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Farmers' perception of the role of veterinary surgeons in vaccination strategies on British dairy farms

I. F. Richens, P. Hobson-West, M. L. Brennan, R. Lowton, J. Kaler, W. Wapenaar

There is limited research investigating the motivators and barriers to vaccinating dairy cattle. Veterinary surgeons have been identified as important sources of information for farmers making vaccination and disease control decisions, as well as being farmers' preferred vaccine suppliers. Vets' perception of their own role and communication style can be at odds with farmers' reported preferences. The objective of this study was to investigate how dairy farmers perceived the role of vets in implementing vaccination strategies on their farm. Semi-structured interviews were conducted with 24 dairy farmers from across Britain. The data were analysed using thematic analysis. Analysis revealed that farmers perceive vets to have an important role in facilitating decision-making in all aspects of vaccination, including the aspects of vaccine distribution and advice on implementation. This important role is acknowledged by farmers who have regular veterinary contact, but also farmers with solely emergency veterinary contact. Given this finding, future work should investigate the attitudes of vets towards vaccination and how they perceive their role. Combining this knowledge will enable optimisation of vaccination strategies on British dairy farms.

In Britain, there are approximately 36 vaccines listed for use in cattle offering protection against eight viral, six bacterial, one parasitic and one fungal species (NOAH 2015). There are no prescriptive guidelines or vaccine schedules stating which vaccines should be used by cattle farmers. This is in contrast to human and companion animal medicine, where vaccine schedules are available for use by practitioners, patients and owners (Day and others 2010, NHS 2014). Previous work has demonstrated that 86 per cent of cattle farmers in the UK used one or more vaccines; bovine viral diarrhoea (BVD), leptospirosis and infectious bovine rhinotracheitis (IBR) were the most common diseases vaccinated against (Cresswell and others 2014). However, there is limited evidence describing the decision-making behind the vaccination of cattle. Elbers and others (2010) and Sok and others (2014) discuss the motivators, barriers and willingness to vaccinate in the face of an exotic disease outbreak, and Bennett and Balcombe (2012) investigated English and Welsh farmers' willingness to pay for a bovine tuberculosis (bTB) vaccine. These studies, however, focused on exotic diseases or a hypothetical situation and their results may not be applicable to the more common situation in Britain, where most vaccines are used against endemic diseases. There are currently no compulsory vaccination strategies in Britain, and therefore, the decision to vaccinate lies with the farmer. If the farmer decides to vaccinate, they must then decide on a vaccine schedule for their farm, that is, which pathogens to target, which animals to vaccinate and how often. This decision-making process is often facilitated by a veterinary surgeon.[i] Indeed, a survey by Cresswell and others (2014) indicated that 93 per cent of farmers purchased their vaccines through their veterinary practice.

Cresswell and others (2014) as well as Meadows (2010) found evidence of poor vaccination compliance by cattle farmers to cold chain storage and administration recommendations. Dairy practitioners' main concerns with regard to cattle vaccination also included issues of compliance (Cresswell and others 2013).

The apparent importance of the vet as an information source and the importance of the relationship between farmers and vets when it comes to disease control suggest further investigation into this relationship would be prudent (Gunn and others 2008, Cresswell and others 2014).

Effective communication between farmers and vets could play an important role in achieving optimisation of vaccination strategies. Vets' perception of their role and communication style can be at odds with farmers' reported preferences (Hall and Wapenaar 2012). These inconsistencies as well as differences in 'veterinarian perceived' and 'farmer reported' barriers to vaccination (Cresswell and others 2013) could result in miscommunication or a lack of discussion surrounding vaccination strategies. With an improved understanding of farmers' perceptions of the vets' role, more tailored advice could be provided by vets.

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I. F. Richens, BVetMed MRCVS,
P. Hobson-West, MA (Hons) PhD PGCHE,
M. L. Brennan, BSc(VB) BVMS PhD PGCHE DipECVPH(PM) FHEA MRCVS,
R. Lowton, BVMedSci(Hons),
J. Kaler, BVSc & AH MSc (Vet Epi) PhD,
W. Wapenaar, DVM Dip ABVP-Dairy PhD MRCVS,
School of Veterinary Medicine and Science, The University of Nottingham, Sutton Bonington Campus, Sutton Bonington, Leicestershire, LE12 5RD, UK

E-mail for correspondence: imogen.richens@nottingham.ac.uk

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[i]This article uses the more colloquial term 'vet' to stand for veterinary surgeon. This was done to improve readability and to reflect the term most used by the interviewees in this study.

