids against a white background, conveying the idea that the dogs were already working in the medical setting, although they were, obviously, dogs, and, thus, lacked the characteristics of a typical medical instrument. These photos defied the obvious boundaries or analytical categories, such as nature versus culture or biology versus technology, raising questions about how this kind of research might be possible considering the strict methodological and technological standards seemingly characterising the world of medicine.

The owner of Kössi and the scientific leader of the dog research project generously welcomed me to start my PhD journey with them and, as Bruno Latour (1987) would say, ‘follow them in action’—that is, following how the research around disease detection dogs was conducted at the grass-roots level. I began taking part in the everyday life of the dog training facility, where Kössi and many other dogs were being trained. I learnt the intricate details of disease detection with dogs, its requirements and methods, and

the joys of succeeding as well as frustrations when things did not always go as planned.

Kössi became the primary dog protagonist in my thesis as I followed him in the laboratory, in media representations, and, finally, at the Helsinki-Vantaa Airport during the pandemic. However, my thesis is more than a love story between me and Kössi. As Donna Haraway (2012) argues, encounters between individual members of species can work as a starting point for tracing associations across scales and kinds, across time and geographic sites. That is, Kössi worked as an entry point to understand the wider circumstances enabling disease detection dog work and research. I was interested, not just in the dogs themselves, but the project around them. My premise was that research or technological development, as theorised in the anthropology of science and in science and technology studies, involves bringing together a variety of actors and entities, not all of which are 'scientific'. Rather, research happens in a variety of locations, not just inside a lab, but extending beyond it, thereby blurring the boundary between science and society.

Thus, rather than focusing on understanding the intimate relationship between individual dogs and humans, I was interested in how the emerging research field surrounding disease detection dogs is constructed, what it requires, and what possible challenges might emerge along the way.

During my research process, I have often been asked if dogs can really smell diseases or whether they should be used in diagnostics. I have not aimed to make such judgments. Rather, I have looked at the processes and practices that were assembled around the dogs, the social and material dimensions, and structures that formed a web of connections and, at times, were also kept apart.

As you know, dogs have previously been

used in many scent detection jobs, such as bomb or drug detection to mention just a few examples. We are already accustomed to the idea that dogs work alongside humans in different settings and perform important societal work. Against this background, disease detection in medical research does not seem that different. It has, however, its own particularities.

Let me briefly explain more about the material and technical dimensions entailed.

Contrary to what my first intuitive reaction to Kössi would suggest, the disease detection dogs I am talking about here today are not trained to smell tumours or other diseases directly in people. Instead, they are trained using biological samples, such as urine or sweat. Healthy and diseased samples are presented to the dog and, when sniffing the diseased samples, the dog is rewarded. When this is done repeatedly, the dog is supposed to learn the odour of the disease and discriminate between healthy and diseased samples. The goal is that the dog generalises the odour of the disease from the samples with which they are presented. In order to be successful, training dogs requires collecting a lot of samples from many different individuals. Otherwise, instead of learning the disease odour, the dog might learn the smell of specific individuals.

Unlike drugs, for example, the smell of a disease is not known to humans. Thus, in order to avoid accidentally teaching the dog the 'wrong thing', a variety of measures is needed. As I mentioned, one central issue is collecting a large number of training samples. Another is that samples should be handled in such a way so as to avoid systemic bias. If diseased and healthy samples have some kind of systemic difference between them, the dog might learn that difference. For example, if diseased samples are collected from a hospital setting and healthy samples from elsewhere, the dog might pick

up the odour of the hospital. Such a systemic bias could lead to the illusion that the dog has learnt the odour of the disease, when, in fact, they have learnt some other characteristic from the samples. Therefore, much care and planning go into building the necessary olfactory infrastructure for training disease detection with dogs.

Therefore, even if in theory it might be easy and fast to use dogs to detect diseases once they are trained, building a research project around them is a slow process. Moreover, disease detection dog research seems to challenge the idea of who contributes to medical research and how. For instance, the role of nonacademic actors is central to this area of research, and this was the case also in the project I followed. Although led by a veterinary scientist, the daily life of the laboratory was largely managed by the association that had been founded by lay dog handlers. However, it was important to find medical doctors with whom to collaborate so that research on human biological samples could be conducted officially and the results could be published in academic journals. Connections to established medical institutions could also offer access to biological samples, crucial to training dogs. Finding such connections was not always straight forward, thereby resulting in visible challenges to establishing new lines of research within mainstream research infrastructures.

