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ORIGINAL RESEARCH

Survey assessing foot trimmer involvement in managing lameness in UK beef cattle

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Abstract

Background: Cattle lameness is a significant welfare and economic problem facing the livestock industry. Published research has investigated foot trimming practices in dairy herds, but little is known about the practices in beef herds. Therefore, the objective of this study was to obtain information about the current practices of professional cattle foot trimmers concerning beef cattle within the UK.

Methods: An online survey comprising 16 questions was created using the Joint Information Systems Committee platform. The survey was open for 3 months.

Results: There was a significant difference ($p < 0.05$) between the proportions of dairy cattle and beef cattle receiving preventative foot trims. Digital dermatitis was the most commonly recorded cause of lameness when a lame beef animal was trimmed by the respondents, followed by white line disease. A thematic analysis of foot trimmers' opinions of barriers to engagement on beef farms is presented, in addition to their opinions on veterinary involvement with beef lameness.

Limitations: Distribution bias may have affected the results, as the survey was distributed online with support from the Cattle Hoof Care Standards Board and the National Association of Cattle Hoof Trimmers. The percentage of foot trimmers not affiliated with either professional body is not known.

Conclusion: Further research on the impact of lameness on suckler and finishing cattle, including investigations into preventative actions to reduce lameness in beef systems, is warranted.

KEYWORDS
beef cattle, engagement, foot trimming, preventative

INTRODUCTION

The prevalence of lameness in the UK beef herd is reported as 8.3% (range 2.0%–21.2%) in finishers and 14.2% (range 0.0%–43.2%) in suckler cows,[1] although the true likelihood of commercial cattle units having zero lameness must be considered unlikely. Lameness is an established welfare issue affecting each domain of the five-freedom framework often used to evaluate animal welfare: nutrition, environment, health, behaviour and mental state.[2] It also has an economic impact, with beef finishing cattle in the UK showing a 240 g reduction in average daily liveweight gain (ADLG) if they are lame once in the finishing period, with this reduction increasing if they are lame for a longer proportion of the finishing period.[3] In North American feedlot systems, cattle diagnosed as lame due to a joint infection that completed the finishing period had a net loss of $286 per animal, and this loss increased to $700 if the diagnosis was lame with no visible swelling.[4]

Professional cattle foot trimmers are an integral part of lameness management in the national dairy herd. There is a positive relationship with higher milk yields on dairy farms where preventative trimming takes place,[5] with dairy cows that were preventatively trimmed at mid-lactation also having a lower incidence of lameness and lower odds of hoof lesions compared to control groups.[6] Specifically, lameness prevention is highly important because once a cow

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becomes severely lame, it has an increased lifetime risk of lameness.[7] However, less is known about the use of routine or preventative trimming in beef cattle.

At the time of writing, there were an estimated 198 registered cattle foot trimmers in the UK, who were either members of the National Association of Cattle Foot Trimmers (NACFT; 127 members) or the Cattle Hoof Care Standards Board (CHCSB; 90 members), with approximately 19 trimmers registered with both professional bodies. In the UK, it is not a legal requirement to be affiliated with a professional body to provide a foot trimming service or to have undergone any formal training. However, to be a member of either association, it is a requirement to be qualified or working towards an approved qualification.

Previous research has reported that beef farmers perceive difficulties in employing professional foot trimmers to trim their cattle, but they are trusted advisors and sources of knowledge to farmers concerning the treatment of lameness.[8] To date, the authors know of no research investigating the current involvement of foot trimmers within beef production systems in the UK.

This study aimed to identify whether there was a difference in the uptake of preventative trimming between beef cattle and dairy cattle and explore the potential barriers to the use of foot trimmers in the care of lame beef cattle. The results could facilitate future work to support beef farmers in reducing their herd lameness prevalence.

MATERIALS AND METHODS

Survey

Participation in the survey was optional. Informed consent was collected from each respondent, and all results were anonymised. The survey was created using a proprietary online survey tool (provided through the Joint Information Systems Committee); therefore, no manual data entry was required.

The online survey consisted of 16 questions: 10 were single-answer multiple choice questions, four were long-answer free-text questions and the remaining two were short-answer free-text questions. The first three questions established the respondent demographics, and the following three investigated the numbers of beef cattle trimmed and compared preventative and therapeutic trims. Four questions explored the foot lesions frequently seen by respondents and the use of mobility scoring on beef farms. The final six questions explored respondents' opinions of perceived barriers to engaging in lameness, veterinary involvement and difference between dairy and beef herd mobility. A complete copy of the survey is provided in Appendix A.

Distribution

The target population for the survey was cattle foot trimmers working within the UK, with foot trimming being their main source of income. The survey was available online, with additional distribution via social media, specific distribution to members of both the NACFT and the CHCSB, and by advertising at the Cattle Lameness Academy (CLA) conference held in June 2023. The CLA is an organisation based in the UK that delivers training, research support and consultancy services relating to cattle lameness. The survey was open for 3 months from April 2023. Distribution bias may have affected the results because access was only via the internet and was targeted towards members of an accreditation body. The percentage of foot trimmers not affiliated with either professional body is unknown.

