

Challenges to exotic disease preparedness in Great Britain: The frontline veterinarian's perspective

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Abstract

Background: Exotic diseases pose a significant risk to horse health and welfare. Several stakeholder groups, including primary care veterinarians, share responsibility for maintaining freedom from pathogens that cause exotic diseases. However, little is known about the current state of exotic disease preparedness within the British horse industry.

Objectives: The aim of this study was to explore equine veterinarians' experiences of, and attitudes towards, exotic disease preparedness in Great Britain.

Study design: This is a qualitative interview-based study.

Methods: Semistructured interviews were conducted with 14 primary care equine veterinarians in Great Britain. Participants were purposively selected to include perspectives across varying levels of experience, clientele and location. All interviews were recorded, transcribed verbatim and analysed using thematic analysis.

Results: Three themes were developed: (a) *the reactive generalist*, relating to participants' self-concept of their role as primary care practitioners; (b) *working within the bounds of influence*, encompassing participants' perceived inability to influence their clients' knowledge and behaviours and (c) *a fragmented horse industry*, illustrating the wider culture in which participants worked, characterised by a lack of cohesion amongst its members.

Main limitations: Only veterinarians' perspectives have been captured, so viewpoints from other stakeholders, such as horse owners and government officials, should be used to triangulate these findings.

Conclusions: The findings suggest that improvements are required before an optimal level of exotic disease preparedness can be achieved. Additional support provided to frontline veterinarians, such as skills-based training (ie, clinical reasoning and collaborative relationship building), accessible and trusted emergency support networks and clear expectations and responsibilities during an outbreak are recommended to optimise exotic disease preparedness.

KEYWORDS

biosecurity, exotic disease, horse, qualitative methods

1 | INTRODUCTION

Outbreaks of exotic diseases, defined in the United Kingdom as those not normally present in the country, occur infrequently but can cause significant health and economic consequences. In preparation for an exotic disease outbreak, each constituent country in the United Kingdom produces a contingency plan that outlines stakeholders' roles and responsibilities for animal disease emergencies.¹ During past significant exotic animal disease outbreaks, including foot-and-mouth disease in the United Kingdom (2001) and equine influenza in Australia (2007), primary care veterinarians were critical in mobilising an effective outbreak response alongside government authorities.²⁻⁴ Given their training, expertise and established relationships with animal owners, primary care veterinarians are well placed to advise both their clients and other stakeholders in the event of a disease emergency.⁵

The British horse industry has experienced sporadic outbreaks of exotic diseases in the past several years, including equine infectious anaemia (EIA) in 2012 and equine viral arteritis (EVA) in 2019.^{6,7} In each instance, the investigation was prompted after primary care veterinarians performed diagnostic testing on horses that had been imported into the country or had gathered with international horses several years earlier.^{6,7} A systematic review of pathogen incursions following international horse movements identified that the majority of transmission events involved horses that had not shown any clinical signs at the time of import, allowing them to enter the general population and subsequently spread infection.⁸ In the event that exotic diseases escape border control, primary care veterinarians are likely to be the first line of defence to detect and report these pathogens.

While contingency planning focuses on coordinating the response to an exotic disease, preventing pathogen incursions in the first instance is central to effective preparedness. Primary care veterinarians have a multitude of roles and responsibilities when responding to an exotic disease outbreak; however, guidance on how to improve preparedness is less clear. There is a wide range of recommendations for veterinarians to improve their skills, including specialised training on recognising exotic diseases,^{9,10} additional biosecurity training¹¹⁻¹³ or taking an active role in improving their clients' biosecurity.¹⁴⁻¹⁷ Despite these recommendations, there is no prior research exploring what primary care veterinarians need for succeeding in this role and a lack of guidance on how they should follow current preparedness advice. A better understanding of the current state of exotic disease preparedness, and any challenges to actioning an effective response plan, would provide insights into opportunities for improvement. Therefore, the aim of this study was to explore experiences of, and attitudes towards, equine exotic disease preparedness amongst primary care veterinarians in Great Britain.

2 | MATERIALS AND METHODS

This was a qualitative interview study conducted from a critical realist stance, which considers that individuals' interpretation of reality

is grounded in their experiences, beliefs and perceptions.¹⁸ The study protocol was reviewed and approved by the Royal Veterinary College (RVC) Social Sciences Research Ethical Review Board (URN 2018-1664).

