



Centre of  
Expertise on  
Animal Disease  
Outbreaks

Report

# UK Farmer and Advisor Views on Bluetongue, its Management and Control

April 2025

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Authors

**Niamh Mahon, Claire Hardy,  
Carol Kyle**

Reviewed by

**Davide Pagnossin**

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Contact

**Jane.Grant@Glasgow.ac.uk**

**[www.epicscotland.org](http://www.epicscotland.org)**

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THE UNIVERSITY OF EDINBURGH  
Global Academy of  
Agriculture and Food Security



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## Executive Summary

Little social scientific research has been conducted into UK farmers' perceptions of bluetongue (BT). Here, we report on findings from an online survey into UK farmers' perceptions of BT risk and a series of semi-structured interviews, conducted with a sample of survey respondents and other livestock keepers. The aim of this work was to explore in-depth perceptions of BT risk, and the measures taken to reduce the spread of the disease and mitigate risks on farm.

1. Livestock keepers in, or near, control zones were more concerned about BT and the impacts of BT than those further away. Concerns were about the direct impact of the disease as well as the indirect impacts of the control zone restrictions on farm businesses and farmer mental health.
2. It was thought that the impacts of BT could eventually spread to other areas of the agricultural industry that are linked in some way to livestock production, e.g., arable farms providing seasonal grazing.
3. Restricted livestock movement has impacted availability of animals for some keepers and this might impact on future breeding programmes.
4. Concern about the disease was mixed with a sense of fatalism due to the lack of methods to control, mitigate and prevent the spread of the disease (especially regarding midge control).
5. In the survey, some people expressed an interest in accessing and using vaccination to protect animals.
6. In the interviews, when questioned on vaccine use, the response was more negative than in the survey, with livestock keepers concerned about side effects seen with the BTV-8 vaccine. There were concerns around efficacy, possible side effects and high costs of the BTV-3 vaccine.
7. Interviewees rated Schmallenberg as more concerning than BT, both for animals and livestock keepers, with elevated emotional and financial impacts resulting in mental health concerns.
8. The use of control zones was seen as a positive if all stock keepers within these zones adhered to the rules and regulations in place. It was questioned as to whether this was always the case.
9. Communication between government bodies and farmers was seen as unclear and for some lacking. The information that was available was believed to be not easily accessible, especially around the current extent of the disease across the UK, the methods of disease notification, and long-term, nationwide plans and strategies to control the spread of, or eradicate, the disease. This is fuelling frustrations and distrust towards the government and greatly impacting farmer mental health.

## Recommendations

Improved communication around the rationale for making a disease notifiable and the process involved in recognising and reporting notifiable diseases would aid understanding and encourage farmers compliance. Clear evidence of the efficacy and any potential side effects of BT vaccines may assist the uptake of vaccines. More explicit advice around what chemical preventatives are available to protect livestock against midges and how to use them could also be advantageous.

This information should be provided via multiple dissemination routes, including online and physical media to ensure it is accessible to people with a range of learning styles.

## Introduction

Bluetongue (BT) is a non-contagious, viral disease of ruminants and camelids caused by bluetongue virus(s) (BTV) and transmitted by biting midges from the genus *Culicoides*<sup>1</sup>. BT is not zoonotic but is notifiable in the UK and has animal health and welfare implications. As it is often managed via the enforcement of animal movement and trade restrictions<sup>2</sup>, outbreaks can have significant economic impacts.

Recent outbreaks of BTV serotype 3 (BTV-3) in continental Europe<sup>3</sup> have led to large-scale morbidity and mortality of livestock<sup>4</sup>. Cases of BTV-3 were confirmed in England first in November 2023 and later in August 2024. Currently, movement control zones designed to limit the spread of the disease are in place across many of the eastern and southern counties of England<sup>5</sup>.

Little social scientific research has been conducted into farmers' perceptions of BT (with some exceptions, for example<sup>6,7</sup>). Here we report on findings from,

1. An online survey which acted as the first phase of a larger social scientific investigation into UK farmers' perceptions of BT risk. The survey explored farmers' concerns about BTV, the use of protective measures, potential vaccine uptake, including drivers and limiting factors impacting uptake, and sources of information and advice.
2. Interviews, conducted with a sample of survey respondents and other livestock keepers, to explore in-depth farmer perceptions of BT risk and of the national measures taken to reduce the spread of the disease, as well as actions they were personally taking to mitigate this risk on their own farms.