If aiming to understand how and why people behave and make decisions, it is imperative to understand their motivators, barriers and attitudes towards that behaviour or topic. It is also a requirement to investigate these using a method and philosophy that allows the collection of rich and detailed data allowing participants to frame their responses by what is important to them. The use of social science and the application of qualitative research is the preferred method to collect this type of data (Christley and Perkins 2010). Qualitative research is concerned with the meanings of the people being researched and understanding their views (Britten and others 1995). It is, therefore, well suited for an in-depth investigation of farmers' behaviour, perceptions and opinions as it allows participants to explain thoughts and opinions in their own words. The need for inclusion of social science in vaccination studies is supported by Chambers and others (2014), who stated that understanding the drivers for acceptance of bTB vaccination by vets and farmers is crucial to a successful vaccination policy.

This research is part of the doctoral research of the first author (IFR), which had the wider aim to identify the motivators and barriers of farmers and vets to the implementation of vaccination strategies on British dairy farms (Richens 2015). Only the results and analysis pertinent to the aim of this study are presented.

This study aimed to describe how British dairy farmers perceive the role of vets in the implementation of vaccination strategies on farms.

Materials and methods

This study is reported following the Consolidated Criteria for Reporting Qualitative Research guidelines (Tong and others 2007). Due to text constraints, only the points relevant to this article are reported.

Sampling frame

Farmers were sampled from a database held by the British dairy levy board (AHDB Dairy) containing information on all levy payers using a maximum variation sampling method, a form of purposive sampling (Bryman 2012b). Purposive sampling aims to strategically sample the population with direct relevance to the research question and has been used previously in qualitative work studying farmers and vets (Heffernan and others 2008, Alarcon and others 2014, Coyne and others 2014). The use of maximum variation sampling in this study ensured a range of participants within each category of interest were recruited. The categories used for sampling were herd size, region and whether the farm was conventional (non-organic) or organic as for this study it was hypothesised that farmers in different regions of Britain, who have different herd sizes and those that farm conventionally or organically, would have different attitudes towards vaccinating their cattle. This hypothesis was based on regional differences in cattle density and disease prevalence, differing management and farm-level factors associated with herd size, and regulations and disease prevention and control decisions associated with organic farming; all factors that may influence perception of disease risk.

All farmers present in the database were eligible for inclusion. Information that was extracted from the database included the postal contact details and farm information such as herd size and whether they were an organic or conventional farm.

Farmers in the database were categorised accordingly. The six regions were defined as south west, south east, midlands, north (England), Scotland and Wales. The English regions were based on the Defra government office regions (Defra 2010). The herd sizes were defined as small (0–49 cows), medium (50–149 cows), large (≥150) and unknown (entries with no herd size recorded).

Recruitment

Farmers were contacted between April and August 2013. Postal address information was available from the AHDB Dairy database. Farmers identified from the database, who were in one of two online telephone directories (yell.com and thephonebook.bt.com), were contacted by telephone. Farmers who had contact details that were not freely available were contacted in writing. On initial contact farmers were given a short introduction to the project and asked if they would be interested in participating. Farmers were given the option to be entered into a draw to win £100 of gift vouchers. Recruitment continued until interview analysis indicated data saturation was reached. This was defined as the point at which no new information was being generated (Bryman 2012a). In total, 250 farmers were contacted either in writing or by telephone.

Data collection

Semi-structured interviews were conducted either face-to-face at the participant's farm at another preferred place or over the telephone between May and August 2013.

All interviews were conducted by one researcher (IFR). The interviewer did not introduce herself as a vet, nor did she disclose the main funding body of the study. However, the interviewer was open about her background if this information was requested by the participant.

Twenty-nine farmers agreed to be interviewed, and 24 interviews were carried out. In two cases, a second participant was present who made a significant contribution to the interview. A consent form was completed for these additional participants and their contribution was included in the thematic analysis. Quotes from these interviews are labelled with the letter 'a' or 'b' to distinguish between participants.

