Effective communication to improve udder health: can social science help?

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Abstract

Improved udder health requires consistent application of appropriate management practices by those involved in managing dairy herds and the milking process. Designing effective communication requires that we understand why dairy herd managers behave in the way they do and also how the means of communication can be used both to inform and to influence. Social sciences- ranging from economics to anthropology - have been used to shed light on the behaviour of those who manage farm animals. Communication science tells us that influencing behaviour is not simply a question of 'getting the message across' but of addressing the complex of factors that influence an individual's behavioural decisions. A review of recent studies in the animal health literature shows that different social science frameworks and methodologies offer complementary insights into livestock managers' behaviour but that the diversity of conceptual and methodological frameworks presents a challenge for animal health practitioners and policy makers who seek to make sense of the findings – and for researchers looking for helpful starting points. Data from a recent study in England illustrate the potential of 'home-made' conceptual frameworks to help unravel the complexity of farmer behaviour. At the same time, though, the data indicate the difficulties facing those designing communication strategies in a context where farmers believe strongly that they are already doing all they can reasonably be expected to do to minimise animal health risks.

Keywords: attitudes, behaviour, animal health

Introduction

Science and policy often see the challenge of improving animal health on farms in terms of getting people (farmers, vets, visitors to the countryside, consumers) to do things they haven't done before, or to do them differently, or more frequently or more assiduously. The most common tools in this endeavour are evidence-based information and rational argument. But we know from other spheres that people – including us – do not necessarily respond in what we might regard as sensible ways to information, persuasion and rational argument. Other people are very adept at subverting the rationality of our well intended efforts, perhaps with anecdotal counter-evidence: 'Did you know that smoking reduces life expectancy?' 'Well, my mother smoked 20 a day and lived to 104'. Or by preferring not to be confronted with evidence: as the smoker said when he handed back a packet of cigarettes to the shopkeeper, "Can you give me a lung cancer pack instead of this impotence pack?"

Social sciences can help us explore and understand the reasons behind the way people behave and the choices they make. These include economics – the first social science to be applied systematically to explain behaviour in the agricultural sector, with farm management as a discipline built around the idea of the 'profit maximising' business. But other, 'softer', social sciences have much to offer, including sociology, with a branch of the discipline, rural sociology, developed to reflect the particularities of social life in rural, largely agricultural communities in 19th and early 20th century USA and Europe; anthropology, with its focus on

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the understanding of 'other' cultures, originally applied to studying peoples in other continents and countries, but with its methodologies increasingly applied to analysis of institutional, professional and work cultures closer to home; social psychology, which seeks to understand how other people's views and behaviour affect the way we behave; and communication science which draws on other social science disciplines to analyse how people's interaction with and through available means of communication influences their behaviour.

All these disciplines have been used to help understand how those in the field of animal health behave, and the choices they make and do not make. And policy makers have recently developed a new interest in the insights that social sciences can add to their evidence base. The paper reviews recent applications of social sciences, other than economics, in animal health before turning to reflections from a recent study of the attitudes and behaviour of livestock keepers in England towards practices to reduce risk of animal disease on farm.

Social sciences and animal health

The idea that attitudes influence behaviour is widespread, leading to the view that if we can first understand, then try to influence attitudes we can influence behaviour. There are many studies in the animal health literature predicated on this idea, most often taking a quantitative approach to the measurement of attitudes. Fairly typical is a USA study of attitudes towards Johne's Disease (JD) control programme (Benjamin *et al.*, 2010). Attitudes were measured through farmers' and veterinarians' responses in a postal questionnaire to a series of statements; the results suggested that those who were better informed or had received training in JD control were more likely to have positive attitudes towards participating in control programmes. In France, Boivin *et al.*, (2007) measured attitudes and beliefs about beef cattle, and knowledge of how to handle them, through postal questionnaires, again asking respondents to indicate the strength of their agreement or disagreement with a series of statements. While mean knowledge and attitude levels were generally positive, the authors concluded that variability between respondents and between the level of agreement with different statements (or 'items') indicated scope for improvement in attitudes and handling through training.