When I first started my own research project, dogs had hardly been used in large-scale, real-life experiments. It was more like a future imaginary. Instead, dogs were imagined as working best alongside medical scientists in the labs, since it seemed unlikely that dogs would be welcomed in clinical settings anytime soon.

However, in spring 2020, the COVID-19 pandemic started. Just as the urgency of the pandemic accelerated medical research to find new diagnostic methods to curtail the spread of the virus, it also provided new opportunities

for disease detection dog research projects, including the one I had been following. Suddenly, Kössi appeared in the news, which reported that he had learnt to smell COVID-19. Soon after, a new experimental pilot study with COVID-19 detection dogs was planned. Only a few months later, in September 2020, a pilot programme was launched at the Helsinki-Vantaa Airport, where dogs were employed to sniff passengers arriving to Finland. A special metal booth was built in the airport and passengers could volunteer to take a dog test. You would walk into a small booth, wipe your neck and wrists with a tissue, and, then, through a small window, hand it over to the dog and their handler. About 30 seconds later, you would receive a paper with your test result. I took the test, and I received a paper back, saying, 'The dog thinks you do not have COVID-19.' Although this was not an official diagnostic test, I must say this information was relieving.

The dog service proved to be a success, attracting media attention globally. Although research with disease detection dogs had been conducted by different groups in many countries already, the pilot programme at the airport was one of the first to employ dogs as screening devices to curtail the COVID-19 pandemic. Four dogs working at the airport received the annual 'hero dogs' of the year award from The Finnish Kennel Club. On social media, the pilot programme was hyped as well as debated. Some were critical of how fast the dogs were operationalised and doubted the reliability of dogs in screening situations, whereas others argued that dogs should be included in the updated law on infectious diseases.

One of the first imageries evoked by the concept of 'disease detection dog', for me as well as for many others I talked with in the course of writing this thesis, was that, as one strolls down the street, sniffer dogs might begin

spontaneously alerting strangers that they have cancer. This uncanny vision evokes feelings of intuitive amusement as well as an uneasiness, a sense of ambivalence, and challenging norms of privacy and personal boundaries. One source of this ambivalence might be the fact that the device is an animate being with partial autonomy resisting human control. Through the dog, dog owners might learn about intimate aspects of their fellow humans without them even knowing. Once a dog is trained to smell a disease, how would that ability be contained? A dog as a medical device thus feeds our imagination in many ways. However, the wildest scenarios of dogs alerting us to diseases in random people on the street may prove to be more of a canine version of a techno-dystopian/utopian science fiction future rather than actually becoming reality any time soon.

To conclude, making dogs part of medical research is not a question that remained isolated within the lab or what is called the 'world of science'. Instead, various groups and experts, including scientists from different research areas, medical companies, stakeholder groups such as patient organisations and professional dog trainers, and funding agencies all took part in the collaborative network that made research with dogs possible and shaped it in different ways. In attempting to attract resources and partnerships for the project, Kössi often played the role of the charismatic star dog, evoking both criticism and admiration. Indeed, his figure was at times also controversial, but I have refrained from making definitive judgments about the 'true' Kössi, his feelings or abilities. Instead, controversies and uncertainties around Kössi and his abilities resonate with the more general dynamics in any emerging research area in which questions of what counts as 'true' knowledge or appropriate methods are still debated and have yet to be stabilised. Given this dynamic, it is not uncommon that the status

of the research field itself is uncertain, and it remains to be seen, how the research field continues to develop. Here in Finland as well as elsewhere, research with disease detection dogs continues, although Kössi has since retired from detection work, while new dogs and their handlers continue the work.

I have, thus, shed light on the *more-than-canine* issues shaping working relations and processes of medical knowledge production with, through, and about disease detection dogs, arguing that making disease detection dogs 'work' requires attention to conditions and structures in which such work becomes possible. This thesis itself might be considered a kind of counternarrative to the popular narratives and assumptions about dogs as 'natural noses', arguing instead that dogs are 'made' into devices rather than born as such. In a way, celebratory narratives surrounding disease detection dogs are like a double-edged sword. On the one hand, they offer justification for doing and investing in dog research so that it might solve challenges in diagnostics and public health care, struggling with rising costs as well as causing suffering for individual patients, either due to misdiagnosis or the invasiveness of a diagnostic procedure. On the other hand, the narrative about dogs as easy, fast, and cheap might undermine the justification for continuous investments in new kinds of infrastructures that are nonetheless crucial for dog training and research. This might be a kind of paradox. Or just business as usual.

Honoured Opponent, I now call upon you to present your critical comments on my dissertation.

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