2.1 | Participants

Equine veterinarians working in primary care practice in Great Britain were invited to participate. Potential participants were identified through a combination of (a) contacts nominated by members of the RVC equine veterinarian community and (b) snowball sampling (ie, participant referrals of other participants). Based on prior understanding of factors that might impact experiences, perspectives and attitudes amongst veterinarians, potential participants were purposively selected to include several demographic characteristics, including gender, length of experience in practice, clientele (racing or nonracing) and geographic location. The research team made initial contact with potential participants by email, describing the study and inviting voluntary participation in an interview. Participant recruitment ended when individuals representing an array of the demographic characteristics of interest had been included in the sample.

2.2 | Interviews

Semistructured interviews were conducted between December 2018 and May 2019 by the first author, an epidemiologist with qualitative research training. The interviewer's background as a non-veterinarian was disclosed to participants prior to the start of the interview. All interviews were conducted face to face at a location of the participant's choosing, such as a quiet area at their practice. Participants were presented with a consent form, and written consent to participate was obtained prior to the start of the interview. All interviews were audio recorded.

An interview guide, previously piloted with two veterinarians, was used to encourage conversation about exotic disease preparedness (Item S1). The interview guide was structured around three broad topic areas: general infectious disease prevention (ie, biosecurity), detecting and reporting exotic diseases and the response to exotic disease incursions. The topic areas acted as a starting point for the interviewer to ask open-ended questions and follow-up questions based on the participant's responses.

2.3 | Analysis

Audio recordings from the interviews were transcribed verbatim by an external service and checked for accuracy against the original recordings by the first author. Inductive thematic analysis was conducted by the first author, based on the method described by Braun and Clarke.¹⁹ Thematic analysis was chosen due to its theoretical flexibility (eg, could be applied from a critical realist stance)

and appropriateness for identifying patterns of meaning across data.¹⁹ An inductive approach was used to avoid imposing a priori assumptions on the data and resulting themes. First, the transcripts were read several times to gain familiarity with the data, followed by initial semantic-level coding to label topics or concepts expressed by participants. All data, and their initial codes, were then imported into NVivo version 12.2.0 for data management. Codes were refined through a comparison with different levels of data (other codes, data extracts, and the original dataset). Preliminary themes were developed through an iterative process of grouping codes with similar meaning together followed by discussion amongst the research team. The final themes reflected patterns identified across the dataset, and subthemes reflected specific elements within each theme.

3 | RESULTS

Fourteen veterinarians agreed to participate in the study (Table 1). Interviews were a median of 53 min in length (range 33 to 87 min). Three themes relating to veterinarians' experiences of, and attitudes towards, exotic disease preparedness were developed from the interview data: (a) *the reactive generalist*, (b) *working within the bounds of influence* and (c) *a fragmented horse industry*. An overview of the themes and subthemes is presented in Figure 1.

3.1 | Theme 1: The reactive generalist

Participants' self-concepts of their role in primary care practice shaped how they approached exotic disease preparedness.

Participants often found themselves working to the 'firefighter' model of medicine, responding to ill-health instead of proactively providing wellness services. This ingrained reactive approach meant that participants struggled to shift into a preventive mindset in the absence of an imminent threat. By identifying as generalists, participants acknowledged they could not reasonably be an expert in all areas of veterinary medicine. Over time, their expertise became targeted towards common conditions, moving them further away from specialist topics like exotic diseases.

3.1.1 | Subtheme 1.1: Firefighting approach to medicine

The 'firefighter' model of veterinary medicine underpinned participants' approach to preparedness; responding to illness (ie, curing disease) was generally prioritised over preventive medicine. Consultations with clients were reserved for resolving health problems and initiating discussions beyond the remit of the situation seemed inappropriate:

On a day-to-day basis, I'm being paid to go and fix the eye or the heart or something and you can't just spiral off into worrying [the client] about West Nile virus. (Vet 14)

With consultations dedicated to the health problem at hand, participants had to find time outside of their client contact hours to focus on preventive medicine. However, this required effort from both the participant and the client. Some veterinary practices set up initiatives

TABLE 1 Characteristics of veterinarians who participated in qualitative interviews exploring their experiences of, and attitudes towards, exotic disease preparedness