Another USA study illustrates the common idea that 'gaps' in knowledge can be identified and then addressed through the provision of information or training. This was a two stage study, in which ten in-depth interviews were conducted to inform the development of a self-completion questionnaire to assess the knowledge of veterinarians about antibiotic resistance, and their perceptions of farmers' use of antibiotics. Conclusions were drawn on the potential for improved use of antibiotics by farmers through filling identified gaps in veterinarians' knowledge about how bacteria acquire resistance and about transmission routes of resistant organisms to dairy cattle, as well as through improved flow of information between veterinarians and farmers (Cattaneo, *et al.*, 2009). In another study, a questionnaire survey of beef farmers identified knowledge, attitudes and practices (KAP) in relation to antimicrobial use; the findings were used to make suggestions on development of education and training programmes (Green *et al.*, 2010). A questionnaire survey to explore Swedish pig farmers' information seeking behaviour in respect of contagious diseases found that proximity to an outbreak was an important factor in the likelihood that farmers would seek information, while printed information sent to all farmers was not particularly effective (Noremark *et al.*, 2009).

In the UK adaptive conjoint analysis, a quantitative methodology developed to identify attributes that influence consumers to buy products, was used to explore how farmers and veterinarians assess bluetongue control strategies, through a self-completion questionnaire

(Cross *et al.*, 2009).They found uncertainty among both veterinary surgeons and farmers about the efficacy of current strategies, and suggested that dissemination of information to veterinary surgeons and farmers needs to be better coordinated.

In contrast to the above quantitative approaches, a study in Burkina Faso and Mali of attitudes towards cattle breeds used qualitative, ethnographic methods drawn from anthropological traditions. The authors identified cultural preferences for breeds that are susceptible to trypanosomiasis, which makes, they suggest, the seemingly 'rational' recommendation to keep trypanotolerant cattle unlikely to be followed; instead, participatory vector control strategies were designed and implemented (Clausen *et al.*, 2010). In Brazil cattle farmers' attitudes towards and knowledge of endoparasite control were assessed through face-to-face interviews, a lack of knowledge of recommended control practices suggesting the need for better communication strategies (da Fonseca Delgado *et al.*, 2009). In Benin, goat farmers' objectives in keeping goats, and their perceived production constraints, were studied through participant observation and focus group discussions. The findings were used to suggest priorities for improved management practices (Dossa *et al.*, 2007).

Studies using a mixture of methods, often drawn from different social science traditions, are becoming more common. A study in the Netherlands used focus group discussions, personal interviews and an electronic questionnaire by email to identify factors affecting the reporting of possible CSF outbreaks. Six themes were identified, which suggested specific actions to encourage reporting (Elbers *et al.*, 2010). In the UK, a 'Pathway to disease control' framework, drawing on social psychology and epidemiology, was developed to explore, through thematic analysis of face-to-face interview transcripts followed by logistic regression, factors that influence farmers' behaviour in respect of zoonotic disease control. Among other findings was that a positive attitude towards control is not necessarily translated into specific action, particularly where farmers do not think their action will make any difference (Ellis-Iversen *et al.*, 2010). Other social psychology frameworks used include Theory of Reasoned Action (for example to explore the association between uptake of technology, livestock farmers' attitudes and subjective norms – Rehman *et al.*, 2007, Garforth *et al.*, 2005), and Theory of Planned Behaviour. Farmers' perceptions of the problem of cattle lameness were assessed through a questionnaire and compared with prevalence measured through observation. Lack of perception of lameness was a major barrier to reducing prevalence, suggesting implications for education and industry level action. The study also highlighted key motivators for taking action on lameness, dominant among which was pride in a healthy herd rather than concerns over what other people might think of them (Leach *et al.*, 2010a, 2010b).

While several of these, and other, studies are predicated on the idea that we can identify and then fill gaps in knowledge of animal health issues and of specific measures that can improve health status or reduce disease risk, they also show that communication of information to address 'gaps' is not sufficient. Attitudes to animal disease, confidence in proposed measures, credibility of information sources, confidence in one's current understanding and competence all play a role – and can all be influenced through carefully planned communication. We now turn to a recent study in England to illustrate how these factors can be brought together in a flexible analytical framework that allows animal keepers' views to emerge in a way that can inform communication strategies. Underlying this approach is the notion that planned communication is not just about getting better, more and clearer information across to farmers and veterinarians, but also about influencing the environment in which they make, and addressing the factors that directly or indirectly influence, their decisions and choices.