Statistical analysis

This survey used a convenience sample. The results of the survey were analysed using Microsoft Excel (Microsoft Excel Office 365) and IBM Statistical Package for Social Sciences Data Editor. Descriptive statistics were performed to summarise qualitative and quantitative variables. A Wilcoxon signed-rank test for non-normally distributed data compared preventative trimming across cattle types. Pearson chi-squared tests were used to investigate the relationship between the percentage of beef animals trimmed by respondents and the types of lesions reported on both sound and lame beef animals.

The answers provided to the open questions regarding foot trimmer opinions on general herd mobility, barriers to engagement with farmers and veterinary involvement in beef lameness were categorised into themes using thematic analysis methodology.[9] This involved data reduction by identifying specific anecdotes and themes within the responses for the creation of keywords for coding purposes. As the questions were answerable with free text, multiple themes were present in some answers and analysed as such. The generated codes were then used to produce treemaps using Microsoft Excel. These were used for visualisation of responses with an ordered hierarchy and nested rectangle sizes demonstrating the relationship of the responses.

RESULTS

Participant demographics

A total of 37 responses were received over a period of 3 months, each of which was 100% complete and therefore eligible for analysis.

The most commonly held professional qualification was the Dutch Diploma, with 15 of 37 (41%) responses, followed by the CHCSB RAU Level 4 in Bovine Lameness and Professional Cattle Foot Trimming (10 of 37; 27%) and the NPTC Level 3 Certificate in Competence in Cattle Foot Trimming (nine of 37; 24%). One trimmer was working towards their CHCSB RAU Level 4 qualification. Two respondents held no

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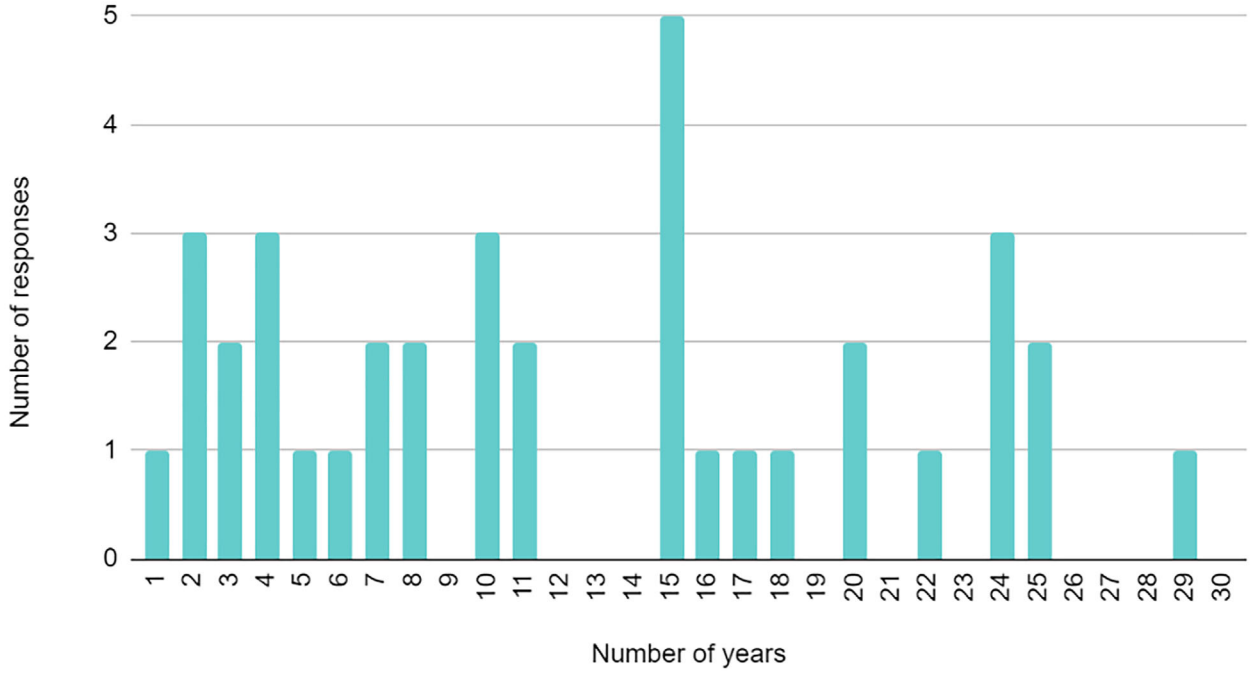

FIGURE 1 Distribution of the number of years respondents had been working as a cattle foot trimmer ($n = 37$)