## Methods

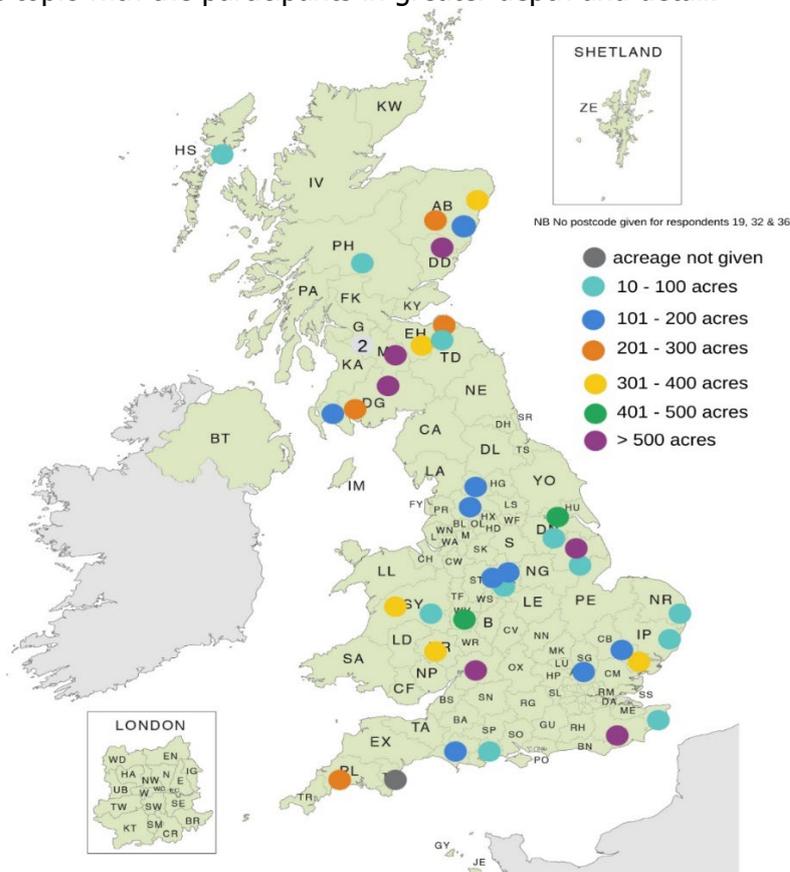
This study took place between May 2024 and January 2025. The online survey was designed and facilitated using Qualtrics software. It was planned to be exploratory in nature and not intended to produce statistically significant data. Instead, the findings provide a snapshot in time of a rapidly evolving situation. The survey opened in May 2024 and was advertised on social media and in the farming press. A donation to farming charities was made for each completed survey. All responses were anonymous; however, participants could provide contact details if they wanted to take part in future phases of the research (i.e., an interview with one of the researchers). Participants were also asked to provide the first three characters of their postcode to determine an approximate location, although this was not mandatory. Responses were collated and descriptive statistics were produced to summarise the data.

In-depth, qualitative interviews were conducted with a sample of survey respondents and others recruited via opportunity sampling, to explore in more depth farmer perceptions of BT risk, the national measures taken to reduce the spread of the disease, and actions they were taking to mitigate BT risk on their own farms. All participants were interviewed online by one of the report authors, following a semi-structured interview script. Interview audio recordings were transcribed and anonymised prior to thematic analysis. Excerpts of the transcripts are presented in this report with pseudonyms to illustrate the key themes identified during analysis.

Ethical approval for the research was obtained from RESAS and the James Hutton Institute ethical review board (project ID: 0254) prior to data collection.

## Findings from the online survey

A total of 42 complete responses were obtained from Scotland (approximately 30%), England (approximately 60%) and Wales (approximately 10%). Holdings ranged from 20 to over 500 acres and included livestock and mixed farms. Respondents, comprising almost equal numbers of males and females, ranged from 18 to over 70 years old. See Figure 1 for a map of the approximate locations of survey respondents. Participants in the survey were not asked whether they had first-hand experience with the disease in their herds and flocks. Instead, these questions were saved for the qualitative interviews, allowing the researchers to explore the topic with the participants in greater depth and detail.



*Figure 1 Approximate locations of the survey respondents.*

Most respondents (91%) were concerned about BT. Concern was around the impact of BT on UK export markets and public perceptions of farming. The potential loss of important genetic diversity due to increased animal mortalities, and the impact any movement restrictions might have on farming businesses were also mentioned. Those that were not concerned cited other more immediate issues taking precedence and how worrying was unproductive considering there was little they could do to protect their livestock from a BT incursion.

Most respondents knew that BT was a notifiable disease (91%). When asked who they should notify, the majority stated their vet, the APHA, or Defra. However, there was a notable number of respondents that expressed a degree of doubt about their answers. Effective disease

monitoring and surveillance are seen as vital components of national animal disease control programmes<sup>8</sup>. Our findings suggest a need to better highlight and advertise the exact processes involved in reporting notifiable diseases to ensure this is carried out.

When asked how easy it was to recognise symptoms of BT, around half of respondents were not sure, and approximately one quarter (23%) thought it was difficult to recognise. A similar proportion (23%) thought it was easy to recognise the symptoms. Key learnings from BT outbreaks in Europe have emphasised the importance of providing farmers and vets with information and advice on how to recognise the signs and symptoms of BT to effectively identify the early stages of the disease and control the spread<sup>3,4</sup>. The findings from this study highlight a need to provide farmers with this information so that they can act promptly upon suspected BT cases.