Attitudes and behaviour towards managing animal disease risk on farms in England

Research objectives and methods

Defra has identified several ways in which animal keepers can reduce disease risk on their farms. These range from isolating incoming animals until it is clear that they are free of disease, through on-farm hygiene measures to avoid transfer of disease from one animal (or species) to another, to improving fencing to avoid contact with stock on neighbouring holdings. The aim of this research (Garforth *et al.*, 2011) was to improve our understanding of the factors that might motivate farmers to adopt these measures or discourage them from doing so, thus providing an evidence base for ways of encouraging the uptake of measures to reduce the risk of animal diseases taking hold on farms in England in the future.

Potential barriers and motivators, based on recent studies of behaviour and behaviour change relating to livestock management in general and disease control in particular (Jansen, van Schaik, et al. 2010; Ellis-Iversen, et al. 2010; Jansen, Steuten, et al. 2010; Jansen, van den Borne, et al. 2009; Bennett, et al. 2007; Garforth, et al. 2006; Garforth, et al. 2005), include lack of information and knowledge, particularly on how to adapt a particular suggestion or piece of advice to the circumstances of the individual holding or enterprise; perceived economic, social and other costs and benefits of implementing advice; particular characteristics of the individual holding or enterprise; credibility, of the advice itself, the perceived source of advice, or the person or institution giving the advice; attitudes towards science underpinning the advice; the views and actions of respected peers ('subjective norms'); and individuals' confidence in their ability to implement the advice effectively. Understanding which barriers and motivators are operative in relation to specific practices or measures shown by research and testing to improve disease control outcomes is an important step towards designing policies to encourage and incentivise positive behaviour by animal keepers. These were explored through semi-structured interviews with 40 farmed animal keepers in England, selected to represent the main livestock enterprise types (beef, dairy, sheep, poultry, pigs) conducted February – March 2011.

The interviews were audio-recorded and transcribed; transcripts were subject to thematic analysis, within an analytical framework illustrated in Figure 1. Drawing on previous research, we expected that farmers' behaviour in respect of animal disease risk management would be influenced by their:

- knowledge of specific practices
- attitudes to specific practices, and to disease risk management in general
- view on the efficacy of specific practices in reducing disease risk (which, in TpB terms, would be reflected in 'outcome beliefs' and hence attitudes) and of disease risk management in general
- previous experience, and the experience they have heard from others, of specific practices
- perception of their ability to put specific practices into effect, and their perception of factors that constrain their ability to put specific practices into effect (which, in TpB terms, relates to 'Perceived Behavioural Control'; and in the Health Belief Model, to 'self-efficacy') which may include current habitual behaviour ,
- perception of what other farmers in similar situations are doing with respect to disease risk management, and

- perception of what other people important to them would think about their doing or not doing specific practices ('subjective norms' in TpB terms).

