

# THE FUTURE OF WEARABLE HEALTHCARE IN THE VETERINARY PROFESSION

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*Its 6:55AM and Jane's smartphone alarm is vibrating angrily on her bedside table. Still half-asleep, she reaches across to silence it and notices a new notification on her homescreen.*

*'Virtual Vet: one new message,' it reads.*

*Squinting, she swipes her thumb across the phone to open the Virtual Vet application. A smiling avatar flashes up on the screen – a dark haired man in a white coat with a stethoscope dangling from his neck. She vaguely remembers selecting him when she set up the application to monitor her terrier Alfie's Vetcheck™ microchip.*

*'We've noticed Alfie's not been feeling himself recently,' reads text that pops up in a speech bubble next to the bobbing head. 'He's drinking and peeing more than normal. Do you want to find out more information?'*

*With a confirmatory click Jane is presented with a whole barrage of text: 'Potential diagnoses: kidney failure, Cushing's syndrome, diabetes... Treatment options... Costs... Outcomes... Recommended specialists.' She scrolls through quickly.*

*The bobbing head reappears at the corner of the screen: 'Would you like to schedule a vet appointment or talk with one of our online veterinary experts immediately?' Her thumb lands on the former option and up flashes a list of available appointments at her local veterinary practice.*

*She selects, '9:20AM' and does a mental calculation over how quickly she'll have to rush the kids into school. 'We're forwarding Alfie's health data from the last three months to your vet,' the grinning head informs her. 'Have a nice day!'*

If that all seems a little too anchored in the realms of science fiction, think again. Wearable technology that is designed to organise our daily lives, monitor our body functions and revolutionise our medical care already exists, and is likely to become an integral part of medical and veterinary sciences.

Imagine having a device which could literally save your life. It could detect an arrhythmia or stroke, flag up gradual weight gain and monitor chronic disease. It would record information about your temperature, heart and respiration rate, pulse, activity level, muscle mass, dietary and calorific intake, hydration and bowel movements. Furthermore, considering for a second that your current washing machine has the same processing power as the rocket which delivered the first of mankind to the moon in 1969, expect it to be unobtrusively, unnoticeably small. Once this technology exists, it will be essential and it will be everywhere.

How will this impact the veterinary profession? Here are just a few possibilities:

- Instant assessment of basic health parameters would free up more time for diagnosing and treatment and triage in emergency cases.
- Remote health data recording would be less invasive for the patient when near-constant monitoring is required or when highly contagious or zoonotic infection presents a risk for attending staff.

- Months' worth of recorded data would provide the clinician with more subjective and detailed assessment of the patients' history.
- An accurate individual baseline of specific health parameters such as temperature and heart rate could be recorded, especially in otherwise healthy patients who are not otherwise regularly screened by veterinary professionals.
- Chronic or acute disease onset could be detected, for example reduced activity levels over time due to gradual-onset osteoarthritis, or a sudden spike in the temperature in a Shar-Pei suffering from episodic familial Shar-Pei fever syndrome.
- Subclinical conditions or disease which 'waxes and wanes' could be picked up with far more accuracy than through reliance on a reported history.
- The response to long-term medication could be subjectively monitored.

Of course, examples of wearable technology are already being used in different areas of the profession with success; from pedometers on dairy cattle which predict the onset of oestrus, parturition and lameness, to harnesses fitted with electrocardiography to monitor cardiac function in small animals over extended periods of time. Dog and cat collars which provide information on heart rate, temperature, pulse and activity levels are already on the market (although they are not in widespread use yet).

The difference between this technology and that which may be available in the future is a) the accuracy and range of data possible to monitor and b) its accessibility by the client. The advent of the internet has already changed the consulting room dynamic in the last fifteen years – how many vets have to deal on a daily basis with a pet who has come in already rightly or (often) wrongly 'diagnosed' by its client thanks to a bit of misinformed googling? In the future, the client may well be armed with an extensive database of health statistics for its animal that is synchronised directly to their smartphone or computer! They may even have the option to outsource the data to a remote vet or an algorithm which can provide them with a preliminary set of differential diagnoses, treatment options and prognoses.

The veterinary profession needs to involve itself in this movement in technology early, so that we can have some input into its development. We should embrace the opportunity for our clients to become proactive in monitoring their animals' health and promote the usefulness of this tool for seeking prompt veterinary intervention. Working with developers will ensure that technology is marketed to consumers as an aid to veterinary care instead of an alternative to it.

The need for a full hands-on physical examination and evaluation of a patient will still always be a necessary part of veterinary medicine. The future of the 'work-from-home' vet diagnosing and treating patients from behind the keyboard or across a smartphone application would seem to be a long way off. There will still be a need for a human's mental database of health and disease recognition; a grasp of the ethical and moral and miscellaneous complications of individual cases that could never be imitated by algorithms. The 'art' of veterinary medicine is unlikely to be radicalised in the next fifteen years, but the advancement of wearable day-to-day health monitors is one way that the 'science' will change dramatically.