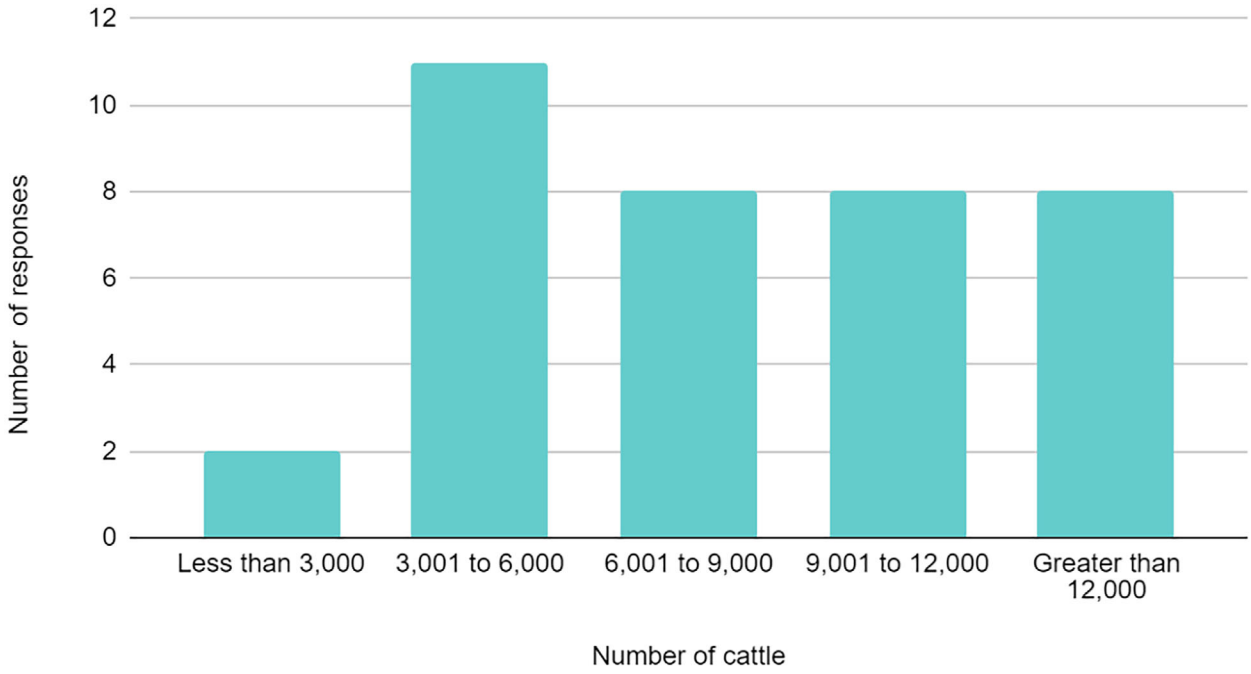

FIGURE 2 Distribution of the number of cattle (of all types) trimmed per respondent in the previous 12 months

professional foot trimming qualification and were therefore unlikely to be affiliated with either UK professional body. Their responses were included in the analysis.

The median time spent working as a foot trimmer was 11 years (mean 12.4 years, Figure 1). This demonstrates the experience held by the respondents and the longevity of a career in this industry. The median total number of cattle trimmed in the 12 months prior to the survey was 6001–9000 animals (Figure 2). Assuming that the middle of the range of the total number of cattle trimmed (Figure 2) is representative of the average number of feet trimmed per trimmer per year, with 232 working days per annum (260 weekdays deducting statutory annual leave entitlement of 28 days per annum), the average trimmer will examine 32 cattle per day, with this increasing to 52 cattle or more per day for the respondents trimming more than 12,000 per annum. Sometimes trimmers will work with colleagues to perform whole herd trims, with multiple crushes set up or multiple people working per crush on one farm to carry out both preventative and therapeutic trims of a large number of cattle.

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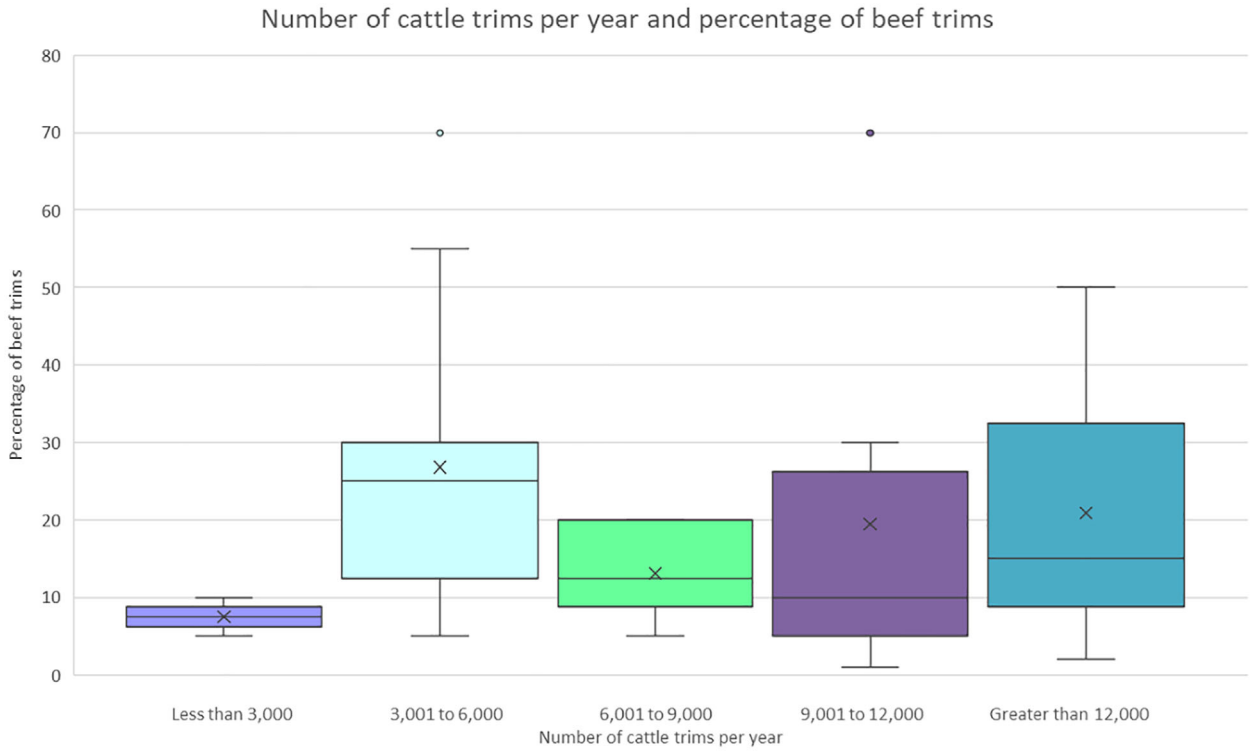