Pseudonym	Gender	Years in practice ^a	Practice type ^b	Clientele	Region ^c
Vet 1	Male	11	Equine	Racing	SE England
Vet 2	Female	17	Equine	Racing	SW England
Vet 3	Male	6	Equine	Racing	E England
Vet 4	Female	27	Equine	Racing and nonracing	NE England
Vet 5	Female	37	Equine	Racing and nonracing	E England
Vet 6	Female	18	Mixed	Racing and nonracing	NE England
Vet 7	Female	10	Mixed	Racing and nonracing	E England
Vet 8	Female	13	Mixed	Nonracing	Scotland
Vet 9	Female	9	Mixed	Nonracing	E England
Vet 10	Female	5	Equine	Nonracing	E England
Vet 11	Female	3	Equine	Nonracing	E England
Vet 12	Male	8	Equine	Nonracing	E England
Vet 13	Male	22	Equine	Nonracing	E England
Vet 14	Male	16	Equine	Nonracing	SE England

^aDetermined from the number of years qualified at the time of the interview.

^bEquine = providing horse care only; mixed = providing care for horses, companion animals and/or food animals.

^cNE = North East; E = East; SE = South East; SW = South West.

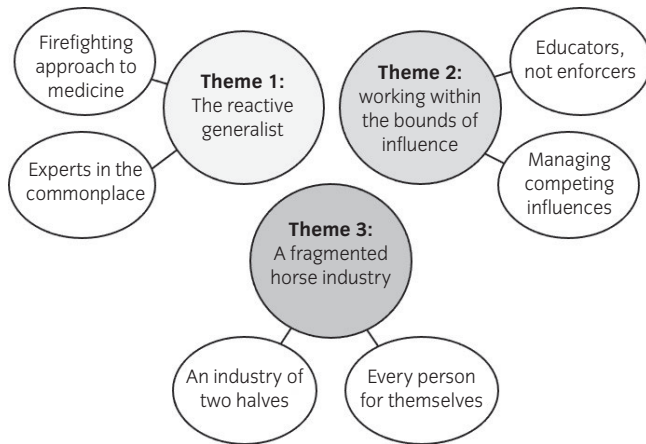


FIGURE 1 An overview of themes (grey) and subthemes (white) developed through thematic analysis of interviews with 14 equine veterinarians in Great Britain

such as evening seminars on preventive medicine and held these outside of normal consultations. In most instances, however, there was a shared failure between participants and clients to discuss preventive medicine until after the fact:

Unless they have an obvious infectious disease, I don't think we would really talk to them about [biosecurity], so they probably wouldn't ask [...] They're very reactive, aren't they, as opposed to proactive conversations. (Vet 11)

This habitual reactive approach to veterinary medicine meant that it was difficult to be proactive about infectious diseases, especially those not currently posing any apparent risk:

We deal with [a situation] as it arrives on our doorstep. We do try to be pre-emptive, I suppose, but I don't know that as a profession we're very good at it. (Vet 3)

Prevention during 'peacetime' was not second nature, and, as such, both participants and their clients struggled to change their habits for no convincing reason. For clients, this meant that the norm was often an absence of biosecurity until an outbreak occurred:

All the yards where we've got strangles [*Streptococcus equi*] serology in place are yards where they've had outbreaks and they've had to deal with the strangles thing, which nearly bankrupted them, and now they have quarantine and strangles serology requirements. (Vet 13)

Participants acknowledged that both they and their clients needed to develop habitual baseline biosecurity behaviours, even when there was no particular infectious threat. It was anticipated

that this shift to a preventive mindset would take some time for both parties:

If I said to myself, 'You need to disinfect every time you leave a yard', it'd probably take me a couple of years to break that habit of not doing it and it would probably take some time for the clients [not to say] 'Why are you doing that? My horses are fine'. They would be upset that you thought their horse was unhealthy in some way. (Vet 9)

3.1.2 | Subtheme 1.2: Experts in the commonplace

As primary care veterinarians, participants had become experts in recognising and managing common conditions. Although they had learned about exotic diseases during their training, it was difficult to retain this knowledge as time progressed:

To be honest, because [exotic diseases] are not relevant to what you're doing day to day, you forget it ... because you're trying to remember and retain so much knowledge. (Vet 8)

Participants often referenced the phrase 'common things are common' to describe how they were taught to consider frequently encountered conditions first before moving to less common ones on their list of differentials. In practice, this translated into developing expertise in the clinical presentation of endemic diseases and recognising when something was outside the ordinary:

You learn, as we all do, a specific set of diseases that fit your daily experience and you do your best to work out the outliers. (Vet 3)