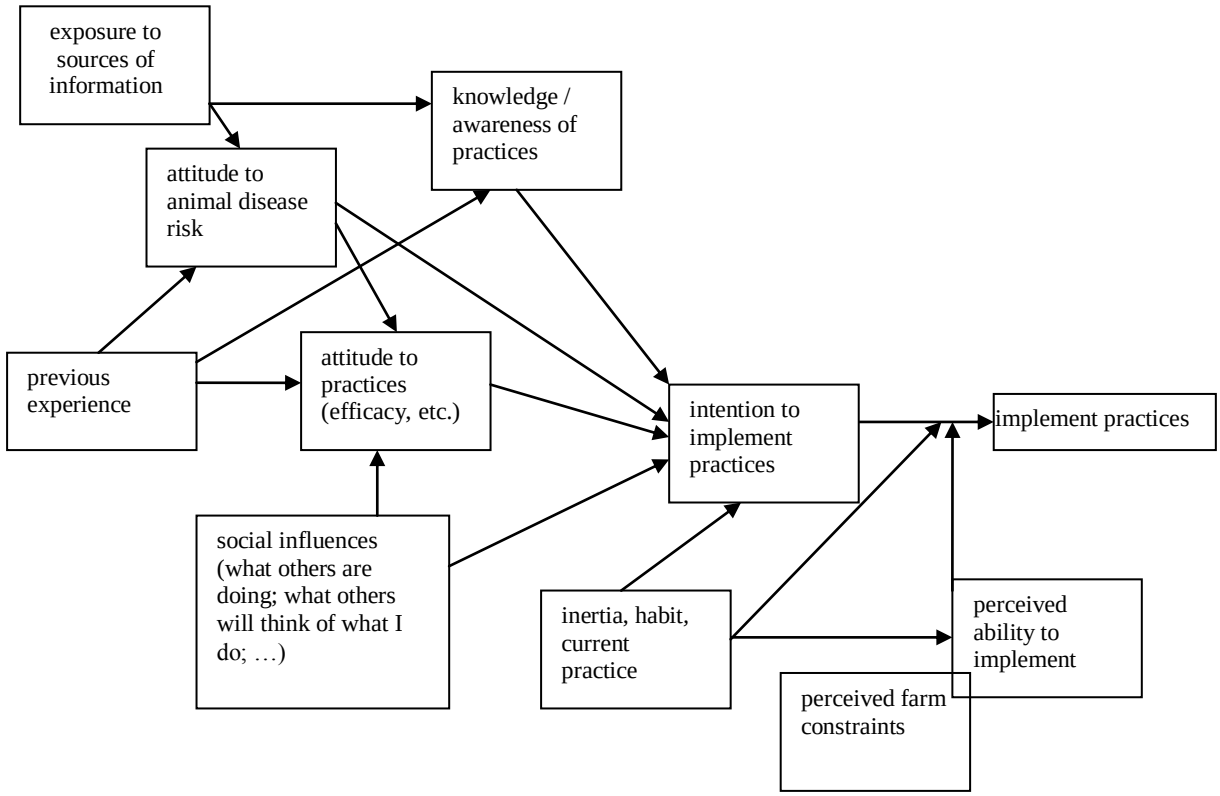

Figure 1. Working hypotheses linking factors that influence farmers' disease risk management behaviour

Findings

The prevailing attitude towards disease risk reduction among the 40 animal keepers is that they are doing all the things that make sense in the particular circumstances of their farm. There were very few instances where interviewees felt they should be doing more; and all had what seemed to them sound reasons for not complying with any practices they had not implemented. A typical response from a sheep farmer commented on the idea that animals bought in should be isolated for several weeks before joining the flock: 'in ideal circumstances we would try to and isolate them from the rest of the flock but obviously sometimes that's not practical if you haven't got much grass around and things like that'.

Regarding *knowledge and awareness of* practices, nearly all the interviewees felt they had a good understanding of disease risk control measures, with only one dairy and two pig enterprises saying they did not. For most, their understanding came from their long experience of working with animals rather than formal training, though many also acknowledged the importance of being able to check with their vet on appropriate action to take in the face of new threats to animal health. One larger dairy enterprise pointed out that understanding is not static: new experiences and challenges lead to the acquisition of new knowledge, a theme that was echoed by several other interviewees: 'I have some understanding but something might pop up that I don't know about. Five years ago I didn't know about Johnes disease. It was something that was there but I didn't know much about it. But generally, I am 90% sure of what I am doing because of experience'.

In terms of *attitude to disease risk*, there is widespread recognition that risks can be managed by good husbandry and reduced through implementing those measures that are practical for the individual farmer's situation. However, disease cannot be avoided entirely. This is not seen by livestock keepers as a fatalistic attitude, but as realistic: one can take sensible precautions to reduce some risks, but the nature of livestock keeping is that disease will occur. Furthermore, some risks cannot be managed or controlled by livestock keepers. Whatever they do on the farm, lack of effective control of risks by other people off the farm can undermine their efforts. One specific example was suggested by a poultry keeper: 'they supply plastic trays now and they reckon they disinfect them but they are all stuck together so I can't see how the disinfectant got in there. And that's why we got shut down because of that'. Attitudes to risk are informed by previous experience: in relation to scab, for example, one sheep enterprise volunteered: 'the times when we have had scab in the past, they always caught it on the moor from other sheep … if there is a problem there you are going to pick it up'. The overall picture from the interviews is that livestock keepers' compliance with the recommended practices is strongly influenced by their attitudes to disease risk. Those who feel a particular risk is both serious and manageable are more likely to take action to reduce it – provided they feel also that the costs are both feasible and justified.

It is also clear that many livestock keepers associate risk with the current disease status in the locality. For example several beef and sheep farmers had stopped vaccinating against certain diseases because the risk was low but would consider starting again (after consulting their vet) if disease prevalence increased in the area. A small poultry enterprise said that they take no specific action to stop visitors bringing disease onto the farm, but 'if there was an outbreak of something' they would not want people that have got their own poultry coming in.

