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# Stakeholder views on shifting UK chicken meat production to slower-growing broilers

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**Introduction:** Longstanding concerns about the welfare of conventional broiler chickens used to produce chicken meat have led to commitments by 104 UK retailers, restaurants, and food service providers, that by 2026 their poultry products will meet the “Better Chicken Commitment” (BCC) requirements, including production using slower-growing strains that demonstrate better welfare outcomes. However, a wide-scale transition to production using these strains has not occurred in the UK.

**Methods:** To explore the reasons underpinning this limited movement and potential solutions, qualitative content analysis of data from 30 semi-structured interviews with representatives of the UK poultry industry, retailers, assurance schemes, animal welfare organisations, and animal welfare scientists was conducted.

**Results:** Key barriers identified were increased economic and environmental costs of production using slower-growing strains, which would produce less meat per unit area, coupled with uncertainties about consumer appetite and willingness to pay for these welfare improvements. Stakeholders differed in their focus. Retailer and industry representatives emphasised meeting current consumer demand, provision of affordable food, and minimising carbon footprint in alignment with legislated commitments and UK government priorities. Animal welfare organisations, assurance schemes, and scientists viewed sustainability more holistically. They highlighted the need for transformative change in the food system and consumer behaviour for a sustainable future encompassing improvements in broiler welfare. Suggested solutions included ways to minimise economic and environmental costs, better alignment of consumer purchasing with preferences through improved clarity in labelling and marketing, and alternative strategies for improving broiler welfare. However, stakeholders diverged on the perceived feasibility, relevance, and effectiveness of these solutions.

**Discussion:** Insufficient relevant and comprehensive data on economic, environmental, and social elements of sustainability, integrating animal welfare, currently compromise decision-making on the best way forward. If UK broiler welfare improvements are to be market-driven, robust contextually relevant evidence is needed to evaluate these trade-offs for all strategies and risk mitigations, to achieve welfare improvement whilst balancing sustainability goals.

## KEYWORDS

broiler, animal welfare, slower-growing chickens, sustainability, chicken meat

# 1 Introduction

Poultry meat is an important human food source in the UK with 1.85 million tonnes of chicken meat produced in 2023 (FAOSTAT, 2025) and an estimated value to the UK economy of more than £3.15 billion (Statistica, 2024a). The selection for high efficiency has led to modern broiler (meat) chicken strains that grow on average more than 60 g per day and reach target weights in under 6 weeks (Cobb-Vantress, 2022; Aviagen, 2022). As a result, chicken is the most affordable meat protein available to consumers. However, concerns about the welfare of conventional fast-growing broiler strains have existed for 40–50 years (Hartcher and Lum, 2020), as rapid growth, often in combination with environmental factors, is associated with welfare issues. Lameness (generally measured using a gait scoring scale: 0—smooth, fluid locomotion to 5—incapable of sustained movement; Kestin et al., 1992) and leg deformities impact bird mobility and access to resources. Notwithstanding some welfare improvements associated with genetic selection (Neeteson et al., 2023), recent reports suggest the prevalence of gait scores of 3 or above, which are likely to be associated with pain (Caplen et al., 2013), ranges from 5.4% to 24.6% of birds (Kittelsen et al., 2017; Tahamtani et al., 2018; Granquist et al., 2019). Further welfare issues include contact dermatitis, manifesting as lesions on the skin of the footpad, hock joint, or breast (Tahamtani et al., 2018; Freeman et al., 2020; Saraiva et al., 2023); metabolic disorders (Part et al., 2016; Zhang et al., 2018); and a restricted behavioural repertoire with less frequent expression of highly motivated behaviour, behaviour associated with positive emotional states (Nicol et al., 2009), and lower use of enrichments compared to birds that grow more slowly (Dixon, 2020; Rayner et al., 2020; Abeyesinghe et al., 2021; Dawson et al., 2021).

Across countries, campaigns by welfare organisations and a perception that consumers prioritise animal welfare have led to a range of national and international initiatives that engage stakeholders involved in the production and provision of chicken meat to improve broiler welfare. Whilst other countries may have different or multiple routes, in the UK, campaigns driven by advocate organisations for animal welfare have focused on the “Better Chicken Commitment” (BCC; Better Chicken Commitment.com, 2023) and (to date unsuccessfully; Loeb, 2025) banning of conventional fast-growing strains. The BCC, also known as the European Chicken Commitment, came about in 2017 when a collective of UK and European not-for-profit organisations agreed on the most pressing welfare concerns for broilers, and published a set of evidence-based minimum standards for broiler welfare. Published initially as the “Joint Animal Protection Organization Statement on Broiler Chicken”, then later as BCC, the collective campaigned for food companies to commit to achieving BCC by 2026 (welfarecommitments.com) to raise the minimum standard of broiler welfare. Whilst often considered to provide the highest welfare, within the UK the market share for free-range and organic chicken meat remains very low (3%–4%; ADAS, 2019), likely due to the expense involved in production. The BCC standards are designed for indoor systems at a lower production

cost, which also reduce exposure to diseases, such as avian influenza. BCC requires that all fresh, frozen, and processed chicken meat products in the supply chain are derived from broiler chickens provided with greater space and environmental standards than the current UK legal minimum. Birds should be housed in single-tier cage-free<sup>1</sup> systems provisioned with natural light, improved air quality, and some enrichment; gas-stunned at slaughter; and third-party-audited (Better Chicken Commitment.com, 2023). Furthermore, the BCC requires the use of broiler strains with better welfare outcomes, determined by meeting the independent criteria of the UK Royal Society for the Prevention of Cruelty to Animals (RSPCA) Broiler Breed Welfare Assessment Protocol (BBWAP) (Better Chicken Commitment.com, 2023). BBWAP evaluation requires rearing birds in standardised environments with a non-limiting diet and undertaking a standardised set of animal-based welfare measurements, focused primarily on health, at a live weight of 2.2 kg, for comparison against industry-agreed thresholds and reference-breed outcomes (RSPCA, 2017). To date, all BBWAP-approved strains are slower-growing. Slower-growing chickens vary substantially in growth rate but have been defined as strains that grow at a rate of <60 g per day (vs. modern conventional strains ≥ 60g per day; Nicol et al., 2024) and generally take between 56 and 81 days to reach target production weight. Strains growing between 50 and 59.9 g per day are referred to as “intermediate” growth-rate birds (Nicol et al., 2024).