Most respondents (61%) were, at the time of completing the survey, not undertaking voluntary or mandatory protective measures against BT. Of those that were, the most common voluntary measures were chemical insect control (e.g., the use of pour-ons or injectables), prolonged quarantining of incoming stock, extra surveillance of their animals, and grazing animals in windier areas. The most common mandatory measure was compliance with the rules in place in movement control zones

If a vaccine was available to them (currently available only in England and under licence), 70% of respondents stated they would use it and 27% would not (one respondent did not answer). Barriers to uptake mentioned by the respondents included the potential cost, current perceived low BT risk, and potential side-effects (e.g., a suggested increase in sheep abortions) caused by the vaccine. Advice from vets and farming peers, and financial incentives were seen as motivators of uptake, as well as the presentation of clear evidence of the efficacy of any promoted BT vaccines. These findings are similar to those reported in studies into BTV serotype 8 vaccine uptake in the Netherlands<sup>9</sup> (which measured intended vaccine uptake) and southeast England<sup>10</sup> (which measured actual vaccine uptake).

General comments from respondents mentioned a lack of easily accessible information, leading to a loss of trust in government bodies and frustration around how BT is being managed at the national scale. This included a perceived lack of information about the ongoing situation in continental Europe, the number and location of cases in the UK, and the implications for farms in movement control zones. There was also a noted lack of information about the cost and availability of vaccines, their efficacy and potential side-effects, and concern about what would happen to vaccine supplies if uptake were not high enough to justify the cost to the manufacturers.

Despite these frustrations, just over half (52%) of respondents were currently looking for more information about BT. Their main sources of information on diseases were vets and the farming press. Social media, farming peers, farming groups and government websites were also important. These findings indicate some of the main routes for providing up-to-date information about BT to farmers. Previous research has indicated that employing multiple dissemination routes and producing both online and physical media is an effective and often preferred method for sharing messages with farmers<sup>11</sup>.

## Findings from the interviews

Interviews were conducted between October 2024 and January 2025, with 13 livestock keepers (nine females and four males), and one livestock vet who also works with the Animal and Plant Health Agency (APHA). Some participants had already completed the survey, others were members of livestock associations and were contacted individually or were previously known to researchers. Interviewees came from across Britain and holdings ranged from 20 to 500 acres, including smallholdings, organic, conventional mixed, livestock, and dairy farms. All participants were interviewed online, following a semi-structured interview script.

### Concern about BT - Individuals

The level of concern around BT varied considerably depending on where participants were located, whether they were in, close to, or outside a restriction zone (RZ). Some keepers were avid information seekers whilst others were not. Some keepers looked at the RZs as being a high-risk area and wouldn't entertain buying stock from there but thought that others would take a risk to get a knockdown price on a good quality ram, for instance.

Farmers within the zones who are required to sell stock directly to an abattoir, or to a designated market on a licence, spoke of achieving lower than expected prices which impacted them financially. Pedigree breeders were concerned that they would be unable to sell breeding stock, particularly rams. Some had decided to sell them for slaughter to raise some income rather than keep them for another year.

A member of a cattle association commented on their perception of responses from their membership.

*I think it's been quite an interesting piece, I'd probably split the country into 3 separate pieces, effectively those in Scotland have probably generally not been too concerned and then when we get into England and Wales there are those who have been very, very concerned and then those who have been less concerned. (Ben)*

This opinion was endorsed by a member of a sheep association.

*I think it's funny when you look at the farmers outside of the RZs in that some take this very seriously and really want to protect their farms. There are plenty of others who almost don't know it's happening. They just carry on as normal you know. (Paul)*

Two keepers in a high TB risk area, on the edge of a control zone, said that BT was not a high priority currently as they had more pressing concerns

*I'd say I'm not [concerned] at the minute; there's bigger concerns out there like TB and...yeah there's bigger concerns out there to me at the minute than Bluetongue. It's not at the top of my list, obviously that could change very quickly if it did come near but no, I don't lose a lot of sleep over bluetongue at the minute. (Janice)*

Another producer said that the number of midges in the wet areas of his land was a concern.

*The farm is 500 acres and we farm on a nature reserve so there is quite a hefty portion of midge population kicking about where they stand in water which has been worrying me. (George)*

However, as they had no direct control over the situation, there was little point in worrying unnecessarily.

*Because I have no control over it. No control whatsoever. I can't tell all the midges to buggie off and do one and don't come near my cows... So, I've done the best that I can yeah. The cattle will be heading inside in the next week or so, so like when they come in I can kind of think right there's less midges about the yard and all that lot but get to December and if they've been bitten now, it might be December when they're going to show symptoms. By that point I've probably worried for two months for no reason. (George)*

Conversely, that same farmer was very concerned about the possibility of not being able to sell his rams (tups) earlier in the year.

*I must admit on the run up to me taking the tups to Thirsk to this tup sale it was giving me hellish anxiety because I was thinking I've got these tups and we're literally going to get to the day before and then we're going to be banged in a zone and then low and behold we were literally 10 minutes from going into the sales ring and then my vet was there and he said we've been brought into the zone. But at that point I'm already there and we managed to get 3 of the tups sold. (George)*

Farmers' concern about the impact of BT was not only based on financial losses but also the impact on mental health too.

*I think in terms of stress for farmers anything notifiable or any sort of shift, things that put a shift in their day to day, their routine, has an impact but they are intangible those stresses. I think we do see fatigue among the farmers, they have issues with succession anyway and I think a lot of them do think there's no point sometimes. (Judy)*

*it would give me a bit better mental health [if I knew where exact cases were] because you wouldn't be...like at the moment, as far as you're concerned with this restriction zone, everybody has got bluetongue so it's like waiting around the corner to jump. But in reality there might not be any positive cases within the area. So not to do anything, but just for a bit of mental health peace of mind that you kind of know that there's nobody next door that's got it. (Betty)*

One keeper spoke of the effect on their mental health when shows were cancelled. Keepers who like to show often breed specifically with that in mind and shows can be a rare chance to socialise.