A question guide was used to ensure that the required topics were covered (available on request). Questions were mostly open-ended and aimed to include a wide area of topics and opinions around vaccinating cattle. This paper focuses on the vet's role in vaccination, as perceived by the farmer. Questions were developed through discussion with farm animal vets, and the research team's experience of working with dairy farmers and qualitative research techniques. The question guide was trialled with two people with experience in the dairy industry. Amendments were made as required to improve the clarity and aid the flow of the questions. The results reported here are only one aspect of the topics discussed; a full analysis of the interviews is available elsewhere (Richens 2015).

Data analysis

The audio recordings were transcribed verbatim by external transcribers. Transcripts were checked against the recordings for accuracy and to remove identifying features. The anonymised transcripts were imported into qualitative data analysis software (NVivo 10, QSR International) for thematic analysis (Braun and Clarke 2006). The entire data set was coded using inductive themes, that is, the themes were derived from the data and not determined a priori. This method of coding resulted in a hierarchical structure starting with individual codes, which were part of subthemes that were, in turn, part of the wider themes.

To assess the robustness of the coding framework (Barbour 2001), a sample (15/24) of the transcripts was coded independently by a second researcher (RL). After the initial coding was completed, the researchers discussed and compared their coding frameworks. Any discrepancies were resolved through discussion and an agreed framework was established after which the second coding was performed.

While interviews are a common method of data collection in qualitative research, there are competing schools of thought about how to analyse the data that is generated. Space precludes further discussion of this debate; suffice to note that this study bears most similarity with the realist approach (Moon and Blackman 2014).

Results

The median interview length was 23.5 minutes (range 10–59 minutes). Fourteen interviews were conducted in person and 10 interviews over the telephone.

Sixteen farmers reported that they were currently using one or more vaccines, five farmers had vaccinated their cattle in the past but were no longer vaccinating and three farmers had never vaccinated their cattle.

In general, farmers were keen to be involved in the study and seemed relaxed throughout the interviews. Some of the discussion was grounded in humour. However, when discussing personal experience of disease outbreaks there was, in some cases, an undercurrent of tension that was thought to be related to fear of disease.

The analysis confirms that farmers do consider the vet as the most important outside influence on vaccination decision-making. This study concentrates on the multiple roles the vet has in the implementation of vaccination strategies on-farm.

The general role of the vet

Analysis of the discussion around the general role of the vet on farm revealed two distinct roles. The first was the role of the vet as a 'firefighter'; that is, for emergency work that the farmer was unable to deal with themselves, and as pharmacies. The second role was the vet as a preventative and herd health practitioner; with the vet being on farm regularly for routine fertility work, preventative healthcare as well as for emergencies.

The identification of a vet as a 'firefighter' seemed to be linked to a sense of pride that some farmers rarely had to call their vet. How often the vet was called was used as a gauge of their herd's health. For example,

> I think thirty years I've only ever had the vet to calve one cow… that's the only time we've ever had the vet out. (Farmer 18)

Reasons given for not using the vet on a more regular basis included cost, the farmers' experience and the perception that low veterinary bills and decreased vet contact were positive indicators of health.

> It does pay because for example 2012 my vet bill was £1,200 for the whole twelve months. About a hundred pound a month isn't it. And it's only because we did some de-horning it was bumped up and some TB testing. It wasn't really for disease control or anything like that. It was more veterinary work on the farm. I was talking to my neighbour and his was £12,000. (Farmer 18)

This was in contrast to the farmers who used their vet more regularly. Although lower veterinary bills were still seen as a positive indicator of herd health, the cost was perceived to be a necessary fact of keeping their herd healthy.

> At the beginning of each year we obviously set up a budget and if I have to increase the budget for vet and med, then you know, obviously we have the discussion obviously why, but I don't have a very high vet bill anyway… So in reality there's got to be a benefit for that vet bill to go up… If we think there's a problem, yeah the vet's there. (Farmer 8)

Regardless of the roles of the vet on the farm, farmers would go to their vet for advice and information on vaccination but those who had their vet on farm regularly had more opportunities to discuss problems and to ask questions.

The roles of the vet in vaccination

The analysis identified five key themes that related to how the role of the vet was perceived by the farmer (Box 1). Not all themes were evident in all interviews, which in itself emphasises the need for an individualised veterinary approach. The multiple roles of the vet in vaccination highlighted that farmer decision-making in the implementation of vaccination strategies is a *process* and not a one-off event.