The UK government’s Animal Health and Welfare Pathway (Defra, 2025) is part of the planned transition of agricultural support and subsidy from the EU Common Agricultural Policy (CAP) basic payment scheme (BPS) (Defra, 2020). One element of the pathway proposes a system to reward farmers financially for the implementation of animal welfare enhancements. For broilers, the stated priorities for welfare enhancements are the adoption of the BCC and the adoption of technology to improve monitoring and husbandry. To date, English poultry farmers have been able to apply for grants to co-fund capital investments in larger infrastructure or specific equipment. New government leadership came to office in July 2024 and the most recent updates have focussed on disease control rather than these priorities (Defra, 2025).

In addition to the encouragement provided by government policy, there have been independent commitments by 104 retailers, restaurants, and food service providers in the UK, that their poultry products will meet the requirements for the “Better Chicken Commitment” (Better Chicken Commitment.com, 2023) by 2026 (Chicken Watch, 2024). However, the implementation of the BCC in the UK has been restricted. This is perhaps unsurprising given that government financial support has focussed on the provision of buildings and equipment, whilst welfare labelling remains unclear. Importantly, where change is occurring, it is primarily limited to the delivery of commitments on stocking density and environmental conditions. Even some UK retailers not committed to BCC have recently lowered stocking density, for at least some of their own-brand ranges, from the legal maximum of 38 kg/m<sup>2</sup> to

1 Cage systems are not used for broiler production in the UK.

30 kg/m<sup>2</sup>. Crucially, there has been resistance to the BCC requirement to use slower-growing strains, and this remains contentious, with only a small market percentage making this part of the commitment.

The scientific literature suggests that the economic and environmental sustainability of utilising slower-growing strains are the main barriers to their widescale use (e.g., Lusk et al., 2019; Chan et al., 2022). The longer life cycle of slower-growing strains requires more resources (land, energy, feed, water, etc.) to produce the same volume of meat product compared with conventional broiler chickens, reducing the efficiency of land use and increasing both the economic cost and carbon footprint of their production. There is clear evidence of quantifiable improvement in some health-related aspects of broiler welfare associated with strain (e.g., production and transport mortality, lameness, contact dermatitis, and antibiotic use; Allen et al., 2023; Nicol et al., 2024; Slegers et al., 2024), that may offset some of the costs for slower-growing broilers due to reduced losses, fewer carcass rejects and impacts on parent flocks. Although there has been some assessment of the economic (van Horne and Vissers, 2022) and environmental (Mostert et al., 2022) impacts of switching to slow-growing birds (or systems that include these birds), data on the comprehensive economic and environmental implications of some specific welfare gains across the whole production chain are lacking. Furthermore, there is only limited information on the behaviour of slower-growing birds (reviewed by Nicol et al., 2024), an important component of welfare. The relative trade-off between welfare gains and economic and environmental costs associated with slower-growing strains therefore lacks clarity. The Animal Health and Welfare Pathway is a voluntary scheme and, to date, does not actively provide support for slower-growing strains. In contrast, the UK government's commitment to reducing carbon footprint is legislated through the Climate Change Act (2008) and subsequent amendments, providing a strong steer to the industry to prioritise environmental sustainability. Nevertheless, in Sweden, Norway, and the Netherlands, similarly committed to the agreed United Nations climate change goals (UNFCCC, 2018), actors at different levels are taking paths towards reducing production using conventional strains (Eurogroup for Animals, 2024). Given the potential improvement in broiler welfare, better insight into different stakeholder views is critical to understanding the reasons for the comparably limited, and where occurring partial, transition to BCC production in the UK, with a particular focus on the commitment to use slower-growing strains as a point of contention. Our aim was therefore to explore stakeholder views on the challenges of production with slower-growing strains in the UK and their suggestions for any potential solutions.

## 2 Methods

Ethical approval for this study was obtained via the Social Science Research Ethical Review Board (SSRERB) at the Royal Veterinary College (URN SR2022-0154).

### 2.1 Selection and recruitment of participants

Candidate representatives from multiple stakeholder groups were recruited if they had specific knowledge and/or interest in a transition to slower-growing strains in broiler production and were engaged with BCC, thus the issue of welfare improvement using slower-growing broilers. Representatives of breeding companies, broiler producer companies, poultry veterinarians, assurance schemes, animal welfare scientists, animal welfare charities, retailers, restaurant chains, and government bodies were identified using the research team's network, web searches, and recommendations by other invitees. Where available, public information was used to confirm the suitability of potential participants, based on their experience and/or expertise. It was not possible to acquire contact details for some potential representatives suggested to the research team. Where named contacts with roles in welfare, ethical sourcing, agricultural production, and/or sustainability could not be identified, initial inquiries were made via general or marketing contact details available online. The relevance of candidates' employment role to broiler production, poultry products, and broiler welfare was taken as an indicator of good knowledge of the BCC/slower-growing breeds which was confirmed prior to interviewing. Suitable representatives were invited via email to participate in semi-structured interviews. Invitations included participant information and a consent form, explained why representatives had been invited and that the interviews would explore their views, or their organisations' views, on the challenges of BCC production with slower-growing strains in the UK, and their suggestions for any potential solutions. One follow-up email was sent to any non-responders 2–4 weeks after the original invitation. Of those stakeholder groups included, only one restaurant chain within the top 5 fast-food providers of chicken products participated. Supermarket retailers represented approximately 58% of the grocery market share in August 2023 (Statistica, 2024b). All major UK broiler welfare assurance schemes were included, and of the producers, the top 3 UK producer companies participated, collectively producing the significant majority of broilers slaughtered in the UK (Clements, 2022; Statistica, 2024c). Of the 12 registered UK animal welfare charities with an annual income of >£100K concerned with farm animal welfare, but not directly campaigning for vegetarian/vegan living, involving professional membership representation (Charity Commission for England and Wales, 2024; Charity Commission for Northern Ireland, 2024; OSCR Scottish Charity Regulator, 2024), or funding this work, four participated.

### 2.2 Conduct of the interviews

Semi-structured interviews were conducted online by a single researcher (IS) over Microsoft Teams version 1.6, between December 2022 and August 2023. The interview guide (Table 1)

TABLE 1 Interview guide.