However, a reliance on unusual or severe clinical presentations to differentiate from common conditions was concerning for some participants, especially because exotic diseases could present with nonspecific signs early in their clinical course:

If you honestly asked everyone on the ground about whether they could recognise one of those notifiable diseases, I think a lot of them would struggle unless it's got some obvious feature because most of them present as high temperatures and being dull and depressed and that's pretty much it. They look like ill horses, they don't look like African horse sickness. (Vet 13)

Participants were therefore concerned about their ability to recognise an exotic disease at the outset, given the uncertainty about when and how the disease would present. To increase their confidence in a diagnosis, participants relied on help from their own network of specialists. In the first instance,

participants often asked for direction from their more experienced colleagues:

I think we're relatively lucky in where I am, I can just call [a particular specialist] and talk through a case and you would hope pretty quickly they would say to get the samples, and also, [we can] talk to people who are a lot smarter than we are that can rule in or rule out an exotic disease, or help us, at least. (Vet 10)

Working in an environment that fostered collaboration between colleagues led to increased confidence in asking for help when needed. This was particularly evident in large veterinary practices where colleagues had a wide range of expertise:

There's this wonderful exchange of knowledge and experiences, or people will flag up a question that you haven't thought about. (Vet 5)

Despite the accessibility of their support networks, some participants felt conflicted about their reliance on others (eg, Vet 11's response of 'I should probably know this' when discussing steps for reporting exotic diseases). However, it was necessary to be selective about which topics would be best suited to others' expertise:

So, you know you need that kind of 'hand on your shoulder'. We're just industry vets doing what we do day in and day out—we're not experts in weird and wonderful diseases that might pop up. (Vet 1)

Although exotic diseases are notifiable and must be reported to the government, participants tended to consult colleagues within their practice or those at a familiar and trusted institution, such as the Animal Health Trust, about any concerns. For some, there was a perception that government veterinarians lacked suitable equine expertise and would not be able to provide adequate support. For others, this was based on direct experience; for instance, one participant described an occasion when she had contacted the government upon suspicion of EVA:

It was very much, 'What do you think it is?', and 'If you think it is, then...', rather than getting support and help from them. It was like, 'I'm ringing you because I'm not sure, so what do you think? You're supposed to be the experts in this!' I was a fairly recent graduate. I felt fairly unsupported by that experience. The horse got better and tested serologically negative to EVA and life goes on. But yes, I'd be concerned that if it [had been EVA], I might not have picked it up and the support wasn't there to catch me for not having picked it up. (Vet 6)

3.2 | Theme 2: Working within the bounds of influence

Participants struggled with a perceived inability to influence their clients' knowledge and behaviours in relation to improving biosecurity. Within the veterinarian–client relationship, some participants viewed their role as information providers, or educators, and experienced frustration when clients did not follow their advice. The need to be influential stemmed from an assumption that the client lacked sufficient knowledge. By acting as an educator, participants aimed to change their clients' behaviours through providing more knowledge. Participants perceived a greater level of influence when a positive client relationship was established; however, good veterinarian–client relationships were sometimes undermined by more accessible and preferable information sources, such as other horse owners on social media. The increased availability and accessibility of competing influences was an added challenge to the veterinarian's ability to influence positive change.

3.2.1 | Subtheme 2.1: Educators, not enforcers

There was a tendency for participants to take an 'educator' approach to the veterinarian–client relationship. Some used a traditional directive communication style, which attempted to impart the veterinarian's knowledge to the client. For example, one participant described his approach for asking clients to follow disease management guidelines:

I will repeat myself until they're bored of me saying it ... and get them almost to repeat it back to me, so that they're at the point where they're so bored of you telling them the rules and regulations, that they're going, 'Yeah, that one, yeah, that one'. (Vet 12)

Participants often observed dissonance between their own training in preventing and managing disease and how clients were approaching disease management. The difference in management styles was assumed, by participants, to stem from clients' lack of knowledge about biosecurity. To counteract this assumed lack of knowledge, participants suggested that the best approach to improve biosecurity uptake was to provide more education:

I suppose it's just making people aware of these things, isn't it? It's education the whole time. The more information that's out there, the better, I guess. People are better informed and they can make better decisions about what they should or shouldn't be doing. (Vet 13)

However, while participants could provide their clients with more information, they were not in a position to ensure it was actually acted upon:

Ultimately, all I can do is offer them my advice and if they ignore that, that's their problem then. It's not my responsibility to nanny them through doing it, I just give them all the information, educate them as best I can [...] if they do it, great, if they don't, then it's fine. (Vet 9)

Developing a positive veterinarian–client relationship was integral to the ability to influence clients. Interpersonal skills, especially outside of clinical consultations, were important for building these relationships:

You're not really working with animals because you go out and see a horse and then the owner wants to show you their barn conversion or their new dog or something. So little of the job is actually dealing with animals—you're mainly dealing with people. (Vet 11)

Compared with endemic diseases, the legislative backing behind exotic diseases provided some assurance that participants could enforce good biosecurity practices with clients. However, without that authority, participants perceived that they lacked enough influence to change their clients' behaviours:

Things like strangles obviously aren't notifiable so we have to reason with people that this is the right thing to do. It's different if you've got one of those [exotic] diseases because it is an official lockdown, whereas strangles isn't, people can move in and out if they choose to do so—it's not, obviously, acceptable but we can't stop them. (Vet 13)

In some instances, this perceived lack of influence extended beyond client relationships. Some participants had brought concerns about inefficiencies in existing policies, such as the passport system, to the governing bodies (eg, passport issuing agencies and the government), but had had their concerns ignored:

I think that legislation should be implemented more thoroughly for passports. I think that horses coming into this country, in terms of my experience, they're never checked at the ports [...] If we have all this legislation, nobody seems to implement it. Even when it's brought to the relevant party's attention, it's just ignored. (Vet 4)

Continual attempts to provide advice to both clients and policy-makers, but not making progress in influencing change in either direction, led to disengagement. One participant described how colleagues' attitudes had changed after encountering clients 'not letting you do what you need to do', for example, clients refusing to allow diagnostic testing. Experiencing past resistance to outbreak management caused them to anticipate resistance in the future:

Vets, they can get very switched off [...] They'd have gone through three or four other outbreaks in a decade, or something, and it didn't go the way that it should have gone so they think, 'Why should I bother?' (Vet 14)

3.2.2 | Subtheme 2.2: Managing competing influences

Veterinarians felt they were viewed as only one of many options for clients, and in many instances, as the last choice for advice:

They always listen to the farrier, dentist, back person, the woman that comes and talks to their horse and the horse talks back, before they listen to the vet. (Vet 7)

Clients frequently accessed a wealth of information, including misinformation, prior to consulting their veterinarian. The rise of social media, online forums, and Google searches was a particular frustration, given the potential for bad advice:

They go, 'I read something here', and you go, 'Stop reading those forums because they're just strange people on the internet giving out information'. (Vet 12)

The natural tendency for horse owners using the same livery yard to chat, compare experiences and exchange opinions was seen as an additional driver of the spread of misinformation. Often, multiple veterinary practices were responsible for veterinary care on yards, leading to considerable scope for confusion when owners received different advice:

[Clients] definitely Google things but then ... on these livery yards, there's a culture of ... there are other vets on the yard and there are other clients who aren't ours, so everybody has a meeting about the best joint supplement and everyone has a different one because different practices sell different things. (Vet 10)

The availability of other sources that could influence decisions put added pressure on participants to be aware of what their clients might be accessing. While clients could be accessing misinformation, there was also scope for them to be accessing good information that would improve their horse's health. Having clients that were well informed through their own initiative meant that veterinarians also had to be up to date on current equine issues:

You can't blag it, you have to know what you're talking about otherwise they will [know]—particularly the equine clients, they are really well informed. I mean, they all sit and read Horse and Hound [magazine] all the

time and ask you, 'Oh, did you read this in Horse and Hound?' (Vet 11)

think that they don't take [biosecurity considerations] on board because they don't need to. (Vet 13)

3.3 | Theme 3: A fragmented horse industry

An effective response to an equine infectious disease outbreak would rely on action at the population level. However, the culture of the wider horse industry in which participants worked was characterised by a lack of cohesion amongst its members. Overarching issues with coordination across sectors, and unbalanced resources between racing and nonracing horses, reflected a siloed industry structure. Participants perceived that owners, in general, did not have a sense of their horse belonging to a national herd.