BOX 1 The five key themes identified by the analysis relating to how the role of the vet in vaccination was perceived by the farmer

- Identification of 'a problem'
- Diagnosing the problem
- Advising to vaccinate
- Providing the vaccine
- Advice on implementation

Identification of 'a problem'

The first role the farmers expected of the vet was to explain and help identify the problem that may require the implementation of a vaccination protocol. In some cases, the farmer identified the issue and called the vet in as a 'firefighter' to confirm and treat the problem. In other cases, on-farm surveillance performed by the vet such as regular disease testing or routine fertility monitoring had indicated a problem. Finding problems on their farm was something that affected farmers emotionally; for example, the realisation that their fertility was suboptimal caused a normally upbeat event to be something of a concern.

> Well, we've always had pretty good fertility, didn't we. But then, we have a monthly fertility visit… and you get a feel that, it's usually quite a cheery time, isn't it. You know, four weeks in calf, five weeks in calf, six weeks in calf, but then there was just a little dip [in fertility]. (Farmer 9)

The identification of a problem, through both veterinary firefighting and disease surveillance, was identified as a motivator for farmers to discuss implementing vaccination strategies with their vet.

Diagnosing the problem

Once a problem was identified, by either the vet or the farmer, the vet's role moved into diagnosing the cause of the problem. The diagnosis was usually achieved via disease testing using samples collected from an individual sick animal or through routine herd surveillance.

> I mean I'd say the vet makes you act on it. I mean you see the problems. You tell the vet. That vet does a test. There's a problem. We have to act on it. (Farmer 14)

The evidence from the diagnostic testing presented by the vet was a trigger for discussion between the farmer and their vet about vaccination. This evidence was a motivator for farmers to vaccinate their cattle.

Advising to vaccinate

Once a diagnosis had been made, the vet's role was to advise the farmer to vaccinate or not. Generally, the participants claimed to follow their vet's advice and maintained that they would continue to do so in the future.

> I think it's got to be a common sense thing really. If the vet really advises you to do it, they're telling you for a reason. (Farmer 4)

The vet's knowledge of local disease epidemiology was also a factor in farmers' vaccination decision-making.

> Well quite a lot of fairly high level [of IBR] in a few farms in our area the vets were telling me. So we thought we'd better use [the IBR vaccine]. (Farmer 6)

However, vaccination appeared at times to be a short-term strategy as it was sometimes discontinued in following years. Some farmers did not follow their vet's advice to vaccinate or had stopped vaccinating against their vet's advice. Reasons reported were the cost and hassle of the vaccines, or a perceived lack of efficacy.

> And even though the vet did advise against [stopping vaccinating], I'd missed the date to redo the boosters so I decided well let's see how it goes knowing full well that it could relapse and if it does, then I say, 'Well I stand here with egg on my face. I've made a mistake', but we haven't had a problem. (Farmer 14)

> …the vet said "Oh it's lepto[spirosis]. You've got to vaccinate cows with lepto[spirosis]." Got the vaccine and it didn't make the slightest bit of difference. (Farmer 15)

A perception of a lack of efficacy appeared to be based on the farmers' own view of the problem and was infrequently supported by further evidence such as diagnostic testing.

Providing the vaccine

If the farmer decided to vaccinate, the role of the vet became that of the provider of the vaccine(s). Most of the participants who vaccinated their cattle purchased vaccines from their vet. Some farmers did purchase, or mentioned considering purchasing, vaccines from agricultural merchants due to reduced cost and increased convenience but argued that they would still consult their vet for advice.

> The BVD I have to [get from the veterinary practice] because it's still under licence to the vets. The lepto[spirosis] we bought outside because it was cheaper. (Farmer 20a)

There was a slight feeling of unease among a few farmers that vets had too much control over the price of vaccines, and they considered that some vets, but not their own, would like farmers to continue vaccinating purely for financial reasons.

> The vets have got a bit of a monopoly over the price of vaccines haven't they. You can only get it off them. So it seems quite expensive sometimes. (Farmer 17)

However, cost did not appear to be a major barrier to vaccination. Many of the farmers were reluctant to stop vaccinating once they had started and felt that the vaccines were worth the cost.

> Well the IBR one is definitely [worth the cost] for us. The BVD and lepto[spirosis], a lot of its peace of mind if you're buying in cows. It can lead to a sort of big loss if you suddenly get an outbreak. (Farmer 23b)

Advice on implementation

Once the vaccine had been supplied to the farmer, this was occasionally the point at which the vet's role ended. However, other farmers used their vet as a source of further advice on implementation of vaccines. Examples of advice sought included which animals to vaccinate, the use of concurrent vaccines on the same day and whether or not to stop vaccinating. It was noted that different vets within the same practice and from different practices sometimes gave different advice. Interestingly, participants tended to distinguish 'my vet' from other vets.