Interview stage	Content and questions
Introduction and background <sup>a</sup>	Interviewer introduced themselves, reiterated purpose of the interview, offered opportunity to ask further questions/obtain clarification, and sought consent to record the interview
Confirming participant role and ID for recording <sup>b</sup>	Interviewer confirmed the interviewee's identity, role and involvement with poultry welfare and/or sustainability, and familiarity with the Better Chicken Commitment
Interview questions: order led by interviewee discussion and inclusion subject to time	What do you believe are the driving factors for the proposed implementation of slower-growing broiler breeds? In relation to the implementation of slower breeds what would you say are the main priorities for your organisation/sector? In relation to the implementation of slower breeds, do you see any challenges for your organisation/sector? In relation to the implementation of slower breeds, do you see any opportunities for your organisation/sector? What are your views on the potential trade-offs between animal welfare, environmental impacts, economic impacts, and sustainability if UK broiler production was to move towards greater use of slower-growing breeds? What are your views on consumer awareness of and attitude towards the implementation of slower-growing broiler breeds? Do you have any views on the positions of other stakeholders (e.g., producers, government bodies, assurance schemes, retailers, restaurant chains) with respect to the implementation of slower-growing broiler breeds?
Wrap up	Interviewer asked if there was anything further the interviewee would like to add and thanked the interviewee for their participation

<sup>a</sup>Interviewees were sent an information sheet and consent statement which they signed prior to the interview.

<sup>b</sup>Transcripts were anonymised prior to analysis.

included seven initiating questions associated with the following topic areas for discussion: opportunities and challenges associated with the implementation of slower-growing broilers in the UK, the associated potential animal welfare, environmental and cost trade-offs, and participant perceptions of consumer perspectives on slower-growing broilers and broiler welfare. Interviews remained flexible so that the order of topics addressed was led by the participant and responses could be sufficiently elaborated and explored using follow-up questions where appropriate. Interview durations averaged approximately 45 min and were recorded and transcribed via Microsoft Teams.

2.3 Data analysis

Interview transcripts were manually corrected according to the audio playback where necessary and pseudonymised using stakeholder ID codes. These ID codes were stored separately from the transcripts, together with the subject identifiable data in password-protected files accessible only to the research team, to allow traceability if any participants wished to withdraw from the study prior to publication. To maintain anonymity, details of the participants and their organisations are not reported. Qualitative content analysis (Lindgren et al., 2020) was used to analyse the interview data. Initial data familiarisation and descriptive topic-level coding of transcripts was conducted by IS and reviewed and refined by SA. Related codes were then grouped into clusters that reflected issues raised by interviewees in response to the initiating questions and refined into the topics presented below through discussion with the wider team.

3 Results

Contact details for the suggested representatives from 15 organisations could not be acquired, but alternative individuals were identified for 10 of these organisations. In total, 65 invitations were sent to 35 organisations. No response was received from 19 contacts. Four contacts were on maternity leave or no longer worked for the organisation. Thirteen of those who responded to invitations were unable to participate, either because of organisational communication policy, time constraints or because they had insufficient knowledge of the BCC or slower-growing strains. Of these, 8 recommended or directly contacted alternative colleagues within the organisation. We were not able to recruit interviewees from three retailers, two restaurant chains, and two producer organisations, nor one scientist and one poultry veterinarian contacted. We were not able to recruit any government departmental representatives responsible for agriculture and animal welfare with relevant knowledge.

A total of 30 stakeholders from 24 organisations participated in the interviews, with some representing different roles within the same organisation (Table 2). Following data analysis, stakeholders were grouped into the following category codes (Table 2) to protect identities: supermarkets and restaurant chain representatives were grouped under R = retailer; producer, veterinarian, and breeding company representatives were grouped under I = industry; animal welfare charity and assurance scheme representatives were grouped under AW = animal welfare; and animal welfare scientists were grouped under S = scientists. Groups were checked for general similarities in expressed perspectives as well as roles within the poultry chain. Key issues raised and discussed by participants are detailed below, with example quotes provided, coded by the umbrella group and the participant number within that group.



TABLE 2 Stakeholder groups and number of organisations represented by the study participants.

Stakeholder group representative	Number of organisations represented	Number of participants	Umbrella category and code
Retailer	6	7 <sup>a</sup>	Retail (R)
Restaurant chain	1	1	
Producer/supplier	4	6 <sup>a</sup>	Industry (I)
Poultry breeding company	2	3	
Poultry veterinarian	1	1	
Assurance schemes	3	3	Animal welfare (AW)
Animal welfare charities	3	4 <sup>a</sup>	
Poultry welfare scientist <sup>b</sup>	4	5	Scientist (S)

<sup>a</sup>Including an interview conducted with two participants at the same time.

<sup>b</sup>These participants were from institutions other than the Royal Veterinary College.

### 3.1 Wide-scale change would require a better understanding of costs

Aside from one dissenting voice (“I think it’s very much exaggerated any benefit in welfare, and a huge leap in welfare I think doesn’t really exist when you move from conventional to slower-growing.” I7), participants agreed that slower-growing broilers experience better health and/or welfare than conventional strains (“They’re more active, they’ve got far less metabolic strain on them [...] not so much heat stress [...] mortalities, heart issues, leg issues etc.” AW6), thus recognising the characteristics of the slower-growing strains as a significant contributor to welfare improvement. Other identified benefits included improved broiler breeder welfare (as parent flocks of conventional birds raised for meat are restricted to limit body weight and maintain reproductive capacity), reduced antibiotic use, better production efficiencies (lower mortality rates and fewer rejects), and improved farmer experiences and farmer wellbeing (“[...] having a conversation with a farmer [...] he said ‘I don’t have to walk around every day with a wheelbarrow picking up dead birds [...] they come and talk to me. They are interacting, they’re moving around. So it’s just a joy’. So, his mental health was up, his chickens’ physical health was up.” R8).

Most industry participants highlighted, and many other groups acknowledged, significant logistical and investment challenges to a large-scale switch to producing chicken using slower-growing broilers under BCC. These included a currently insufficient supply of slower-growing broilers, a substantial lag to meeting any increased demand (“It takes up to two years to turn the supply chain around.” I9), and insufficient land and buildings, because the greater space required and longer production cycle would reduce the output for a given area over the same timescale, thus requiring more birds to be grown (“We’re getting several food service companies saying they want BCC birds, but there’s not enough space, so we can’t have the numbers they want.” I6; “[We would] struggle to meet the market demand as it stands using a slower-growing regime based on today’s volume.” I2). However, other stakeholders considered these issues surmountable with planning.

Complications beyond construction and funds, such as obtaining local community acceptance and building permits, were also flagged (“Getting building permits and getting permission to build new chicken houses is very, very difficult.” I7; “The people who say that they are really concerned about welfare are probably the same people who object to a chicken shed going up next door.” R4).