FIGURE 3 Number of cattle (of all types) trimmed per respondent and the percentage of these that were beef cattle. For each category of the number of overall cattle trims per year, the middle line of the box indicates the median percentage of beef cattle trims, with upper and lower quartile values shown as the upper and lower edges of the box. 'X' indicates the mean percentage of beef trims performed in each category. Outliers are indicated as individual dots

Beef cattle trimming

Of all the cattle trimmed by respondents, only a median of 15% (mean 19.95%, Figure 3) were from beef breeds. This suggests that respondents trim approximately 1125 beef cattle a year. One of the two unaffiliated trimmers reported that up to 70% of their trimming was performed on beef cattle.

This survey revealed a significant difference ($p < 0.001$) in the proportions of dairy and beef preventative foot trimming carried out by participants, with a median of 50% of trimming work being preventative across all cattle types but only 10% of trimming work being preventative across beef cattle trims. Overall, there was no significant difference between the percentage of beef cattle trimmed per year and the type of lesion seen when trimming either sound or lame beef cattle. The most commonly reported lesion identified when trimming a non-lame/sound beef animal was sole bruising/haemorrhage, followed by 'no identifiable lesion' (Figure 4). The respondents were only able to select one option. Of those that selected 'other' lesions, laminitis, sand cracks and corkscrew claws were described.

This survey revealed that digital dermatitis was the most commonly reported lesion in beef animals that presented as lame to the foot trimmer (Figure 4), followed by white line disease. Of the respondents who selected 'other' lesions, toe necrosis was described twice, sand cracks were described twice, and corkscrew claws and fouls were described once each. There are multiple risk factors for each lesion, and the data do not allow for the evaluation of these and the effect this has on the types of lesions reported by the respondents. Moreover, further separation into lesion types seen in finishing cattle and suckler herds within this survey is limited.

None of the respondents had themselves performed a mobility score on a beef herd.

Perceptions about trimming beef cattle

Trimmers were asked to describe their perceptions of the UK beef herd's mobility in comparison to that of the UK dairy herd (Figure 5). The free-text responses were classified into themes, with the results summarised in treemaps. A range of responses were given regarding beef mobility, with no significant agreement between respondents regarding whether overall UK herd beef herd mobility was better or worse than dairy herd mobility.

One reason for participants perceiving mobility to be worse in beef herds was the presence of digital dermatitis and lack of treatment or control in comparison to dairy herds. Another factor was the type of cattle on beef farms, with the potential for heavy conformation or double-muscled beef breeds considered by some to cause poorer mobility. A further reason was the overall low prevention of lameness along with the perceived

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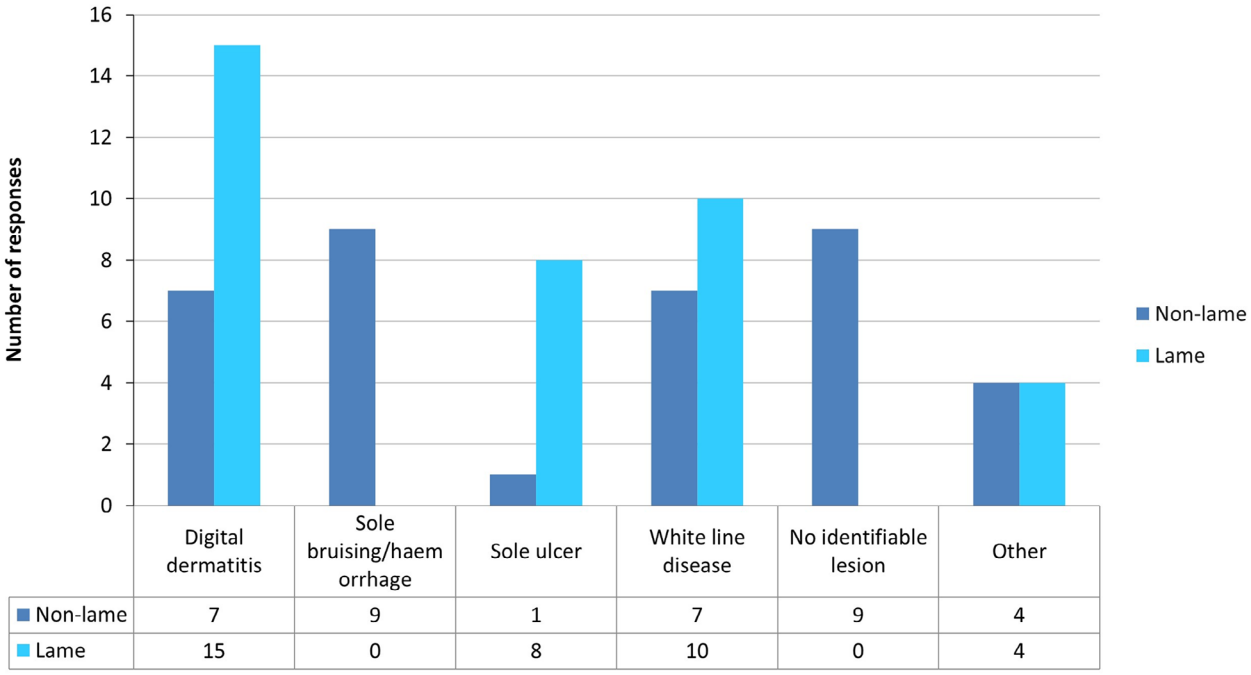

