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# Flock health planning: How to move from a plan to a reflective planning process in Northern Irish sheep flocks?

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## Abstract

Flock health planning has been advocated as part of a wider drive within livestock production for veterinarians and farmers to adopt a prevention-focused approach to veterinary medicine. This approach has, at its core, a cyclical process of assessment, evaluation, action and re-assessment, and is documented, at least in summary, in a health plan (HP). The HP has become a defining pillar of farm quality assurance schemes (QASs), introduced to address calls for greater transparency and accountability in food production. There is limited current information on the attitudes and behaviours surrounding flock HPs in the sheep sector and the barriers to greater involvement in an active process of continual improvement through reflective flock health planning. This study aims to address these issues with reference to the national flock in Northern Ireland. A mixed-methods approach was used to explore farmers' and veterinarians' opinions and behaviours related to QASs and HP, with data obtained through an online scoping questionnaire, semi-structured interviews with 27 farmers and 15 veterinarians, and discussion groups with farmers and veterinarians. No evidence of a positive association between a farm having a HP and implementation of 12 industry-recommended flock health activities was identified using the Fisher's exact test. Farmers reported a reluctance to pay for veterinary advice while some veterinarians reported a lack of time to develop HPs for farmers, and sheep-related work generally. Farmers predominantly saw the HP as a static, physical document, which had limited impact on their management practices, rather than a proactive, reflective and collaborative planning process. Veterinarians tasked with completing HPs felt restricted by limited knowledge of on-farm practices, flock production data and a lack of confidence in the accuracy of on-farm medicine records. This led some to believe that the HPs may fail to address critical issues. A new

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approach to engage farmers and veterinarians together in active flock health planning needs to be developed. This will need a sustainable delivery plan. Then the focus can be shifted towards ongoing reflective health planning to drive change for the betterment of sheep health and welfare.

#### KEYWORDS

advisory, farmer, health plan, health planning, sheep, veterinarian

## 1 | INTRODUCTION

A proactive approach to veterinary medicine and its role in improving livestock health is not new. Repeated calls have been made to the British veterinary profession for nearly a century about developing a preventative approach, rather than the more reactionary 'fire-brigade' approach to farm animal health (DEFRA, 2004; Lowe, 2009; MAF, 1938, 1944). In 2004, following consultation, a Department for Environment, Food and Rural Affairs (DEFRA) integrated and comprehensive Animal Health and Welfare Strategy for Great Britain was launched (DEFRA, 2004). This initiative had a vision to create a new basis for animal health and welfare by 2014, with stakeholders working together in partnership to create, from the bottom up, a relevant driving force for change (DEFRA, 2004; Osmond, 2009). Central to the delivery of this approach would be animal health planning to fulfil the maxim: *Prevention is better than cure*. Veterinarians were intended to be at the forefront of delivering specialised, proactive services, and farmers were encouraged to engage with their veterinarians to determine how these services could be tailored to their unique farming situation (DEFRA, 2004). Animal health programmes such as those proposed had been reported in the veterinary literature since at least the 1960s (Barfoot et al., 1971), with early examples focused on the dairy sector. These early HPs had a distinctly production and economic focus (Table 1), albeit one focused on optimal, rather than maximal, production at the individual farm level (Morris & Blood, 1969). These HPs did demonstrate improvements in animal health and production, however, sometimes without sufficient regard to the concomitant promotion of improving animal welfare (Wathes, 2005). This animal health planning was described as an active *process*, rather than simply a physical document – a health *plan* – that may or may not impact on-farm activities (Sibley, 2000). The active process involved in health planning evolved over time, and more recent iterations of the approach have been described (Nicholas & Jasinska, 2008; Sibley, 2000) and are summarised in Table 1 alongside a comparative, earlier outline (Dobbs, 2005).

Proffered benefits of following the health planning process included improving the smooth running of the farm through good stockmanship and appropriate use of veterinary medicines (Atkinson & Neale, 2008), increased farm efficiency and improved financial returns (Barfoot et al., 1971), as well as enhancing animal welfare (DEFRA, 2004; Dobbs, 2005; Gray & Hovi, 2001; Lovatt, 2004; Sibley, 2000). While the veterinarian is central to this health planning approach, implementation of agreed action points can

be a challenging process, which often fails in practice, especially when multiple actions are simultaneously targeted (Speksnijder et al., 2017). To facilitate change in agricultural practice, there must be a discernible payback (Scott et al., 2007). This motivational payback can be in economic, environmental or personal satisfaction terms (Clark et al., 2001). However, objective data outlining the expected payback, specific to the sheep sector, have not been clearly presented in recent publications, although individual diseases or case studies have been published (Robertson et al., 2018). In 2007, estimates of the financial benefits that the introduction of a compulsory flock health programme might yield suggested that annual costs associated with preventative measures would be slightly less than the average flock's annual veterinary bill at the time of the study (Scott et al., 2007). However, this suggestion was not tested in the field to verify the estimated cost-benefit ratio, did not include the initial additional costs, where applicable, of vaccinating the resident flock at the time of plan initiation, nor costings for any additional infrastructure or labour required to deliver it. A DEFRA pump-priming initiative, undertaken between 2006 and 2008, focused on farm health planning, and attempted, in part, to address the knowledge gap surrounding the current financial or production benefits of HPs. They, however, concluded that many farmers remained unconvinced about the business benefits of undertaking a health planning approach to their farming (Osmond, 2009) and the report's authors were unable to identify

**TABLE 1** The evolution of the steps involved in the animal health planning process from the mid-1970s to early 2000s (Dobbs, 2005; Nicholas & Jasinska, 2008; Sibley, 2000).