> So I spoke with four different vets from the same practice [about Schmallenberg vaccination] and I've had four different answers. One says do it. That was the oldest of the vets. 'Do everything', he says. The next one says they need to understand it a bit more themselves, the position I was in. The second one says, 'Well just do the cows that aren't in calf yet'. And I'm thinking, 'Well hang on. I'm getting mixed information'. Then my own actual vet, [name of vet], he actually said to me, 'Well let's start at the bottom and just guarantee that we protect the heifers', which is fair enough. (Farmer 8)

When asked about where responsibility for disease control and vaccination lay, the overwhelming response was that it lay with the farmer. However, participants did still place some responsibility on the vet's shoulders.

> There's a fair responsibility lies on the farmers' shoulders. Obviously, if he has a problem then if he reckons his problem's getting out of hand he needs to be prepared to go to the vet. And I'd say about fifty-fifty between, or maybe sixty-forty because the farmer has to make the initial call to the vet if he thinks the problem he has is getting out of hand. And mostly I am responsible for the vet, to advise him properly in what we do with the vaccines. (Farmer 10)

What defined a good vet or a good farmer–vet relationship varied between participants and did not appear to be related to the role of the vet on the farm.

> We're pretty well free of disease with our system, you know, we hardly require a vet. We just mainly use them for drugs. We have a good relationship with them. (Farmer 6)

Participants described good vets as practitioners who were practical, experienced, opinionated, knowledgeable and had the right attitude.

> Don't see the senior partner quite so often [laughs]. I like having him because he's a farmer's son and seriously practical, whereas some of the younger ones perhaps haven't quite forgotten what they learnt in vet school [laughs]. (Farmer 3)

In summary, the relationship between the farmer and their vet was considered important, with the vet facilitating decision-making in multiple ways. All participants felt their relationship with their vet was good; however, the description of the relationships varied. Likely due to this perceived good relationship, most participants would ask their vet for advice regardless of how frequently they were using their vet's skills on their farm.

Discussion

Vets were perceived as major facilitators for vaccination on British dairy farms, regardless of their main role on the farm. Vets were involved at multiple points throughout the vaccination decision-making process and helped to facilitate awareness of the potential need to vaccinate.

The fact that farmers tended to distinguish 'my vet' from other vets suggests that assigning an individual vet to every farm client would be a proactive step to strengthen the relationship between farmer and vet. This is similar to human medicine; people tend to distinguish 'my doctor' from other doctors and the health service in general (Casiday and others 2006). Promoting the individual vet–farmer relationship would enable farmers to have a single point of contact and allow the vet to tailor their advice to the farm.

Part of the vet's role in promoting awareness of a need to vaccinate, and one reason why farmers place importance on their vet's advice, was their perceived knowledge of local disease epidemiology. Vets were felt to know what diseases were prevalent in the area and if there had been cases locally. These were factors taken into consideration when farmers assessed the risk of disease outbreaks on their farm, and therefore a need to vaccinate.

In relation to knowledge of local disease epidemiology, it is worth considering the current paucity of endemic disease prevalence data and an apparent trend towards a reduction in government support for disease surveillance. With farmers appearing to rely on their vets for information regarding disease risks and disease prevalence, it appears to be crucial that vets are fully armed with this information.

Although the participants in this study identified themselves as being responsible for disease control and vaccination on their farm, there was some responsibility placed on their vet's shoulders. This finding supports previous work that highlighted the need for an integrated and improved vet–farmer relationship as well as the changing role of the vet in food production and animal welfare (Statham and Green 2015).

There appeared to be a perception among some participants that having low veterinary costs was a good herd health indicator. This assumption would depend on what the money is being spent on; if mostly on medications and emergency work, then a lower vet bill may be an indicator of good herd health. However, if money is spent on preventative herd health monitoring, fertility testing and vaccinations, then this may improve the overall profitability of the farming business. Traditionally the veterinary profession does not perceive themselves as 'service providers to businesses', and a business model for charging for services such

as advice, or time taken to complete paperwork, is not well established. When this is coupled with the farming community's perception that veterinary services are too expensive and lack charging transparency, a cultural barrier is formed (Lowe 2009). The Lowe report highlighted that although vets identified disease prevention and health planning as an area they could add value for their clients; when farmers were asked what value was added by their vets, they could not identify any area where this was the case. This finding echoes similar attitudes of the sheep farmers interviewed by Kaler and Green (2013) about their opinions on the role of the vet; that vets do not have a major role to play in flock health management and that their time is costly.