FIGURE 4 Most commonly reported lesions recorded by respondents when trimming non-lame and lame beef cattle. Respondents were only able to select one option

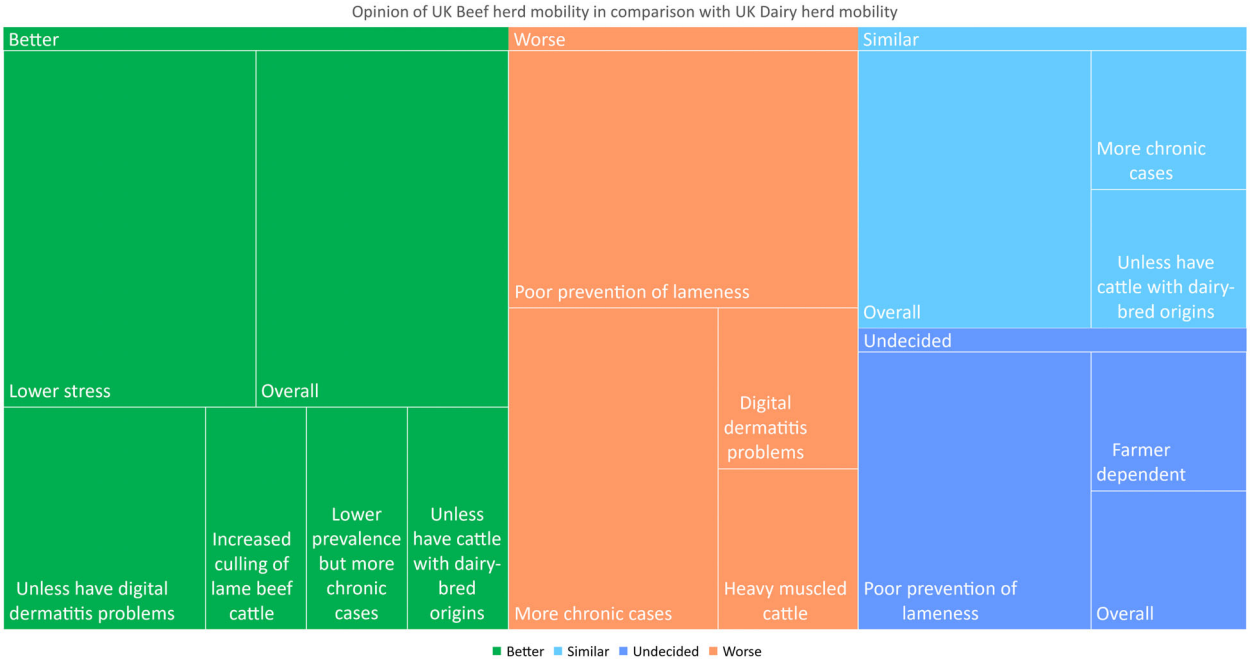

FIGURE 5 Treemap displaying responses to the question 'What is your opinion on the UK beef herd's mobility in comparison to the UK dairy herd?' The area of each rectangle corresponds to the number of responses within that theme

chronicity of individual lameness cases, which were suggested to be worse than those in dairy herds. One respondent stated, 'Probably less beef cows are lame, but the ones that are lame are longer-term problems that haven't been seen soon enough.' Of those who believed beef mobility to be better than dairy mobility, a common theme for this belief was the 'lower stress' on the beef cattle, for reasons such as not being housed on concrete all year round and less metabolic stress caused by milk production demands.