All participants recognised the potential environmental impacts of a wide-scale UK switch to BCC and slower-growing broiler production, but related views on sustainability, and thus prioritisation, differed. Retailer and industry participants tended to focus on specific environmental and economic outcomes. The amount of feed, energy, and land needed to accommodate a production shift was a particular concern for industry representatives (“You need far more feed and you need far more land to produce that feed, some of which is being deforested.” I8). Similarly, retailers were very concerned about the implications for meeting net zero commitments (“Rightly or wrongly, the target both agriculture, both retailers and government and the world have, is to reduce our carbon emissions.” R4), noting this also influenced their investors. In general contrast, welfare charities, assurance schemes, and welfare scientists viewed sustainability more broadly, reasoning that it encompasses rather than conflicts with animal welfare (“We don’t see [it] as a trade-off. The animal welfare is the non-negotiable bit in the middle [...] you then have to construct an environmentally viable farming system around that baseline, so it almost comes first.” AW3). Many participants were highly critical of the evidence underpinning current knowledge about the environmental impacts of slower-growing broiler production due to an unrepresentative focus on carbon footprint (“[...] carbon tunnel syndrome, everyone’s focused on carbon, carbon combinations, ground questions [...] to them that’s a proxy of sustainability. In fact [it] encompasses so much more, so societal is welfare, there’s kind of wider environment as wastage. So yeah I think we do have to think about more in a more kind of broader context.” S2) and calculations using non-standardised methods or non-representative data, such as comparing conventional birds with non-commercially relevant, niche, or very slow-growing strains. Accordingly, some participants considered

that the environmental trade-offs with slower-growing production could be less problematic than current evidence suggests, but that without addressing the gap in a robust, comprehensive assessment, effective solutions cannot be explored.

Fundamentally, any strategy to improve broiler welfare must be economically viable. The increased cost of production using slower-growing broilers, due to their lower food conversion, lower breast meat yield, and greater resource use to produce the same product volume was a major shared concern amongst all stakeholders. Some stakeholders felt that a complete switch to only slower-growing UK broiler production may eventually bring down production costs, citing comparisons with free-range eggs when first introduced, but others considered the cost unlikely ever to equate to conventional production. Several participants emphasised the importance of considering small economic gains, for example through reduced mortalities and carcass downgrades, which add up and may offset potential losses elsewhere, particularly where the whole supply chain is considered (“[...] there’s a lot potentially a lot of gains to be had at the breeder level [...] and the fact they produce more chicks and eat less feed. Actually the [difference in] feed consumption [...] thinking about the whole life cycle [...] compared to conventional [...] was slight.” S2). However, others believed these offsets were not sufficient to compensate for the greater costs (“[...] mortality and rejects, so the stuff that you put in and doesn’t make it to the shelf, doesn’t go anywhere near offsetting the difference.” I1). Ultimately, this increased cost would have to be transferred to the consumer.

### 3.2 Do consumers want this and will they pay?

Most participants believed animal welfare charities to be driving the BCC through sustained pressure on retailers and food service companies, with the aim of raising baseline broiler welfare standards. Some regarded this as more efficient than direct consumer campaigns (“By one stroke of a pen, for example, you get a big company making a commitment. KFC, for example, how many customers is that going to be by 2026 and beyond? They’re going to be buying chicken that’s raised to the Better Chicken Commitment standard.” AW2). However, stakeholders disagreed about whether consumers played a role in the pressure to implement BCC in the UK. For some, particularly retailer representatives, addressing general consumer concerns about animal welfare in alignment with their brand, and avoiding associations with negative press and exposés, underpinned their engagement with BCC. Others did not perceive any pressure from consumers (“I don’t think that consumers have been pushing for this at all.” I3).

Stakeholders, especially retailers, were particularly concerned about mixed signalling associated with the consumer–citizen gap; as “citizens”, people often express willingness to pay for higher welfare products, yet their purchasing decisions as “consumers” do not reflect this. Indeed, some retailer and industry participants believed that the limited purchasing of higher welfare chicken meat products

in the UK reflects low consumer priority for broiler welfare (“[...] at the end of the day, the customer decides what we put on a shelf [...] customers are voting with their feet.” R5). Consumer disinterest in BCC higher welfare was perceived to be associated with both a higher price and a sustained UK consumer preference for white breast meat. Slower-growing birds produce darker meat overall, with lower breast and higher thigh yields. Some participants thus raised concerns about consumer preferences for certain meat attributes and cuts (“[There is] a whole issue around how you get consumers to change away from just having breast meat and have more dark meat [...]” R4). Insufficient consumer demand for slower-growing broiler products would result in surplus product and significant food (and economic) waste (“[...] we’ve done trials in certain areas, in certain retail environments and food service, people haven’t wanted it because they haven’t bought into it. So waste goes up. We don’t want food waste.” I4). However, other participants were optimistic that this potential challenge could be overcome (“[...] we’ve taken sugar out of drinks and people don’t notice, so I’m sure retailers could probably turn people back towards slow-growing chicken without too much work.” S4). Indeed, some retailers reported good customer feedback on the taste and quality of products from slower-growing birds, whilst acknowledging their customer profile may differ from other retailers. Furthermore, increased importing of white meat, potentially from countries with lower welfare standards, would be needed to meet current demand, thus introducing different welfare concerns while undermining UK production. A higher price was perceived to be a key reason for consumers’ reluctance to purchase higher welfare products, although it was acknowledged that the price consumers pay for chicken does not adequately reflect production costs and that this needs to change (“Chicken is a prime example, but not the only example, of food being artificially cheap for a long time [...] So all the externalities factored out [...] it’s always been a broken system and we need to be thinking about [...] affordable food, rather than cheap food, and that implies a certain standard of living and a functional welfare system and all sorts of complicated social policy as well as agricultural policy.” AW3). Participants felt there was a sustained consumer expectation of low-cost staple foods (“Food products are too cheap [...] the consumer has had the benefit over probably 20–25 years [...] of cheaper and cheaper and cheaper food. That is why they have now got much more disposable income, which they like to spend on holidays and fine clothes, and all the other good old things and we’re asking them now to stop doing that.” I3), making cost increases unpalatable. One reason for this expectation is the historic use of fresh chicken as a key staple in price competition, whereby low-price staples were (and still are) used to draw consumers to shop at supermarkets (“[...] we have conditioned consumers to buy based on price [...] and yet you’re trying to put something in front of them that is more expensive so to get them to buy up [...] is going against the grain of all behaviour we’ve ingrained in them for the last ten years.” I2). However, some retailer participants felt that the transfer of increased costs to consumers was incompatible with their responsibility to provide consumers with affordable protein. The UK “cost-of-living crisis”, which began in 2021, was frequently