*Poor turn out to quite a few of the shows generally obviously from those from within the zones but also from some folks out with the zones and just slightly wary of mixing their animals with potentially infected animals. So I suppose going back to your first question on mental health, a lot of them that's their raison d'être for carrying pedigree stock is to go out and show. So I suppose when you think about it from that aspect yes there has been an impact there because folks who would love to have been out showing haven't been able to go out in some cases or...maybe not they haven't been able to but they've decided not to from a risk mitigation point of view. (Ben)*

## Concern about BT - Industry

Farmers were asked about their perception of the risk of BT to the wider industry and the effect it may have on the way farmers make their decisions. They mentioned the financial and emotional impact of unexpected feed costs and the impact on pasture management.

*...some people haven't been able to shift the animals that they wanted because they are in the RZ and they can't get them out and that blows up their feed costs and might have impact on their pasture management that they didn't foresee having 300 extra sheep. (Judy)*

The restriction has impacted keepers of one rare breed, particularly as the majority of breeders are in a RZ, resulting in restricted access to breeding stock. However, those that are not in a zone have been able to sell without movement restrictions, potentially giving them access to private buyers they might not normally see.

*So recently I've sold a couple of rams which has helped me because I'm not in the zone and they were out of the zone and I've had people wanting animals, but it's been really hard to source any because they're all in the restricted zones. (June)*

Although that individual was able to sell stock, they have observed fewer vendors at the local rare breed sale as most vendors were unable to travel out of the restriction zone, resulting in a reduced choice of animals to buy. This has the potential to impact on genetic diversity and future breeding programmes for the pedigree keepers.

*... obviously the [sheep] are a rare breed, and we went to the rare breeds sale and the only sale and unfortunately a lot of people didn't take stock because obviously most of them are in the restricted zones. So it meant that there was hardly any ewes or rams to buy. (June)*

Many livestock keepers are facing decisions around where to buy new breeding animals, finding their choices are limited either because they are in a zone or breeders they might have visited in the past are in a zone which adds another level of concern.

*... we've got to buy in a bull at some point. That may be coming from...so down into Wiltshire but we'll just watch where the zones are as to whether that's something that we do or not. I mean we'll have to get one, so if it does get to that point then obviously we'll be looking at testing and that sort of thing if we are still allowed to move stock. (Maisie)*

Others will be forced into making decisions around selling progeny and keeping the breeding males rather than buying in new blood due to the risk of importing disease into their own herds and flocks.

*That's going to be the only problem, obviously we bought one from [a restricted zone] this year which with the situation now, I now realise what a risk it's been although he's been here months so he's fine but that's the only thing that might be slightly difficult is managing...we have got 2 rams but its managing obviously next year or the year after, they're all going to be slightly related and that's obviously when I may have to consider getting another ram or I will have to sell the ram lambs progeny. (June)*

The impacts may not be restricted to livestock farms. Some keepers move animals to graze arable crop aftermath and may not be able to move them, resulting in a knock-on effect adversely impacting the arable farmer too

*Some arable farms have animals to graze the aftermath, and they can't go home. That has massive effects for them and the arable industry as well as the animal agriculture sector. (Judy)*

*I think a lot of folk really didn't know what was coming and they were quite concerned as to business effects. You go back to the spring there and there was folk with pregnant animals off farm and not sure if they could get them back to farm and things like that. (Ben)*

## Thoughts on restricted zones

The imposition of restricted zones elicited mixed sentiments from the interviewees. Most thought it was a good idea that infected stock could not move out of particular zones (unless under licence) and that there would be some level of protection for those not in RZs. As suggested below, interviewees felt that RZ's are the only effective way of controlling BT at present and can inhibit the spread of the disease.

*I suppose the problem is it's all we've got really; we do have vaccination but when you get to the vaccination point what does that do to potential export markets and things like that and there's also unproven nature, so the Control Zones are the only real blanket approach we have at the moment. (Ben)*

*Yes I do [think RZ's are a good idea] because I think we saw particularly with Foot and Mouth how quicky things escalated when animals were moving all over the place and I think the lesson we learnt from that was just how vulnerable the industry is to these sort of mass migrations of livestock from one end of the country to the other. So, I don't really see that there was another option. (Julie)*

*I personally believe that this government, the UK has done the right thing in imposing movement restrictions i.e. Control Zones. I do believe that was the right thing to do. Because ... the animals which can be infected don't show infection, don't show any symptoms for a week or 10 days and by that time it's too late ... So I do believe it's the right thing to do. (Pam)*

However, RZs were only perceived to be an effective measure if all keepers in the zones adhere to the restrictions, which interviewees noted may not be the case.

*I think I would worry that people are not recording movements and are probably moving stock still where they want to move them and probably out of area, out of the zones. (Jane)*

There were some comments around the apparently arbitrary designation of zones, for example a boundary that goes through a farm,

*...so, it's a case of well your whole farm is shut down even though half of them are okay and half of them aren't okay. (Betty)*

and the seemingly sporadic ways in which zones are implemented. One participant was confused about the timing of restrictions while another didn't understand the rationale for the movement within restricted zones into an area very close to the border of an unrestricted zone.