A total of 12 of 37 (32%) respondents felt there were barriers to engaging with farmers regarding the trimming of lame beef cattle (Figure 6). Farmer perception of lameness was a common theme, with one respondent stating 'Beef farmers don't see lameness as big (of an) issue as they don't lose milk production in the milk tank like dairy farmers do', and another writing 'Getting farmers to acknowledge they have a lameness problem'. Availability and suitability of handling facilities were mentioned, along with working

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FIGURE 6 Treemap displaying themes of responses from trimmers who responded 'yes' to to the question 'Are there barriers to engagement with lame beef animals?', with the area of each rectangle corresponding to the number of responses within that theme

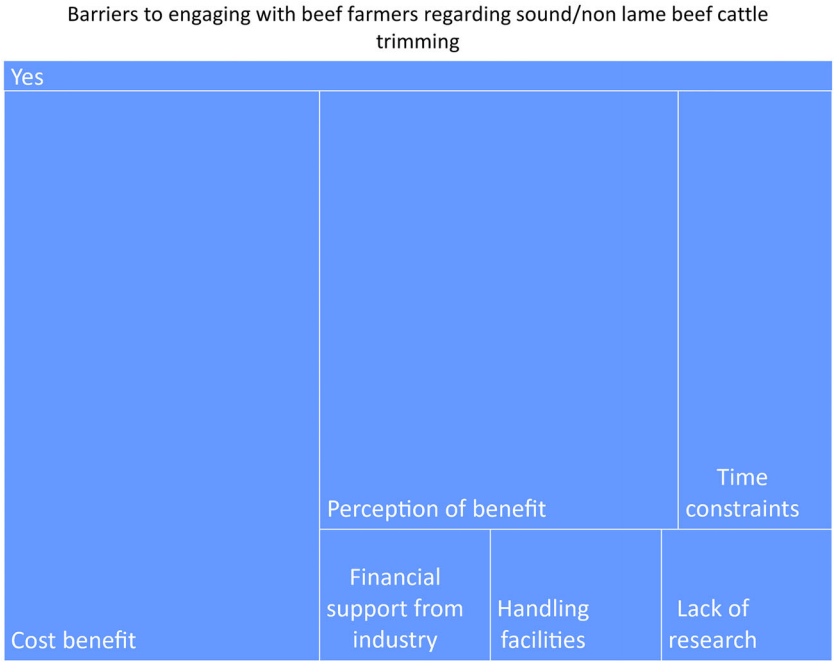

FIGURE 7 Treemap displaying themes of responses from trimmers who responded 'yes' to the question 'Are there barriers to engagement with sound/non-lame beef animals?', with the area of each rectangle corresponding to the number of responses within that theme

with chronic lameness cases where the response to treatment may be limited and the financial gains of the farmer employing an external trimmer may be low. Trimmers also identified that beef herds often struggled to control digital dermatitis.

A total of 16 of 37 (43%) respondents identified barriers to engaging with farmers about preventative trimming of sound beef cattle, with many trimmers reporting poor farmer perceptions of the benefits of preventative trimming (Figure 7), alongside the cost compared to the financial return of doing so. The respondents themselves generally recognised benefits trimming as a preventative measure, with one respondent stating 'They (the farmers) don't seem to realise the benefits far outweigh the cost of routine trimming. I've a few beef herds I trim yearly and attend asap [as soon as possible] to any lame cattle, these farms have almost zero problems throughout the year'.

Lastly, the trimmers were asked how engaged they felt veterinarians were with beef cattle lameness. In dairy herds, veterinarians are engaged in routine mobility scoring through specific advice and tailored support for specific risk factors, which has been demonstrated to reduce lameness prevalence.[10]

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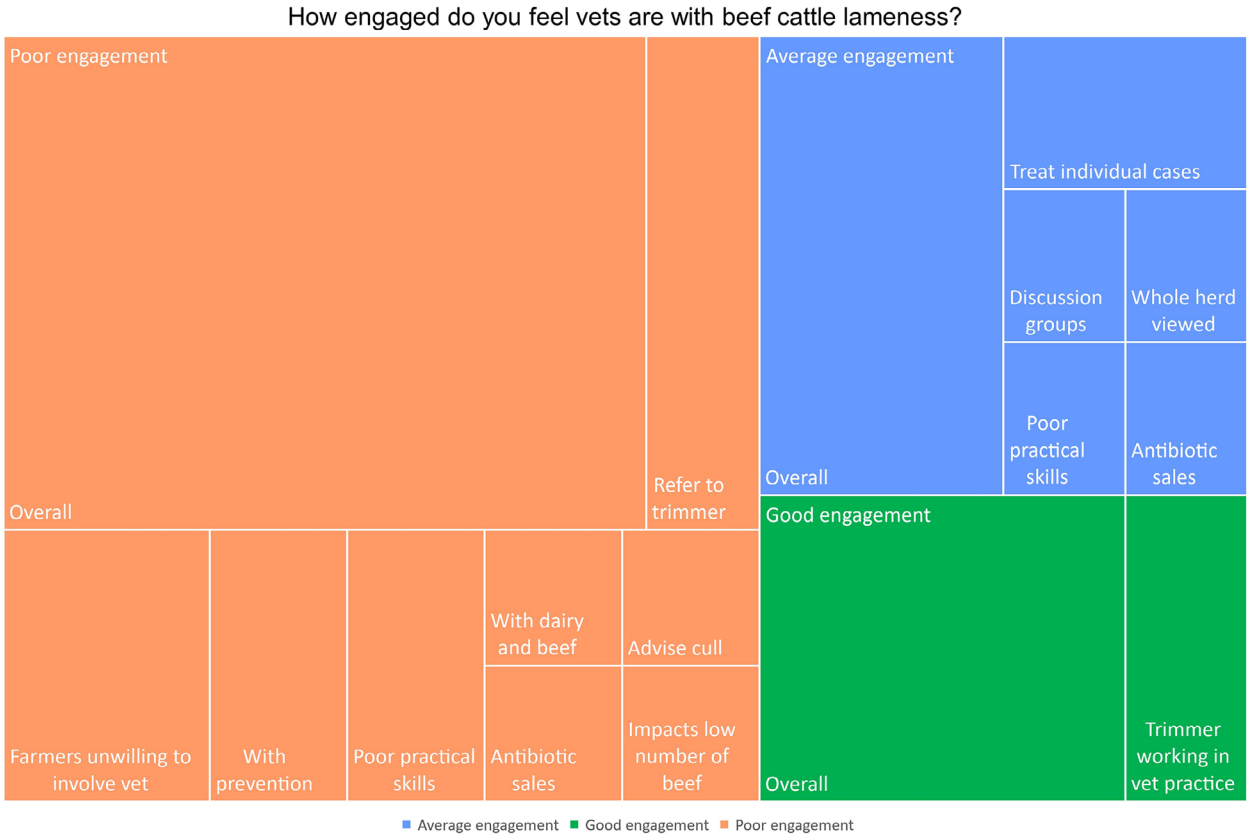