mentioned as a further key issue (“Nobody wants to increase the price of food now in the current situation where inflation is going through the roof.” R1). Some retailers interpreted associated shifts in purchase patterns as de-prioritisation of broiler welfare by consumers (“[...] we’re seeing [...] customer purchases of the organic and free-range category down.” R7; “[...] we’ve already seen in many products people trading down for cheaper options.” R1). This had resulted in waste (“[...] we think we’re about 25,000 birds over where we need to be [...] 25,000 chickens every week that either got a discount label on them or ended up going into the bin or a food bank or everything in between. So morally and ethically, I don’t believe that that is the right thing to do.” R5). However, other retailers had not seen changes in consumer purchasing and felt that animal welfare remained very important to their customers, with some even predicting a longer-term resumption of welfare as a consumer priority (“[...] I would see that almost as a short term pause [...] once we’re through that, we’ll go back up that hierarchy of needs because that’s the market that we are operating in the UK.” I2).

### 3.3 Consumers don’t (or don’t want to) understand chicken production

Some participants felt that the interpretation of purchasing behaviour as an indication of welfare de-prioritisation by consumers was an over-simplification. Indeed, participants across all stakeholder categories felt that poor knowledge or understanding of poultry production amongst consumers was a barrier to expression of welfare preferences when buying chicken meat (“[...] consumers expect standard chickens to be free-range, let alone BCC [...]” R6). Some considered this to be compounded by consumer confusion about the relationship between welfare and various labels and assurance schemes (“[...] they see Red Tractor and they assume it’s a slower breed anyway [...] so I think there is a lot of assumption and [...] confusion in our customers minds.” R6). Many participants therefore highlighted the importance of effective marketing, and some felt this was being underutilised (“[...] if you were marketing a new mobile phone [...] clever minds would be on how to position that in branding and image and perception to the consumer [...] with the chicken [...] we’re not doing that in the same way.” I9). Tapping into what is meaningful to consumers was considered to be a critical aspect of effective communication about broiler welfare but was acknowledged to be extremely challenging (“[...] at the end of the day, we’re still asking for indoor production [...] it’s very easy to say cage or no cage but actually to get the consumer to understand the difference between more space and being active is a little bit harder.” AW4). It was felt that unfamiliar terminology associated with BCC would confuse consumers, and some participants had encountered negative consumer responses to the term “slower-growing” (“[...] the general consensus was that it wasn’t a good thing, because their feeling was that they were slightly uncomfortable about farming. Having a longer life was worse because chickens were suffering for longer.” AW6). A further recognised issue was that a sector of

consumers actively chooses to be disconnected from farming, but may still experience general concern (“[...] when you try and get them to elicit their understanding, all they know is they have a very generalised anxiety, a very general concern about chicken farming, but they cannot be specific.” AW6). Some felt that many consumers trust retailers and food service companies to have addressed their implicit concerns, such that they do not have to consider them at the point of purchase (“[...] they care enough to put their trust in certain brands and they expect that brand, whether it be a retailer, a brand on the shelf, a food chain, to deliver on their expectations and you know that that is a trust is hard won and its easily lost.” R3).

## 3.4 Suggested solutions

### 3.4.1 Addressing challenges associated with the slower-growing broiler production in the UK

Animal welfare scientists and some retailer representatives highlighted the potential for innovation or supply chain improvements to mitigate the environmental and economic impacts of slower-growing broilers. Suggested strategies included switching to more local feed protein sources or to alternatives such as insects, as well as more efficient use of the carcass, although the need for further research was recognised. Solutions were frequently inspired by the case study of the Norwegian company, Norsk Kylling (<https://norsk-kylling.no/>), which switched all production to slower-growing broilers, using a range of innovations across the whole production chain, and demonstrated improved welfare outcomes with no overall impact on environmental metrics and no additional cost to consumers (Norsk Kylling, 2021). However, UK industry stakeholders considered this unfeasible, citing Norsk Kylling’s control of the whole production chain as a major factor that would not be replicable in the UK (“There was a whole supply chain that decided they were gonna do that, there was also an awful lot more margin in the production to start with [...] they grew bigger birds so that the breast meat amount that they took off each individual was the same [...] they reduced overall margin to achieve it without passing on that to the customer [...] There is no way in the UK supply chain that you can take that cost and not pass it on to the customer.” I1). Some participants, referring to Dimbleby’s UK National Food Strategy report (Dimbleby, 2021), proposed that a UK switch to slower-growing broilers could be combined with the “less but better” messaging, i.e., eating less, but better quality chicken, thus addressing its greater expense and benefitting both bird welfare and the environment (e.g., “[...] ‘less but better’ piece is absolutely critical because you wouldn’t be able to rear as many birds as you can do using a more intensive regime.” I2). Some even considered this an essential part of a wider societal strategy to drive food system change that would resolve multiple challenges including sustainability, environmental stability, animal welfare, climate change targets, and biodiversity (“The environmental impact is so great that tweaks to systems aren’t going to get us to where we need to be. We need to stop building these sheds. We need to shift production and consumption into reverse [...]” AW3). However, the complexity of this approach, requiring shifts at all

levels including changes in consumer behaviour to reduce both demand for chicken and food waste, was recognised. Several participants referenced how shifts to slower-growing production had occurred in the Netherlands; retailers, pressured by NGOs and encouraged by the Dutch government, unilaterally phased out products from conventional broilers for the domestic market following sustained welfare campaigns. Whilst some highlighted UK competition laws preventing retailer collaboration, others suggested that retailers still have significant power to alter consumer behaviour with clever marketing, for example in promoting whole carcass use and different cuts with new products and recipes (“In the Netherlands [...] the retailers did a bit of an education piece and [...] brought more products onto the market that was kind of using different cuts [...] some of the restaurant chains redesigned their menu, so they’ve perhaps taken chicken breasts out and [are] using chicken thigh in a curry now and explained why they’re doing that.” AW2). Some stakeholders also felt that the challenging UK current financial climate could actually help in the longer term because people are already buying less meat (“[...] people have got less money to spend. Therefore, they’re buying smaller. [...] If people have to stick with that behaviour for another 18 months as we manage this cost-of-living scenario, then perhaps they’ll automatically be in a new world where they are consuming less protein and maybe in that world then they would prefer to buy better welfare but less volume.” I2). One participant even suggested government taxation of animal protein as the only effective way to change consumer purchasing. However, others, primarily retailers, argued that consumers should be free to choose between BCC and more-affordable meat protein products in accordance with their income. In general, whilst acknowledging that further investigation is needed, participants felt that given a choice in chicken products, consumers would express their welfare preferences more directly through their purchasing behaviours if there were more transparency around the costs of BCC, improved alignment of labelling with consumer understanding of welfare, and clearer communication of better welfare without providing overwhelming detail ([in reference to trials with labelling] “[...] they liked enhanced welfare as basically like, the least informative label they could think of, and whatever their concern was – [...] antibiotics or growth promoters or anything like that that – enhanced welfare to them meant that it didn’t have that.” AW6).