*I understand the concept of putting a zone around positive cases for example, but I struggle with the fact that it's been implemented so sporadically almost. I know when there was a huge, huge extension of it. They...the APHA, put out a post on Facebook and the comment was we've seen quite a few cases over the last few days, which to me then just suggests actually they've just had these cases and just not done anything about them. They've not implemented a zone around those cases, they've just gone well we've left it for 3 days now we'll just implement a massive zone, and, in that time, anything could have moved out of the area. (Betty)*

*...we are outside the zone. If I wanted to get a sheep for example, from the middle of Norwich I couldn't. If that zone extended [to here] I could go all the way over to the middle of Norwich, get a sheep there from a prime hotspot area, bring it down to my area, even though I'd be right on the border and then again almost the free movement within the zone in itself seems ludicrous because then if someone is right on the border like that, they're then going to spread it around there. Yeah I think it's incredibly ineffective the way it's been done. (Betty)*

The impact of the RZ varied depending on individual situations. George, who found himself in the RZ, commented:

*For us thankfully ... we'd sold all of our pedigree breeding stock early on but if we hadn't it would have stopped us selling pedigree stock up at Carlisle. (George)*

### Access to external markets

Livestock keepers in the UK are frustrated when trying to understand the regulations around livestock movements with BT restrictions. Industry representatives have been voicing concerns raised by their members. Before the introduction of BT restrictions, they were able to export to Ireland and relied on this market for their pedigree sales. Currently this market is no longer an option for them. Their understanding is that this is to prevent the spread of BT. However, animals from Europe, potentially exposed to BTV-infected areas, can be exported into Ireland.

*Cattle from the North of Scotland that could potentially be exported to Northern Ireland (NI) but are not allowed because effectively we're treated as an infected country and yet animals that have passed through active midgy zones are free to travel and I think there's...it's caused quite a lot of consternation, quite a lot of frustration on that front (Ben)*

Equally, when it comes to importing pedigree livestock, breeders of both cattle and sheep have a reduced choice of animals due to restrictions.

*A lot of Northern Irish breeders and Irish breeders in general would come to the UK for breeding stock and that's both cattle and sheep and so to hamper the cross border trade or the cross...trade across the Irish Sea has been...it's not gone down well with both folks in Northern Ireland and also folks over here who have previously sold to them. (Ben)*

Restriction zones mean that UK livestock breeders have reduced trading options open to them, leading to a great deal of frustration, and are dealing with economic consequences.

*'People have had to move on but .....it's just another thing in the line that has stopped that NI trade.'* (Maisie)

Both cattle and sheep keepers have concerns on the effects of BT on the economics of livestock keeping, particularly on the restrictions of livestock movements and their access to markets. Despite BT and the risks incurred with movements, animals are still required to be sent off farm and equally animals need to be bought in.

## Compensation

Ultimately, some farmers are going to be adversely affected financially and/or emotionally by the outbreak of a disease. As well as the concern around direct impacts of the disease, for example animals contracting BT and the financial implications of treating sick animals, those within the RZ are adversely impacted and are often at a disadvantage compared to those without the RZ. Disadvantages include having to keep stock that may otherwise have been sold or sending stock directly to slaughter instead of going to sales. They may also find it difficult to purchase new rams to avoid in-breeding.

*It opens up all sorts of discussions then doesn't it about whether a Restricted or Temporary Control Zone is fair, and it does disadvantage those farmers that are within that zone there's no doubt about that.* (Paul)

Participants commented on the lack of compensation, particularly for higher value pedigree stock, and how other businesses wouldn't be shut down without some form of compensation.

*I think if you have a positive case ... I don't know if there's compensation for if they take the animal which is slightly worrying because we're all pedigree animals so they're higher value. ... what other businesses could be told right you can't trade with this person, this person and that person and you've got to more or less shut down part of your business and then we'll let you know when you can. No other companies would do it without some sort of help or backup.* (George)

## Awareness that BT is notifiable

The clinical presentation of BT can look very similar to other diseases, e.g., foot and mouth disease, which could have a huge impact on the farming industry. Although we didn't ask farmers if they knew why BT is notifiable, it may be pertinent for them to be aware of why it is so important to notify the authorities.

*Things like bluetongue look like foot and mouth. You can't have a disease that walks around looking like foot and mouth and not know about it... But what I do know about bluetongue is that some of the clinical signs are very very similar to very very serious diseases which would be disastrous for UK livestock so that's why we need to know when stuff is drooling and ulcerated.* (Judy)

Keepers were asked if they were aware that BT is a notifiable disease. All said "yes" they were aware, though some were uncertain about the clinical presentation, but most said they would call a vet if they were worried about the health of an animal. There was a concern about the way the disease, once notified, might be handled, including a fear of being shut down and not being compensated. Some farmers thought that there were those who would prefer not to notify the authorities and just dispose of an infected animal.