Attitudes to disease risk measures seem strongly linked to attitudes to disease risk itself. Many interviewees base decisions whether or not to implement specific practices on perceived trade-offs between risk, efficacy and cost, not through any quantification of these factors but through a personal, qualitative assessment – which could also, perhaps, be interpreted as a post-hoc rationalisation of a decision taken on less rational grounds. Typical is this sheep enterprise's explanation of their decision not to vaccinate against bluetongue: 'vaccines are a very good thing, don't get me wrong, I couldn't manage without them but the less you can keep jabbing animals has got to be a good thing. You have to weigh up whether it's worth doing or whether you take a risk and probably this year, at the present time, I'm going to take the risk and not do it this year. If I was further east, I might probably do a bit more, going the other way if the truth were known'.

Another common theme is questioning the efficacy of practices, not because the theory does not make sense but because they cannot be fully implemented or because other risk factors will intervene. Although this was a theme with all enterprise types, it emerged particularly strongly with free range poultry (both smaller and larger enterprises) and seems to have an impact on the credibility of advice and, by association, the source: 'biosecurity between buildings, I think is just a waste of time on a free range farm as birds fly from one range to the next, and wild birds. Very difficult on a free range system as a sparrow can land in one field then flies up and lands in the next field'. The practices which are most commonly applied are those which farmers regard as common sense or simply part of good husbandry. They include vaccination, being selective over sources of new animals, keeping new animals separate from existing stock on arrival, and cleaning buildings between batches. These practices are adopted where the returns seem to justify it.

As for *social influences*, a strong theme coming through the interviews is that what other livestock keepers are doing and saying has relatively little influence on what the interviewees themselves do in respect of disease risk management. They rely very much on their experience and their own idea of what is sensible. The exception is the small number of less experienced interviewees who mentioned specific other people in the sector who they regard either as role models or with superior knowledge to their own. There were several references to carrying out measures because they represent good practice (for example, with reference to hygiene and animal welfare), but these seemed to be more related to personal values than a need to conform with others' views.

Interviewees' disease risk behaviour is strongly influenced by their *previous experience* – of practices that have worked or not worked, of diseases on farm, of working with animals for several years (often for decades), and of the organisations with which they have dealings. If a practice does not work, or is even seen to make things worse, livestock keepers are quick to change, even if the change is one that others might regard as an idiosyncratic choice. As the manager of a medium sized pig enterprises said, in respect of cleaning housing between batches: 'we found out very quickly that the worst thing you can do was to pressure wash and disinfect between batches because we found they built up a certain amount of immunity. So now we clean out and have foot dips going in and out of the farm but we don't pressure wash'.

On the other hand, a bad experience can provide the impetus to change practice: 'obviously because I buy a lot of calves in each year I never quite know what I'm bringing in. Last year, part of it was BVD, I know it stemmed to one farm. So I limit the farms now that I bring in animals from'.

As for *inertia and habit*, while there are frequent comments from interviewees about their having found a pattern of disease risk management practices that work for them, there is no strong indication that they are keeping to a pattern because of inertia. Indeed, most interviewees referred to occasions, often quite recent, where they had changed practice for various reasons. The continuation of habitual behaviour does not seem to be a strong driver of the use or non-use of specific measures. Farmers are willing to be convinced that they should use measures that they currently do not, but they need supporting evidence and advice from trusted sources, which for most is a vet whose opinion they have reason (from previous dealings) to trust.

Exposure to sources of information is clearly a necessary (though not sufficient) condition for effective communication. Most interviewees do not go out of their way to search for new information. Those that do, refer to keeping up to date through reading the general farming press, or through their interactions with vets. The international literature on farmer innovation and uptake of new technology often identifies 'other farmers' as a major source of new ideas. In this study, 'other livestock keepers' and neighbouring farmers do not figure prominently.

The dairy enterprises were the exception: three of them were members of discussion groups: although these were focused on issues other than animal health (grassland management, business performance), members do exchange information and ideas about disease risk measures and disease incidence at these meetings.

A consistent theme is the use of the vet to follow up on or check information and advice heard from other sources, whether these be in the local community, on the mass media and Internet, or from national organisations. Some vets are clearly being proactive in this field. One smaller sheep enterprise, when asked about their sources of advice, replied: 'My sister. Local vet

practice. Phone them first. We go to regular health-based meetings for sheep and cattle, through the vets. On things like worms. We can pick up some interesting points'. Overall, those who are more exposed to sources of information are in a position to choose to adopt a particular measure. But the influence of that exposure is always mediated by farmers' own assessment of its relevance to their situation, an assessment which is often made after referring to the vet for further information and an opinion.