### 3.4.2 Alternative ways to improve broiler chicken welfare

Some industry representatives believed that slower-growing birds were not viable on a large scale and suggested alternative strategies as more feasible and impactful ways of improving welfare for larger numbers of birds, without the same degree of associated environmental and economic risks (“Do we try and make improvements that are an incremental improvement over time that people can adjust to and afford, or do you try and make one big change which is unlikely to be affordable?” I3). Reducing stocking density or improving management was considered more feasible than switching strains, and welfare improvements already

achieved via genetic selection in conventional birds were highlighted (“[...] there has been a huge change since [...] the turn of the century. The bird of that stage had huge amount of leg weakness [...] and that bird is in a much better place today than it ever was.” I5). However, others were sceptical about the degree of welfare improvement that could be achieved for conventional birds, either through further selection or management changes (“[...] what we were seeing was that with the fast growth rate bird, there was a ceiling of 65%-70% of them [without compromised walking ability] [...] and that was in really good farms. [...] With the alternative breeds that ceiling was more like 90%-95%.” AW4). Another alternative strategy suggested by industry stakeholders was the use of “intermediate” growth-rate strains, such as the Hubbard Redbro (which has been accepted under BCC) and the Aviagen Rustic Gold (undergoing evaluation at the time of the interviews), which are considered to have performance closer to the conventional strains, whilst retaining the welfare outcomes of the slow-growing strains (“[...] retailers like [Redbro] because they’ve in fact got BCC birds, which is in effect a standard broiler almost because it grows that much faster.” I6).

## 4 Discussion

In the UK, the campaign by NGOs, supported by government policy to adopt the BCC, remains the primary mechanism to improve the welfare of broiler chickens by driving corporate policy change. To date, corporate implementation has been limited, and although the BCC has more broadly encouraged environmental improvements, the use of slower-growing strains has remained an obstacle. Exploration of stakeholder views on the implementation of slower-growing strains in the UK within the context of BCC revealed a general agreement about the associated economic and environmental challenges but, perhaps unsurprisingly, differing views on their tractability. These views fell generally into two types. The majority of retailer and industry participants regarded the current external circumstances of i) high consumer demand for chicken, especially certain cuts, at a low price irrespective of “stated” consumer expectations around welfare; and ii) global prioritisation of net zero targets, as unlikely to change, making a switch to slower-growing broilers economically and environmentally unviable. Representatives of welfare charities, scientists, and assurance schemes believed that these external factors can and must be changed to solve longer-term food system sustainability. The tension between these positions was partly underpinned by differing priorities of focus within the multidimensional construct of sustainability. Although the subject of much critical discourse, sustainability is most commonly conceptualised as comprising social, economic, and environmental/ecological aspects (Purvis et al., 2019) that must simultaneously be balanced to “meet the needs of the present without compromise to future generations” (Brundtland, 1987, Ch2. para 1, p. 41). Industry and retailers focussed on the risks of food inequality (in relation to access to chicken meat) due to cost, undermining of the UK trade, and increasing carbon footprint, i.e., factors directly affecting these organisations or their customers.



Scientists and welfare charities, not directly impacted by implementing production change, tended to consider a broader range of missed opportunities, including improvements in animal welfare, and farmer wellbeing and reduced antibiotic use, and were more likely to suggest solutions that involved long-term transformative change.

Notwithstanding significant logistical challenges and investment costs, the limited publicly available UK data to date (ADAS, 2019) and calculations for systems in other countries suggest that increased costs per unit weight of chicken are inevitable with transitioning to slower-growing strains. van Horne and Visser (2022) reported 25%–32% greater cost per kg for six EU Member States, depending on farm-level production costs; ADAS (2024) reported an additional cost in EU production of 37.5% per kg of meat based on industry estimates, whilst US production costs were estimated to be an additional 11%–25% per lb (Lusk et al., 2019), depending on bird average daily gains (ADG). However, clarity about the true price gap is compromised by general limitations and challenges in cost calculations, such that data can be non-representative, for example not considering parent flock data or welfare offsets across the whole production chain; or can rapidly become outdated, for example through rapid changes in (particularly feed) cost, or changes in strain-use (given wide variation in the ADG of slower-growing strains; Nicol et al., 2024). Indeed, here, stakeholders' views on costs may have depended on which strain(s) they had in mind when answering the questions. Thus, more robust independent and comprehensive economic analyses at the strain level are still required. Visser et al. (2019) suggested that a substantial welfare improvement could be gained via lowering stocking density, providing enrichment and utilising slower-growing strains, with “relatively small” increases in production costs. In practice, the starting price point and margins, which differ between countries, are likely to play a role in true feasibility and palatability of any increased price to UK consumers. The Netherlands transitioned to the use of only slower-growing birds at lower stocking densities for the domestic market with no impact on consumer consumption, but this is estimated to represent only 40%–50% of broiler production, with the remainder under conventional production exported (USDA Foreign Agricultural Service, 2024). In the UK, domestic consumption represents 82.1% of the market share (Defra, 2024a), so a complete transition would be a much greater challenge. The success of the Netherlands' chicken retail transition to improved welfare production with slower-growing breeds was attributed to several factors, including animal welfare NGO pressure, government direction, retailer agreement, the absence of other consumer options, and retailer marketing (Saatkamp et al., 2019).