*I think the fact that its notifiable is one of those things that makes me more worried about it but not in terms of the actual disease itself but just how it's handled... one thing that I find is more of a worry is that because it's notifiable you've got that lack of trust that you'd get fair compensation for it afterwards. (Betty)*

*I think almost having it notifiable in that way would actually impact the knowledge of it because people would just rather stay quiet and just get rid of the sheep and hope it goes away, rather than having their farm shut down with a notifiable disease. So, I almost feel like that's more of a negative than actually something positive because at the end of the day it just requires people to actually be honest and let the vet know. (Betty)*

There were those who thought that being notifiable was a positive way to highlight the disease and control spread.

*Well I think yeah what it does is, for example bluetongue then, obviously the more people notify it and get the vets to look at things... APHA get involved ...the authorities I suppose or the correct people get involved then the right treatments and precautions are in place then. (Edward)*

*...yeah it is important that they're notifiable because then at least measures can be put in place and cattle movements can be stopped and all that sort of thing. So yeah I'm sure that does help and shows the seriousness of it really. (Janice)*

*I think it's your duty to let somebody know because obviously, it is being passed by the midges and you're putting other people at risk. So for me, it's a good thing that it's notifiable. I think for other people it's a bad thing because I think people do want to not tell anyone and cover it up because it's going to make their life difficult. (Jane)*

## Preventative measures

Interviews discussed several prevention methods that could be used against BT and the midge vector, none of which thought to be ideal. Some keepers said that their main protection was to avoid buying in stock where possible.

*So I wouldn't go and buy anything and bring it on farm. I feel more control over that situation but with a midgey I don't...I literally don't know what else you can do ...we do biosecurity for the health scheme with the animals so...but...a mosquito doesn't get that. (George)*

## Vaccination

Many of those interviewed were aware the current BTV-3 vaccine doesn't give good immunity, but it reduces the clinical signs, the animals are less poorly, and the mortality rate is reduced.

There was a general reticence around vaccinating for BTV-3. Some of those interviewed had livestock during the previous outbreak with BTV-8 and were adversely impacted by administering the vaccine for this strain, their negative experiences affecting their willingness to vaccinate this time around.

*I know it's a different strain this time but given our experience of the BTV8 vaccine we would definitely not be vaccinating if the need be. It was very very sore on the animals and we had an awful lot of them suffer with it. If there was the assurance that the*

*BTV3 vaccines or whatever the current one is, wasn't as hard hitting we maybe would consider it but given our previous experiences we'd be very hesitant to vaccinate as a prevention measure. (Gloria)*

The side effects experienced with BTV-8 have resulted in the lack of confidence in any new vaccine. In addition, hearing that it is a suppressant vaccine, providing limited protection against infection, will affect uptake.

*I think the problem is with the vaccine as well as much as I'm aware its only suppressive so it's not going to stop them getting it, the other thing that one of my vets has said is that the last vaccine they had for bluetongue 8 had severe side effects that they didn't realise until afterwards. (Jane)*

The lack of trust in vaccines in general, and the BTV-3 vaccine providing limited protection for their animals was an issue. Similarly, vaccination cost and the inconvenience of having to give the vaccine twice, made the decision to not vaccinate easier than taking the decision to vaccinate.

*Since COVID trust of vaccines has just gone and when the vaccine says that it doesn't stop them from getting it they can still suffer symptoms, they just might not die. Well why am I going to blow £2,000 on a vaccine that they might still die anyway. Like where do they think all this money is coming from. They're very good at spending...the government are very good at spending other people's money and from what I gather from people around my way...well I don't know anybody that's vaccinated. I think everybody is just willing to sit tight and see what unfolds. I might as well go and vaccinate them with 2 mls of water. (George)*

*If they turned around and said the vaccine is 100% and it will stop them getting it...but like with the cattle you've got...I think it was you've got to jab them and then wait a month and then jab them again and then it's another month. So they've got 2 months to get the resistance...well by that point half of them might have...I dunno I might say I might bring the cows in and then in December all the cows have got bluetongue. But I've just spent £2,000 vaccinating them but apparently it might help them get over it better. So its...yeah...there are too many ifs and buts. (George)*

In many cases interviewees perceived the risk of BT to be low, so waiting to see how the situation developed appeared more appealing than rushing to vaccinate. They preferred to wait to see if their holding would be included in a restricted zone rather than make the decision to vaccinate as a precaution.

*If we happened to be in a zone or something very close we would probably consider it, we'd be vigilant in terms of how localised it was...we'd have to look how we could incorporate it because we do have a vaccine [protocol] so we'd have to make sure we could incorporate it correctly into the system because you don't want to overdo sheep with too many vaccines at any one point you know. It's like anything we do with our sheep we will always look at what the cost benefit ...you've got to make sure that animal health and welfare is paramount anyway. (Edward)*

*I would probably let the people in the zone actually try it first and see if they had good results with it or if it caused all their sheep to keel over. But in theory then yes, I would vaccinate all of ours if it was available. (Betty)*

There was also confusion around whether vaccinating animals was a good option. In some cases vets were advising against vaccination

*I have spoken to 2 separate vets about whether I should be vaccinating the sheep, both of the opinion no. I mean I know you can get the vaccine out of area now but they're of the opinion that no probably don't vaccinate. ...my vet here isn't vaccinating his own sheep. (Jane)*

### Chemical prevention methods

When asked about chemical prevention, some interviewees said that, though they were using them, there was no evidence that insecticidal treatments were effective. Moreover, the information around what insecticides to use and the best way to use them was reported to be sparse. Other keepers may be using them instead of vaccinating.