Many interviewees referred to some particular *constraint or feature of their farm* or enterprise when explaining why they had decided it was either unnecessary or impractical to adopt one of more the disease risk measures. Features making a measure unnecessary include geographical isolation and the protection from neighbouring stock afforded by roads and water courses at the farm boundary; those making a measure impractical include the construction or layout of farm buildings, lack of space, and fragmentation of the holding into several separate parcels. One of the pig enterprises felt that they could not do any more to prevent disease transmission from rodents and other wildlife without compromising their commitment to running an open system: 'if we starting boarding it up it would cause problems and is not the essence of what we are trying to do. It wouldn't cost much but it would compromise the welfare'. More general constraints are cost and time: 'there's a lot of advice in the health plan, things like keeping holes filled in fields so there's no water. It's just impossible, there's not enough hours in the day'; 'I'd like to vaccinate for BVD and I'd like to do quite a few other things but I can't, purely too expensive for the return'.

Attitude to sources of advice was not identified in the analytical framework, but it comes through as a strong theme for all enterprise types. Vets are seen as the most credible and reliable source of advice on disease and disease risk management, providing more farmer-focused advice than government sources: 'You've got to get to know your vet. They will come and talk to you. And they wouldn't give the advice that Defra give about washing down, they would know that it doesn't sound right. A vet will give an honest opinion. I would ask a vet first, before a government vet'; 'I think the thing is with Defra's information is that they don't know your farm or your situation so Defra tend, in my opinion, to work a lot more along generally established lines and ideas and they are not always practicable on your farm. Whereas a vet will come out to your farm, look at what you've got, look around and ask questions, and from that he or she will make a judgement on what is actually the best thing to do in your situation'.

Conclusions and implications for effective communication

Most interviewees accept that action taken on farm and by farmers can reduce the risk of endemic disease breaking out and spreading among their animals. Most also feel they are doing all they reasonably can, within the constraints of their enterprise, to minimise such risks. However, the measures they implement and the rigour with which they do so are influenced by changes in perceived disease risk over time: as the perceived threat of disease increases, measures are applied more rigorously. This reinforces the importance of effective disease surveillance to provide early warning about current and possible future disease threats. Dissemination of credible early warning information through the farming press and vets will help to sharpen livestock keepers' assessment of risk and have both a direct and an indirect effect on the implementation of disease risk measures. Credibility is vital, though: the science on which recommended measures are based must be credible and clearly articulated, and the measures themselves must be seen to be realistic and cost-effective.

Most livestock keepers regard one or more of the measures that Defra would like to see adopted as unnecessary, ineffective or not appropriate to their situation, in part because of a

perception that Defra recommend measures that are beyond what would be sensibly required. They see themselves as making rational decisions, based on the circumstances of their enterprise, on what measures to implement, irrespective of what other livestock keepers are doing. There is a high level of confidence in their own knowledge and expertise built up through years of experience. Information is more likely to be acted on if it is seen as relevant to the particular circumstances of the enterprise, and if there is opportunity for generic advice to be mediated through a trusted, local source of expertise. And the fact that most feel they are already have a good understanding of disease risk management suggests that generic information and advice is likely to be ignored as not relevant. One way of encouraging more, and more consistent, compliance with measures might be to focus on risk communication, encouraging livestock keepers to develop a more realistic assessment of risk to their own animals. This should be tailored to the different disease risk situations faced by different enterprises, which needs to involve local (public and private) vets who are widely regarded by livestock keepers as the main players in interpreting and filtering information emanating from national bodies. The farming press could also be used to enhance risk communication to animal keepers, given the wide use and credibility of these media.

Livestock keepers clearly place great importance on being able to access authoritative and trustworthy information relevant to their particular circumstances, which most of them see as available from their local veterinary practice. While they do not automatically act on the advice they receive, they are much more likely to act in response to information that is directed at their particular circumstances. Information and advice that is general and appears as if it is being sent out to all is more likely to be ignored at best, and at worst to reinforce attitudes that advice from central sources is not relevant or practical to the individual recipient. Farmers look to their vets to interpret and contextualise information and advice received from elsewhere.

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