FIGURE 8 Treemap displaying themes identified in responses to the question 'How engaged do you feel veterinarians are with beef cattle lameness?', with the area of each rectangle corresponding to the number of responses within that theme

Although not significant, there was an impression that respondents felt that veterinary engagement in beef lameness was poor (Figure 8), with one respondent stating, 'Vets are there to treat lameness when it occurs, but in my experience, vets wouldn't engage with beef farmers on how to improve/prevent lameness'. Some respondents mentioned that selling antibiotics is how veterinarians engage with treating lameness, or that beef lameness issues are referred directly to a professional foot trimmer for reasons including handling facilities and experience, without the vet staying engaged with the outcome of this referral. The practical foot trimming skills of veterinarians were commented on, with on respondent stating 'Usually their practical knowledge isn't the best, it's good, knowing what to do, but physically doing it is something else entirely'.

There are veterinary practices that employ professional foot trimmers, which could allow for easier communication between veterinarians, farmers and trimmers. This is reflected in the findings, where a proportion of trimmers with a positive outlook on veterinary engagement in beef lameness mention that they work within a veterinary practice.

There was an observation that veterinarians are in an advantageous position to view all animals on a beef farm during statutory whole herd bovine TB testing, at fertility visits for suckler cows or at herd health planning sessions (if required for compliance with farm assurance schemes).

DISCUSSION

Participant demographics

The estimated total number of qualified foot trimmers associated with a professional body in the UK is 198; therefore, this survey had an approximate 17.7% (35/198) response rate from registered trimmers, with an additional two responses from unaffiliated trimmers, totalling 37 responses. This response rate is comparable to text-based, online surveys without individual contact and follow-up.[11] To work as a foot trimmer, there is no requirement to be qualified or registered with either professional body; therefore, the population of unaffiliated trimmers is difficult to quantify. Therefore, a small known population of trimmers, combined with an unknown number of unaffiliated trimmers, is a limiting factor for the distribution and completion of the survey.

The survey's completion rate was 100%, which could be attributed to the relatively short nature of the survey, combined with the survey topic being of interest to foot trimmers. Selection bias may be present in the results due to distribution bias, as discussed previously, and the possibility of trimmers engaging with the subject due to previous interest in beef lameness. Furthermore, the geographical location of the respondents is unknown, which may mean that not all areas of the country are represented in these results.

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Beef cattle trimming

There are 1,462,980 individual female cattle in the UK beef breeding population. Given a reported 14.2% prevalence of lameness in suckler herds,[1] around 207,743 suckler cows may be lame at any one time. In addition, around 2,130,370 steers, heifers and young bulls were sent to slaughter over 12 months (between October 2022 and 2023).[12] The estimated lameness prevalence in finishing cattle is around 8.3%, meaning that an additional 176,820 beef cattle would require an examination.[1] Around 1940 beef cattle per year are required to have their feet examined in order to provide one therapeutic trim to each lame beef animal.

Given the reported low level of beef animals trimmed by survey respondents, this finding suggests that it is unlikely that all lame beef animals are being examined by a qualified foot trimmer and it is even less likely that routine trimming is being carried out by qualified foot trimmers. These estimates do not quantify the involvement of veterinarians or farmers performing remedial or preventative trims, with a range of training and confidence in the ability to perform foot trim reported by farmers.[13] It should be noted that while some cases of lameness may self-cure, many lame cattle will require repeat visits to successfully treat the inciting cause of lameness and manage the condition, which could further increase the number of cattle trims that need to be performed.

If an individual finishing animal is lame for 45 days of a 90-day finishing period, with a 240 g reduction in ADLG, it would be 10.8 kg lighter, and based on a sale value of 474.2 p/kg, the farmer would be expected to lose £51.21 on that animal.[14] Scaled up, there could be a £9,054,998 per year loss to the beef industry if 8.3% of finishers are lame for 45 days in their finishing period. Early detection and prompt, effective treatment, including the use of qualified trimmers to deliver this, could not only reduce the economic impact of lameness incidences but also improve the welfare of affected individual animals.