3.3.1 | Subtheme 3.1: An industry of two halves

The overarching structure of the horse industry was described as 'disparate' and 'disjointed', with different sectors (ie, racing and non-racing) operating by their own rules within their own contexts. In particular, the racing sector had more resources and support than other sectors and could therefore prepare and facilitate a more coherent response to outbreaks. This was largely driven by the economic value of racehorses:

In the racing industry, each animal is valuable and it's an asset. Each mare has a business plan, believe it or not. If you messed it up with a £12 blood sample that should have been taken last week, now she can't get bred, she's going to miss a year, it could be half a million down the pan. (Vet 1)

The racing sector was guided by recommended biosecurity protocols created by regulatory and statutory bodies, such as the British Horseracing Authority (BHA) and the Horserace Betting Levy Board (HBLB). Despite being voluntary, members in the racing industry knew the recommendations were industry-accepted and felt compelled to follow them:

We all go by the HBLB Codes of Practice in the Thoroughbred industry, which is pretty well rammed down the throat of everyone now. (Vet 1)

In contrast, the wide variety of activities encompassed by the non-racing sector allowed for more lenience and discretion in biosecurity-related decisions:

A lot of [nonracing owners] are individuals with a couple of horses on their own property, so their attitude to biosecurity is very different to a big livery yard because clearly they don't have the same risks. So yes, I

Contextual differences between racing and nonracing sectors meant that the guidelines created for racing were not perceived as applicable to other types of horses. Several participants suggested that existing guidelines could be modified for the nonracing sector ('An HBLB Codes of Practice for the general horse industry would be quite useful' [Vet 7]). However, the segregation between the racing and non-racing sectors hindered effective preparedness, given that preventing a pathogen incursion was in everyone's best interest ('Should we get something like West Nile, it's going to affect everyone' [Vet 14]). Ultimately, the lack of cohesion and coordination within the horse industry was seen as a barrier to effective communication in the event of an outbreak:

If we're all coming at it from a different point of view, it's not going to work, so there has to be one structured approach to allow it to actually function, otherwise people are going to get all different types of information and that's when you end up with problems and arguments. (Vet 12)

3.3.2 | Subtheme 3.2: Every person for themselves

Participants perceived a greater tendency towards individualism in the horse industry compared with other livestock sectors. When biosecurity precautions were undertaken by participants, horse owners assumed it was related to their individual horse (eg, that the veterinarian was implying their horse was unhealthy). However, livestock farmers viewed biosecurity as a routine precaution to protect their herd:

Our farmers expect you to arrive in clean overalls with clean wellington boots and they expect you then to disinfect yourself before you leave the farm [...] The farmers see it as a good thing that you've arrived clean, you're leaving clean and you're not a problem for them, because they are looking at the whole herd, not just an individual. (Vet 9)

Participants perceived that horse owners primarily looked out for themselves, despite keeping their horses in a shared environment. In the event of a yard outbreak, this attitude was perpetuated by the tendency for owners to blame others for introducing the pathogen:

It's a very emotive issue. Everyone gets very upset and starts pointing fingers at one another about who brought a disease onto the yard—there's a lot of politicking involved. (Vet 13)

Particular endemic diseases, such as strangles, were associated with stigma, judgement and abandonment:

As soon as you mention there's a possible strangles [outbreak], I find it unbelievable [...] It's the stigma that's attached to it, that's what I think is strange ... people treat them like lepers when they've had strangles. (Vet 4)

This tendency for horse owners to ostracise those with horses affected by disease made it challenging for participants to promote preparedness, a practice that relies on altruism. Preventing the spread of infectious diseases requires clients to make sacrifices (eg, restricting horse movements). When horse ownership was tied to clients' livelihood, such as for those in the racing industry, it was more difficult for participants to convince them to be altruistic:

[Client] was just about to take a group of horses to the sales when these three mares had their neurological disease. I said, 'You can't take them,' and he said, 'I'm taking them, you might be wrong, so I'm taking them, we haven't confirmed it yet. I need to make money.' Now if that had been the neurological EHV [equine herpesvirus], it would have been a disaster wouldn't it, because his horses might have passed it on to everyone else's. (Vet 1)

This often led to a conflict of interest between a client's perspective of looking after their own horse and the veterinarian's perspective of looking out for a wider population of horses:

At the end of the day, they're all interested in their own horses, as you would be, because you're then going to take them home to your entire yard, your entire business and livelihood. Whereas from my perspective and my team's perspective, you're responsible for the entire [race meet population]. If you've got a sick horse in there, then everyone else is at risk. (Vet 2)

In the event of an outbreak, participants were pessimistic about the likelihood that horse owners would 'give up' their everyday activities in order to protect others:

It will entirely depend on their perception of their moral and ethical boundaries about what's more important, their show at the weekend or the wider health of the country's populations of equines as a whole. (Vet 9)

4 | DISCUSSION

This study provides insights into British equine veterinarians' perceptions of their role in exotic disease preparedness. The findings highlight several challenges to preparedness, including the mismatch between the nature of primary care practice and the required awareness of exotic diseases, the lack of influence on clients' general horse

management behaviours and the fragmented nature of the equine industry.