The UK production of organic broiler chickens peaked in 2023, increasing by 39.5% compared with that in 2022 (Defra, 2024b). This suggests that retailers anticipated an increased appetite for higher welfare production by some consumers prior to the UK “cost-of-living crisis”, which could resume in an improved economic climate. However, most retailer and industry participants expected consumers to react very negatively to any substantial and sudden price increase. Whilst in the past chicken

was considered a luxury food, Western societies now expect it to be a cheap staple (Vaarst et al., 2015). Fresh chicken is a key product in price competition between UK retailers, reducing the incentive to introduce changes that significantly affect costs. Yet food inequality is clear in some societal sectors, frequently manifesting in unhealthy diets associated with cheaper, highly processed foods and little access to fresh fruit and vegetables (Hunt et al., 2023). As of June 2024, 22% of UK consumers were worried about not being able to afford food (Food Standards Agency, 2024). Retailer participant reports of financially constrained UK consumers transitioning to cheaper products, rather than buying fewer free-range and organic products, suggest that convincing consumers to adopt a “less but better” strategy to account for increased price would be challenging, particularly whilst cheaper imports remain available. This would need to be part of a wider national change in the UK food culture (Dimbleby, 2021). However, many consumers will pay high prices for luxury goods that do not cost much to produce, and there is scope to explore this as a basis for remarketing chicken meat for a “less but better” strategy. Although our interviews took place during a peak food inflation period in the UK (Statistica, 2024d), animal welfare and sustainability in food production have remained important to consumers, with the percentage of respondents expressing concern about these topics respectively increasing by 6% (to 72%) and 9% (to 70%) a year on (YouGov, 2023, 2024). In other countries too, the public consistently expresses concern about broiler welfare (e.g., Mulder and Zomer, 2017; Yang and Hong, 2019; Heinola et al., 2023). Despite this, consumers often do not purchase higher welfare products, even when they are able to afford them. Some retailer and industry participants interpreted this as an indication that welfare is not important to many consumers in reality, and that costly welfare improvements are therefore a business risk, even though reputational risks associated with public perceptions of animal welfare remain a concern.

In general, poor consumer knowledge was a source of frustration for all participants, although increased knowledge about production does not necessarily translate to attitude change (Howell et al., 2016). Consumer expectations around animal welfare cannot be met without additional cost, but also potentially undermine the expression of preferences at purchase, one reason for market failure (Harvey and Hubbard, 2013). Consumers who believe baseline welfare standards are higher than in practice may see no reason to pay extra. However, greater transparency on increased costs associated with welfare improvements could risk revealing damaging information about conventional practice. The price gap between free-range or organic and value chicken products is large, but the participant-reported confusion around labelling is consistent with the literature (e.g., Pinto da Rosa et al., 2021; Gorton et al., 2023). This suggests that consumers who may be able to afford middle-segment products associated with more modest welfare improvements may not buy them because they do not understand what these products represent. Indeed, Kotschedoff et al. (2024) reported a 2.19% increase in market share of higher welfare products when standardised welfare labelling was voluntarily introduced in German supermarkets. Participants in our study favoured simplified messaging, but this should still be meaningful

to consumers and aligned with scientific metrics of animal welfare to avoid the perception of “animal welfare washing”. A further challenge is those consumers who actively choose to remain ignorant about production methods, but may still have implicit expectations to which they hold brands, retailers and food-service companies to account, thus delegating responsibility for standards (Schröder and McEachern, 2004). Fernandes et al. (2021) highlighted the risks for the industry in not meeting public expectations about animal welfare, including loss of public trust and social licence to operate, as well as business losses.

Chicken meat has been estimated to have a lower global carbon footprint impact on deforestation and biodiversity loss than beef, lamb, or pork but appears to have a greater impact on marine eutrophication than red meat (e.g., Gaillac and Marbach, 2021; Bidoglio et al., 2024). Existing literature indicates an inevitable increase in environmental impact associated with production using slower-growing strains, especially when considering shifts at a country-level scale (e.g., Chan et al., 2022), although others have demonstrated that this depends on how the impact is calculated, including whether the whole production chain and mitigations, such as altered feed components, are considered (Mostert et al., 2022). Amongst our study participants, industry representatives and to some extent retailers generally perceived the environmental impacts to be substantial, while others felt there was insufficient evidence for this. A robust and relevant evidence base for environmental impacts is imperative (Gržinić et al., 2023), but the literature on life cycle analysis (LCA) evaluating sustainability of the poultry sector has been criticised for poor standardisation and insufficient exploration of important metrics (Constantini et al., 2021). Similarly, despite the many important aspects of environmental sustainability in poultry production (Vaarst et al., 2015; Gunnarsson et al., 2020), industry and retailer concerns focused on carbon footprint. This is unsurprising given the UK government’s legal commitment to reduce carbon emissions to net zero by 2050, and the expected role of the industry in achieving this target, but applied in isolation leaves wider sustainability goals unaddressed. Other stakeholders had a more holistic conceptualisation of sustainability. Alongside a broader range of environmental and economic metrics encompassed within this evaluation, one under-researched element of social sustainability (Vaarst et al., 2015) considered by several stakeholders was the growing concern about farmer wellbeing (Jones-Bitton et al., 2019; Daghigh Yazd et al., 2019). Generally, it seems that farmers fare better if their animals have better welfare (Pinillos et al., 2016; cattle, King et al., 2021), but there are few empirical data on farmer wellbeing within broiler chicken production. Within a holistic sustainability model, not only should animal welfare remain uncompromised in the pursuit of carbon neutral, but it should be enhanced. Whilst the UK government policy is supportive of welfare enhancement, including BCC (Defra, 2025), the mechanisms involved are voluntary and clearly signal a lower relative importance of welfare improvement to achieving carbon neutral. In contrast, although their understanding of the relationships between these factors is unclear, consumers generally appear to prioritise welfare over environmental impacts across livestock systems (e.g., Heng et al., 2013; Perino and Schwickert, 2023; Ammann et al., 2024).

Furthermore, the recent economic and agricultural policy of the new leadership has reduced confidence within farming groups (NFU, 2025) and increased concern regarding expanding intensive production within the animal welfare and environmental charity sectors (Horton, 2025).