Preventative foot trimming is important for multiple reasons. When facing an increased lifetime risk of lameness if a cow has had one case of lameness, prevention of this first incidence is key.[15] This has been shown in dairy cattle, where trims administered mid-lactation reduced lameness incidences[8] and significantly increased milk yields.[5] There is, to the authors' knowledge, no published literature on the benefits of preventative trimming in beef animals, particularly in suckler herds where dams are likely to remain in the herd for extended periods of time.

This survey revealed that a median of 50% of trimming work was preventative across all cattle types, but only 10% of trimming work was preventative across beef cattle trims. This indicates that the use of foot trimmers by beef farmers is more frequent for therapeutic trims, whereas, in dairy herds, preventative trimming is more prevalent. However, our data did not distinguish between finisher and suckler units, which is a limitation, as the trimming requirements may differ between them.

The commonly reported lesions identified in non-lame/sound beef cattle are similar to findings in finishing cattle slaughtered in northern Italy, where sole haemorrhage and white line disease were reported, even though these finishing cattle were supposed to have no evident locomotion problems at the time of slaughter.[16] However, our finding of digital dermatitis being the most commonly reported lesion in cattle presented as lame to the foot trimmer contrasts with other literature, where white line disease, claw overgrowth and underrun sole were recorded as the predominant lameness-causing lesions observed in beef cattle in the UK.[1] Corkscrew claws and vertical fissures were the most common in beef cattle that presented to a veterinary hospital in Canada.[17] Given that the use of antibiotics as a first-line treatment for a lame beef animal prior to a full examination is a commonly reported practice,[13] this will likely be delaying the animal receiving effective treatment, alongside encouraging unnecessary use of antimicrobials. Higher incidences of foot rot and joint sepsis are recorded in feedlot systems seen in North America,[18] which may be due to differences in housing and management systems.

As reported in our results, none of the respondents had mobility scored a beef herd themselves. Regular mobility scoring to identify lame animals is widely used in dairy herds, allowing for prompt treatment and acting as an important management strategy for reducing lameness, with the introduction of technology for automated scoring now increasing.[19] There are multiple locomotion scoring systems used for beef cattle, many of which are based on a four-point scale.[20]

Perceptions about trimming beef cattle

Beef farmers are reported to underestimate the prevalence of lameness on their own farms by 7%, even with knowledge of the mobility scoring scale used to estimate prevalence.[13] The appreciation of cattle experiencing pain may also be a barrier to providing treatment to lame cattle, either by the farmer or an external foot trimmer.[8]

Trimmers identified difficulties with the control of digital dermatitis, which could partly be due to difficulty in regularly foot bathing beef cattle. It is common for foot bathing in dairy herds to occur upon exit from the milking parlour; however, a daily routine movement of animals is less likely to be performed in beef herds, so careful consideration of the design of footbaths must be made. Further research into the efficacies of different foot-bathing protocols in the UK beef systems would be beneficial.

Barriers to engagement identified in relation to trimming sound beef cattle included the cost to benefit and farmers' perceptions of preventative trimming.

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There is great value in further research investigating the relationships between preventative trimming and beef cattle mobility, lameness incidence and lifetime risk of lameness, particularly with respect to suckler herds where longevity is important.

With respondents commenting on the opportunities for veterinarians to view all animals on a beef farm at various times, the role of mobility scoring in beef herds should be considered. Mobility scoring could be useful even if it only provides the farmer with information on lameness prevalence in their herd; however, routine mobility scoring would prove challenging in most UK beef systems because, especially in summer, cattle are not housed on a hard surface such as concrete, which will likely alter mobility score results. These visits should all provide opportunities to identify possible lameness issues and collaborate with farmers and trimmers to implement positive changes to reduce lameness prevalence.

CONCLUSION

Professional foot trimmers reported that beef cattle represented a low proportion of the total animals they see each year and that these animals were significantly less likely to receive preventative foot care than dairy herds. Digital dermatitis was the most commonly reported lesion identified in lame beef cattle in this survey. There were a wide range of barriers to engagement with foot trimmers for both lame and non-lame beef cattle, and there is further scope for veterinary involvement with professionals in this area. Further research into the impact of lameness across beef production, including the impact of veterinary and foot trimmer involvement and implementation of preventative measures to better foot health in beef systems, would be valuable.

AUTHOR CONTRIBUTIONS

Hannah M. Fitzsimmonds, John Fishwick and Sophie Mahendran conceptualised and designed the analysis. Hannah M. Fitzsimmonds collected the data. Hannah M. Fitzsimmonds and Sophie Mahendran performed the formal data analysis. Hannah M. Fitzsimmonds, John Fishwick and Sophie Mahendran wrote, reviewed and edited the manuscript. John Fishwick and Sophie Mahendran supervised the project. All the authors have read and agreed to the published version of the manuscript.

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CONFLICT OF INTEREST STATEMENT

The authors declare they have no conflicts of interest.

FUNDING INFORMATION

The authors received no financial support for the research or publication of this survey.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ETHICS STATEMENT

Ethical approval for this study was granted by the Royal Veterinary College's Social Science Research Ethical Review Board (reference number URN SR2023-0018).

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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