As primary care practitioners, participants shared a strong identity as generalists. An increased recognition of the value of primary care practitioners as 'expert generalists' has highlighted their unique skillset in recognising familiar patterns and applying clinical reasoning.^{20,21} Both generalists and specialists play integral roles in medicine, and by acknowledging the expertise needed to be a successful general practitioner, veterinarians can be better supported in that role.²⁰ Differential diagnoses, in the first instance, often rely on the ability of a veterinarian to recognise and categorise a disease based on its clinical presentation.^{22,23} Therefore, training focused on strengthening clinical reasoning skills, rather than specific diagnostic aspects for particular exotic diseases, is better suited to support primary care veterinarians in all aspects of their role as expert generalists. The potential for delays in diagnosis because of lack of specificity of clinical signs highlights the importance of developing good, baseline biosecurity practices as routine, as well as the need to improve understanding and perception of individual risk.

Participants described a pragmatic approach to preparedness, which relied on effective support systems. Unsurprisingly, the first ports of call were colleagues and other familiar sources. Trusted colleagues and specialists are frequently used by veterinarians to guide their clinical decision making,²⁴ with most experienced colleagues acting as key individuals for advice.²⁵ In contrast, distrust and unfamiliarity might dissuade participants from following an organisation's advice.²⁶ In 2010, local veterinarians in the county of Devon, UK, criticised the lack of communication from the government about a confirmed case of EIA in their region.²⁷ A previous study of horse owners in the United Kingdom described a sense of distrust in whether the government would engage in equine disease outbreaks given that they were not farm animals.²⁸ Furthermore, several studies have reported that distrust in authorities was a barrier to veterinarians reporting notifiable diseases, even when it was mandated.^{29,30} Despite the usefulness of veterinarians using personal support networks when presented with clinical uncertainty, developing and strengthening trust between veterinarians and the government is needed to ensure that suspected exotic diseases are actually reported, as mandated.

In the absence of an imminent threat, participants did not prioritise exotic disease preparedness because of more immediate concerns. The lack of prioritisation of nonimmediate threats has been described for other emerging issues, such as antimicrobial resistance, where veterinarians felt it was difficult to change their current behaviours when antimicrobial resistance was regarded as something that was not currently affecting them.³¹ Instead, participants continued to default to the 'firefighter' model of responding to threats, as and when they arrived. The veterinary profession has experienced longstanding difficulties in moving into a preventive advisory role, often due to a complex relationship between the veterinary and agricultural industries, as well as political environments and pressures.³² In the farming industry, veterinarians have struggled to market their

preventive services, citing difficulties in putting their knowledge into action on farms.³³⁻³⁵ This is further complicated by the fact that most preventive care is being administered by other professionals or by the owner themselves, rather than the veterinarian.³⁶ As the demand for 'firefighter' services remains high (eg, over 60% of small animal consultations),³⁷ equine veterinarians might struggle to shift effectively into a preventive advisory role for distant risks, such as exotic diseases.

Arguably, there is a tendency in veterinary training to view knowledge as something that can be passed from one person to another.³⁸ Some of the participants relied on this didactic style of communication, tending to assume that providing more education to clients would result in them changing their behaviours. Moving towards a relationship-centred communication approach would increase the likelihood of achieving any desired behaviour change.³⁸⁻⁴⁰ The competition between veterinarians and other influential sources can conflict with an individual's professional identity, because it positions clients as 'frustrating obstacles' to transferring their veterinary knowledge.⁴¹ Communication strategies tailored to specific clients might allow veterinarians to reach an agreed solution with those who are initially less receptive.⁴² Owners who trust their veterinarian are more likely to prefer them to other available information sources,⁴³ so strategies aiming to strengthen the veterinarian-client relationship could mitigate veterinarians' perceived lack of influence and lead to positive change.