*Does putting the insecticide on the animals really work? Nobody knows it's not proven...The APHA just put on the official documents treat with insecticide. But it makes no recommendation as to which one or how often .... but there's nothing to advise you on insecticide on the sheep. (Iona)*

*In the early stages people were using insecticides and endoparasite products, they were dipping and they were using some of the spray on products and some people were using garlic sprays and stuff like that to try and keep the midges away. In fact there was probably quite a lot of that going on to be honest you know, people using things like Spot On and Crovect and there was quite a debate going on within the industry bodies really about whether there was any evidence to suggest that it was going to work or not but it was quite interesting really because what I've said about farmers holding off and not vaccinating until they really see the need to, there were plenty of farmers that were thinking well I am going to dip my sheep. (Paul)*

They indicated that a lack of guidance on what would be effective was frustrating. Some keepers attended webinars and looked for advice to help them manage the situation and were waiting to hear from official sources what could be used.

*I've been on the webinars... whether to use Crovect rather than Clik because it's a slightly different...obviously Clik binds with the wool but Crovect just stays on the wool and so we did think well if we used Crovect would they be less likely to be bitten by the midges. But then listening to the webinar kind of it would only last a few hours and then the midges would be biting again...Certainly, the webinars have said that fly repellent is not really working. (Jane)*

More information on what to do and more importantly on what not to do would have been appreciated. People have been left confused, and this has led to them using anything or everything, to try to protect their animals.

### Alternative prevention methods

Alternative methods to the use of chemicals and vaccinations included garlic or oregano licks, the use of fly traps and offering an area indoors where animals could avoid flies and midges.

*I have put in oregano buckets so obviously they're a triple action...Owen's buckets, to kind of repel flies and obviously they work for worms as well. I have thought about getting garlic ones because a lot of people have said...a lot of people are using garlic buckets. (Jane)*

## Information around BT

Interviewees mentioned a lack of regular updates and a lack of detail within BT updates provided by government bodies (e.g., no information about the geographical location of BT infected holdings). Important to these individuals was the existence of a “plan”, that is an understanding that the government was in control of the situation and has a strategy to resolve the situation, returning the UK to a BT free status. This is illustrated in the following quotation, in which the lack of a perceived plan causes the interviewee a great deal of stress.

*What is their plan? What is the plan? How long is this restriction zone going to go on. Why...they keep putting this 100...I think I saw somewhere like 110 or 112 cases, are 10 or 15 of them on one farm? Is it 1 case in that case...it's not a lot. In the bigger picture, literally if all them cases were all down south and like I say the 2 cases that were not far away from us, there's been no other...I've not heard of any other positive cases. So am I stressing and worrying for no reason. I want more information where it is, what's the plan. Do we just sit and hold tight and then get to spring and then they turn around and say well the whole country is in it; you've got to deal with it. It's the not knowing that's the thing that really bugs me, the not knowing what the long term plan is. (George)*

The quotation below echoes what was said by the previous interviewee and adds to the points made, some information is repeated regularly in government communications, but other information is obscured or not revealed. This leads to farmers questioning the ability of government bodies to control the situation.

*I wish...it's difficult because they don't tell us very much but I wish there was a strategy that they could tell us about instead of being wishy-washy and beating around the bush and not quite willing to say things. They go on about symptoms and so on, we all know this now and anybody who is interested should know this by now, but it is the strategy behind how they're going to deal with it. I do approve of the control zones, but they have to think whether it would not be better quite soon to integrate the whole of England into a control zone. (Pam)*

Information about the current BT situation was deemed to be difficult to find and not communicated to farmers in a consistent or systematic way.

*Somebody had shared a post on Facebook from APHA and we had a conversation with a few of our neighbours and we all said the same thing, if it hadn't of been for one of us spotting it on Facebook on APHA, for about 3 or 4 weeks nobody knew naff all about it – nothing. Then even my vet said if you don't go and look for the information you don't really know what's going on and then I think it was the...a few days after they'd banged us into the big restriction zone, then I started getting text messages every time they changed the zone. We've not had an email or anything like that. Just these sporadic text messages and you think what the hell is that ... It's not targeted ... it's just a generic...it's just like a quick generic text message, it's not targeted at the...not individuals, you know what I mean, the area, your county kind of thing. (George)*

These points are highlighted again in the following quotation.

*I think the main thing that would be useful is actually knowing where the cases are. I think that's the biggest thing in terms of messaging and from what I've seen it's causing so much distrust because people are saying you know well the zone has extended passed so and so's farm or so and so's farm but they haven't heard of a single case in the area. (Betty)*

Interviewees mentioned how they would like to receive information and updates, but not all keepers are active knowledge seekers.