Our participants generally, although not universally, agreed with published evidence that under the same housing and management conditions, slower-growing strains consistently demonstrate significantly better health-based welfare outcomes and certain positive differences in important behavioural welfare outcomes compared to conventional strains (Dixon, 2020; Rayner et al., 2020; van der Eijk et al., 2022; Rodrigues da Costa and Diana, 2022; Nicol et al., 2024). Although both are encompassed within BCC, reducing stocking density for conventional broilers was one suggested “alternative” to using slower-growing strains, which could improve the welfare for more birds at a lower cost. However, whilst limited, data to date suggest that strain is likely to have a greater relative impact on welfare. Rayner et al. (2020) reported few improvements in negative welfare outcomes for slower-growing strain “B” at 34 kg/m<sup>2</sup> compared with 30 kg/m<sup>2</sup> under commercial conditions, suggesting that more space did not improve the welfare of this strain. Guinebretière et al. (2024) reported that a reduced growth rate (strain) improved a wider range of welfare outcome measures to a greater extent than reducing stocking density from 37 kg/m<sup>2</sup> to 29 kg/m<sup>2</sup> under experimental conditions. Some industry participants believed that utilising intermediate-growth strains would be a better way to balance trade-offs between welfare, environmental impacts, and costs than using slower-growing strains. Industry participants made a clear distinction between these strains, but it is unclear whether other stakeholders made the same distinction and whether their positive views about slower-growing strains extended to intermediate-growth birds. BCC production in the UK now primarily involves the Hubbard Redbro, an “intermediate” growth strain, but published data on welfare outcomes for this strain, whilst positive (Baxter et al., 2021) are scarce to date, and the lower efficiency compared to conventional birds still translates to increased economic and environmental costs (e.g., Mostert et al., 2022; van Horne and Vissers, 2022). A more comprehensive quantitative analysis of the welfare implications of each prospective strategy would be beneficial using a full range of welfare indicators and evaluation of the whole production chain. For example, limiting feeds appear to impact hunger in conventional birds even whilst partly improving health (Wilhelmsson et al., 2019), but whether slower-growing broilers are more fearful, or how improvements in broiler-breeder welfare or bird mortality during transport affect overall welfare gains, remain unclear. Attempts to integrate animal welfare into LCA, whilst commendable, have been criticised for a lack of standardisation of metrics and underrepresentation of welfare domains (Lanzoni et al., 2023). Turner et al. (2023) recently developed a poultry-focused welfare LCA, tested in the context of Canadian egg production, but similarly noted requirements for further research and development. For a wide-scale change in production to occur, welfare improvement should be large for a relatively limited cost (Saatkamp et al., 2019). Thus, integrating representative LCA

welfare assessments into more comprehensive environmental and economic assessments is challenging but necessary to evidence the true trade-offs.

Some limitations of our sample must be acknowledged. Due to a specific focus on stakeholders most immediately engaged with a potential transition to slower-growing broilers, we did not include groups outside the veterinary domain with a more general interest in welfare and/or environmental sustainability. Engagement with particularly the latter might validate the hypotheses proposed by existing participants regarding environmental trade-offs. Certainly, independent research with consumers is urgently needed to verify expressed views on consumer perspectives and obtain a deeper understanding of these. Our sample underrepresented fast-food providers of chicken products and relevant animal welfare charities. Given that most charities worked together closely on campaigning for the Better Chicken Commitment, it is likely that the views expressed by the organisations participating were generally representative of this group. Although only one fast-food chain participated, the motivations of this sector in relation to broiler welfare and product economic and environmental costs are likely to be similar to supermarket retailers, and within our sample, we found this to be the case. Our supermarket retailer participants, whilst not comprehensive, represented the majority of grocery market share at the time of the interviews as well as a variety of consumer profiles. UK broiler welfare assurance schemes and producer companies were generally well represented in terms of coverage of UK broiler production. Whilst acknowledging the aforementioned limitations in representation, the views of those within each stakeholder group and across aligned groups were generally consistent, suggesting transferable findings.

In summary, participants agreed that improving broiler welfare is important but disagreed on the best mechanisms to achieve this. Participants generally agreed on the welfare benefits of slower-growing strains but diverged on the feasibility of addressing barriers to their wider-scale implementation in the UK under BCC. Industry and retailer stakeholders generally considered slower-growing strains to be a relevant part of the market, but that they should not replace the UK baseline standard of production due to the economic and environmental costs of their production. Welfare charity, assurance scheme, and scientist participants focused on addressing these costs and on transformative food-system change, but the latter requires national engagement at all levels, and at present, this is lacking. The BCC is one strategy to improve UK broiler welfare within a market-driven system amongst a possible range, including improving welfare for conventional birds or finishing at a lower live weight. Discussion with stakeholders revealed that the effectiveness of BCC in driving welfare change within the current UK food system has been limited by significant concerns regarding UK consumer appetite for changes in poultry production. These concerns relate to consumer willingness to pay for the relatively higher costs of BCC production, especially those associated with slower-growing strains, as well as its environmental viability. Policy change associated with the alteration in UK government leadership in July 2024 may influence the relevance of our findings, but the current relative policy prioritisation of

welfare and sustainability seems unlikely to change. If welfare improvements are to be market-driven, then welfare gains must be significant for the additional costs involved, valued by consumers and balanced against other sustainability goals. A better understanding of factors that may undermine a direct relationship between citizen attitudes and consumer behaviour, such as consumer interpretation of welfare labelling, brand-associated welfare expectations, and price expectations compared with low-cost luxury products, is needed to support improved alignment between these roles and offer greater clarity on what consumers truly want. At present, robust evidence encompassing the holistic evaluation of economic, environmental, and social sustainability trade-offs is lacking for BCC including slower-growing strains to effectively evaluate alternative strategies. Integrated evaluation should therefore consider lifetime welfare across the production chain, the number of animals impacted, and potential unanticipated welfare consequences, alongside the feasibility of strategy implementation encompassing infrastructure and investment requirements, economic and environmental mitigations, the policy ecosystem underpinning expectations of the industry, and consumer acceptability of associated trade-offs. A systems mapping analysis could help clarify the feasibility of potential strategies and innovations to mitigate risks in the UK context.

## Data availability statement

The datasets presented in this article are not available because the datasets generated for this study are held at the Royal Veterinary College. Under the conditions of ethical approval by the Social Science Research Ethical Review Board (SSRERB) at the Royal Veterinary College (URN SR2022-0154) and in view of the potential to identify individuals in contravention of GDPR, we do not have permission from the participants to share the data further.

## Ethics statement

The studies involving humans were approved by the Social Science Research Ethical Review Board (SSRERB) at the Royal Veterinary College. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

## Author contributions

SA: Conceptualization, Data curation, Formal analysis, Funding acquisition, Methodology, Project administration, Supervision, Writing – original draft, Writing – review & editing. IS: Data curation, Formal analysis, Investigation, Writing – original draft. CN: Conceptualization, Funding acquisition, Writing – review & editing. JC: Formal analysis, Methodology, Writing – review & editing.

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## Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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