An individualistic culture within the British horse industry appears to pose a key threat to effective exotic disease preparedness overall. Study participants perceived that owners would not act against their self-interests in order to protect the health of the wider horse population. In the UK cattle and sheep farming community, barriers to collective action during a disease outbreak were linked to distrust within the community itself.⁴⁴ Community distrust can be a product of 'in-group' formation, where individuals naturally form groups with those that are similar to each other.⁴⁵ A study of livestock keepers identified a strong separation between commercial and hobby farmers, in which commercial farmers perceived themselves as 'good' and perceived hobby farmers as 'poor'.⁴⁶ This is similar to the distinction between the racing and nonracing sectors observed in this study. The lack of collective identity across the British horse industry, and the individualistic culture of its members, has implications for the type of preparedness measures that would be effective and feasible to implement. Individualistic cultures tend to benefit from the adoption of passive measures (ie, those instituted by an overarching body) instead of those that require substantial action from the individual.⁴⁷

However, given the fragmented culture of this industry, a reliance on an overarching body to institute change might introduce further challenges. The British horse industry is an amalgamation of several overarching bodies that regulate and advise on several interest groups (eg, racing, breeding and equestrian competition). In 2010, a structural review of the British horse industry concluded that relationships between the large number of interest groups were unstable.⁴⁸ Furthermore, the review found that a differential

allocation of resources across the groups created an unequal distribution of power and the potential for conflict amongst the members.⁴⁸ While the structure of the industry has likely changed since 2010, the mirrored experiences of the participants suggest further improvements are required to achieve unison. Continued lack of cohesiveness would be detrimental to any outbreak response that relies on effective partnerships across multiple agencies, organisations and stakeholders.⁴⁹

As this was a qualitative study, the findings are not intended to be statistically representative of the wider population of veterinarians, but rather representative of a variety of experiences, attitudes and perceptions held by veterinarians within a specified context. Criteria used to evaluate quantitative research, such as statistical power and generalisability, are not directly transferable to qualitative research due to differences in epistemological assumptions. In fact, small and purposively chosen samples are a benefit of qualitative research because they allow for the collection of rich, in-depth accounts from participants.⁵⁰ The purposive selection of participants across different demographic characteristics, including gender, length of experience, type of clientele, and geographic location, allowed for the inclusion of diverse viewpoints, but the consistencies across participants' accounts support the reliability of the key findings.⁵¹

Qualitative research is inherently influenced by the research team, because the researcher is actively engaged in conceptualisation, interpretation and reporting.⁵² As an infectious disease epidemiologist, the first author was aware of general issues surrounding disease preparedness in the equine industry; however, they had not trained as a veterinarian and therefore could approach topics with participants without prejudgement or assumed knowledge. The experiences and positionality of the wider research team, which included equine veterinarians, brought a richer understanding of the data through team discussions. It is important to note that this study does not capture the views of clients, government officials or infectious disease specialists, and therefore, further research is needed to explore other stakeholders' experiences and perceptions of exotic disease preparedness.

5 | CONCLUSIONS

This study sought to explore primary care veterinarians' experiences of, and attitudes to wards, exotic disease preparedness in Great Britain. The findings suggest that improvements are required before an optimal level of preparedness can be achieved. There are several areas where veterinarians can be better supported at the frontline of disease emergencies: (a) strengthening the development of clinical reasoning skills and fostering collaborative client relationships; (b) ensuring that primary care veterinarians have access to support networks during an emergency, such as trusted senior colleagues or infectious disease specialists; and (c) clarification of the role of the primary care veterinarian in disease preparedness, particularly in engaging in biosecurity implementation with their clients. Further research into the culture of the horse industry and how the

overarching structure might facilitate or prevent effective disease preparedness is required.

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CONFLICT OF INTERESTS

The authors have declared no competing interests.

AUTHOR CONTRIBUTIONS

K. Spence, S. Rosanowski, J. Slater and J. Cardwell contributed to study conception and design. K. Spence collected and analysed the data, with guidance from J. Cardwell. K. Spence, S. Rosanowski, J. Slater and J. Cardwell contributed to data interpretation and manuscript preparation. All authors approved the final manuscript.

ETHICAL ANIMAL RESEARCH

This study was granted institutional ethical approval from the Royal Veterinary College (URN 2018-1664).

INFORMED CONSENT

All participants provided written informed consent.

DATA ACCESSIBILITY STATEMENT

The data that support the findings of this study are not publicly available due to privacy or ethical restrictions.

PEER REVIEW

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section.

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