*I look a lot on social media, right or wrong ...I'm involved with the National Sheep Association so they do an update in their magazine or their email and they send a weekly email out so I get information and I hope that their information is fairly correct. So yeah I read publications and I look on social media, I see articles in the farming press so yeah I think generally farmers would get the information like that. I sometimes reflect upon like what...my granddad is in his 80s and he's got an iPad so he does use...he does see things online. (Edward)*

## Schmallenberg

Schmallenberg is another midge-borne viral disease that causes abortions, stillbirths and foetal abnormalities as well as morbidity in affected animals. Unlike BT, it is not a notifiable disease, there is no legal requirement to report cases and there are no restrictions imposed on holdings with confirmed cases. Interviewees were asked about their concern around Schmallenberg compared to BT. Some keepers believed it to be of more concern as it can have a huge emotional and financial impact at lambing and calving, while others who hadn't experienced it weren't concerned, or knew little about it.

*I'd say Schmallenberg is a far far higher risk to be honest, again especially after seeing this lady that I bought this ewe from, bless her she'd bought in this brand new imported pedigree ram and the only surviving lamb of that ram was the one that I had. Every other lamb that was born died so I'd say Schmallenberg is a far far higher risk than bluetongue because it can just wipe out an entire lambing season basically. (Betty)*

The mental toll on farmers after having experienced calving or lambing animals affected with Schmallenberg is intense.

*On an individual level it's such a catastrophic thing to deal with when you've got bad deformities that in some respect I would actually find Schmallenberg a scarier prospect to deal with because at least with bluetongue it's just a sick animal but with Schmallenberg you've got the idea of do we do a caesarean if we've got things stuck. It's just hideous so yeah it's not nice. (Julie)*

Livestock keepers see more reports of Schmallenberg cases and themselves and their neighbours are likely to have experienced suspected cases. They are aware of the disease and the risk of experiencing it in their animals is high, unlike BT where the number of cases are relatively small, especially out with the restricted zones in England.

*To be fair I think we heard a lot more about Schmallenberg earlier this year than we heard about bluetongue. There was a lot more Schmallenberg around our area and a lot more people were having it. I think Schmallenberg is a lot more serious and*

*because I think it can reduce lambing scanning percentages and all sort of things. I think Schmallerberg has great effects on people and the livestock in this area particularly, more so than bluetongue definitely. (Edward)*

*Yeah so Schmallerberg I'd say is more on our radar perhaps than bluetongue. (Debby)*

*I say just in the back of your mind you're thinking okay just be prepared to keep an eye out for signs of things when it comes to particularly sort of calving/lambing you might just in the back of your mind think have I got a problem with this one, do I need to just have a better look and see what's going on rather than go and have a cup of coffee and leave it to it. (Janice)*

Livestock keepers that have already experienced the disease are conscious that a birth might turn difficult, and the animal might require assistance if infected at tugging/bulling time.

*It probably doesn't spread as much as bluetongue I don't know. I think...I don't know if it affects yield and things like that. All I know about Schmallerberg is it makes calves deformed that's the only thing I know about that, they seem to have twisted legs and things like that. I don't know what other effects it has on your herd, so no it's not something I worry about. (Janice)*

Unlike Schmallerberg, BT is an unknown to most livestock keepers and therefore, in their mind, a lesser risk and one they can do little to protect against.

*But I think yes it's one of those things, you feel sort of slightly helpless however informed you are because you don't really have a vast amount of control over it. (Janice)*

## Conclusions and implications

In conclusion, livestock keepers in, or near control zones were more concerned about BT and the impacts of BT than those further away. Concerns were about the direct impact of disease as well as the indirect impacts of the control zone restrictions on farm businesses and farmer mental health. It was felt that the impacts of BT would eventually spread to other areas of the agricultural industry that are linked in some way to livestock production, e.g., arable farms providing seasonal grazing. This concern about the disease was mixed with a sense of fatalism around the perceived lack of methods to control, mitigate and prevent the spread of the disease (especially midge control).

There was an interest in accessing and using vaccinations to protect animals, however the efficacy and risks involved need to be clearly and simply presented to ensure high uptake. Likewise, the use of control zones was seen as a positive if all stock keepers within these zones adhered to the rules and regulations in place. It was questioned as to whether this was always the case.

Communication between government bodies and farmers is seen as lacking and not easily accessible, especially around the current extent of the disease across the UK, the rationale behind BT being notifiable and methods of disease notification, and long-term, nationwide plans and strategies to control the spread, or eradicate the disease. This is fuelling frustrations and distrust in the government and greatly impacting farmer mental health.

**Key recommendations from this report are:**

- To clearly and simply advertise the exact process involved in reporting notifiable diseases and why it is important, to the appropriate institutions.
- Provide farmers and their vets with information and advice on how to recognise the signs and symptoms of BT in its early stages.
- Provide farmers with clear evidence of the efficacy and any potential side effects of any promoted BT vaccines.
- Provide the above information via multiple dissemination routes, including both online and physical media to ensure it is accessible to people with a range of learning styles and needs.

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## Acknowledgements

The authors would like to thank all the farmers who provided their time and insight when completing our online survey and taking part in the in-depth interviews. This work was funded by the Scottish Government Rural and Environment Science and Analytical Services Division (RESAS), as part of EPIC (Centre of Expertise on Animal Disease Outbreaks).

For further information please contact: [Jane.Grant@glasgow.ac.uk](mailto:Jane.Grant@glasgow.ac.uk) (general enquiries)