The cost of the vet also appeared to be linked to the vet's role in the sale of vaccines to farmers. Vaccines were purchased from vets because it was perceived they had to be, and from agricultural merchants because it was cheaper and more convenient. In the traditional farm animal veterinary business model, medicine sales are a major contributor to income. The slight feeling of unease apparent in the data surrounding vaccine pricing echoes the concern highlighted by Lowe (2009) that pricing of veterinary medicines is not transparent. This was, however, a minority opinion among the participants.

The current study seems to suggest farmers' perceptions of veterinary charges have not changed since the Lowe report; however, their advice was perceived to be trustworthy and was sought throughout the vaccination decision-making and implementation process. Although the farmers were not explicitly asked if their vets charged for this advice, the general feeling throughout the interviews was that the advice was given free of charge over the phone or while on the farm for other reasons. A change in culture appears to be required in both the dairy farming industry and veterinary profession; for farmers the perception that increased veterinary contact and veterinary bills are a proxy for poor herd health needs to be shifted to the integration of vets into the farm team and a change in spending to veterinary advice and preventative care instead of medicines. Although emergency veterinary work will always be required, it has been shown that management and preventative medicine changes can reduce the incidence of common diseases such as left displaced abomasums (Mueller 2011), milk fevers (Husband 2005) and the effects of infectious disease (Newcomer and others 2015) occurring on farm. For the veterinary profession, the culture change needs to be in the business and charging models of farm animal practice. There needs to be a move away from medicine sales towards a more advisory and preventative herd health role (Statham and Green 2015), as well as a corresponding shift in undergraduate and postgraduate veterinary education to prepare and support vets throughout this change. In particular, the inclusion of professional communication skills and how communication may vary between companion and farm animal practice, as well as between 'firefighting' and preventative roles (Kleen and others 2011). Both the report by Statham and Green 2015 and the current study suggest that this shift does appear to be materialising in both the farming industry and veterinary profession.

Other stakeholders in the farming industry, such as agricultural organisations, milk buyers, levy boards and Defra, could encourage this cultural change by working with the veterinary profession to present a united and holistic approach to vaccination and disease prevention and control.

The aim of this study was to describe how British dairy farmers perceive the role of vets in the implementation of vaccination strategies on farms. However, it is possible other influences may play a role in farmers' vaccination decision-making. Indeed, in the quotes presented in this study, neighbours and vaccine providers other than the vet were described. Previous research investigating attitudes to biosecurity, in general, highlights the role of Defra, farming media, other farmers and Farmers' Unions as sources of information (Brennan and Christley 2013, Heffernan and others 2008). It is also important to consider any potential influences on the vet themselves such as pharmaceutical companies. It is beyond the scope of this study to answer these questions; however, it would be a useful area of further research.

It was the aim of this study to collect a broad range of opinions using a method that allowed the collection of rich and detailed data. The aim was not to produce results representative for the British dairy farming population, so caution must be used when applying the findings to the British dairy industry as a whole. Despite this, the use of maximum variation sampling meant that a diversity of farmers and farming types were included in this study.

Space precludes presentation of further discussion relating to the philosophical and methodological decisions and process; however, this information can be found in the PhD thesis of the lead author (IFR) (Richens 2015).

This study provides clear evidence that vets have an important role in facilitating farmer decision-making in all aspects of vaccination, including vaccine distribution and advice on implementation. This role is acknowledged both by farmers with regular veterinary contact and those with solely emergency veterinary contact. Given this finding, future work should investigate the attitudes of cattle vets towards vaccination and how they perceive their role. This is important to further understand the challenges towards the optimisation of vaccination strategies on British dairy farms.

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Patient consent Written consent was obtained prior to face-to-face interviews and verbal consent was recorded prior to telephone interviews. All interviews were audio recorded.

Ethics approval The study received ethical approval from the School of Veterinary Medicine and Science Ethics Committee, The University of Nottingham.

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