Mid 1970s	Early 2000s
Identify health problems on a farm	Identify the animals subject to the given health planning process
Rate the economic importance of each health problem	Identify health and welfare-related activities already undertaken
Institute control measures	Identify, collate and review available records relating to health, welfare and production
Monitor health and financial outcomes	Devise action plan, setting targets
Use evidence to make your decisions as to where you place the emphasis on health and economic decisions	Schedule frequency of reviews, review targets

substantive data to counter the farmers' view. They also highlighted the need for long-term projects to gather information about the production benefits of changes brought about through a health planning approach, a viewpoint echoed by the authors of a study considering preventative management of lameness in dairy heifers in south-west Britain (Bell et al., 2009) and another addressing dairy sector antibiotic usage in the Netherlands (Speksnijder et al., 2017).

Variations and alternative approaches to driving preventative care have been suggested and trialled. In the 'Stable-school' approach, small groups of participants focus, with defined aims or targets, on one specific area of mutual concern relating to their farming businesses (e.g. mastitis control), work with external advisors, for a time-limited period, to support each other in advancing towards the specific aims (Morgans, 2019; Vaarst et al., 2007). In Scotland, a recent novel proposal has been put forward, as part of ongoing consultation into future farm support, to incorporate data collection and sharing as a condition of enhanced state financial support (Park, 2022), thus addressing, at least in part, the lack of data typically available for health planning (Bellet et al., 2015). One element of farm support launched in England aims to reward farmers who provide public goods, beyond basic statutory requirements, in delivering animal health and welfare, or environmental benefits that the public value but that are not specifically rewarded by the marketplace. Central to this is funding for an optional, on-farm veterinary visit to collect data and offer advice on flock or herd management, annually, for up to 3 years (DEFRA, 2022).

Quality assurance schemes (QASs), linked particularly to the meat industry (Wood et al., 1998), have also had an influence on health planning in the livestock sector. These were a livestock-industry-led response to calls from food retailers, welfare organisations and the general public's demands for transparency, traceability and accountability to be brought to all stages of food production, which state authorities had failed to deliver (Bredahl et al., 2001; Northen, 2001). They also served to support food businesses' responsibilities to meet due diligence requirements placed on them under the Food Safety Act 1990 in the UK (Bredahl et al., 2001; Wright et al., 2002) and the early 1990s saw an acceleration of QASs in the United Kingdom and beyond.

Quality assurance schemes brought a raft of new standards and regulations, alongside a new approach that some farmers found bewildering, deemed an imposition without clear benefit, and threatening to their autonomy (Hubbard et al., 2007; Wathes, 2005). Central to these was the requirement to have an HP in place for each livestock species enrolled in the assurance scheme. Motivation for enrolment in a particular assurance scheme may differ between farmers and, as such, may impact their engagement and attitude towards scheme requirements (Hubbard et al., 2007). Further, in addition to these industry-led generic assurance schemes, proprietary schemes, managed by individual food processors and retailers, imposed additional requirements for producers wishing to supply their products (Bredahl et al., 2001; McDonald's, 2018). These served as part of food retailers' own specific schemes designed to create a competitive advantage in the marketplace through enhanced environmental or welfare claims,

or by attempting to influence the (visual and eating) quality of the final product (Northen, 2001). Bonuses or improved supply arrangements were offered to farmers participating in such schemes for their produce; however, as the growth in demand from processors increased, it became mandatory in all but name for farmers in many sectors wishing to sell into the domestic UK market to be a member of an assurance scheme (Bredahl et al., 2001; Hubbard et al., 2007; Northen, 2001). This has led some farmers to no longer consider the schemes a positive tool for improving their farm, but a necessary evil to remain in business, without a specific financial reward for the additional workload (Hubbard et al., 2007). The links between regulatory record-keeping and potential production benefits have been considered elsewhere, concluding that as farmers seek to meet regulatory demands, the link between the records and the on-farm practices they seek to moderate become de-coupled (Escobar & Demeritt, 2017). Furthermore, some farmers have the opinion that regulations brought in under such QASs have failed to benefit animal welfare (Hubbard et al., 2007).

It has been recognised in other livestock sectors that there is a significant difference between a farmer simply possessing a health plan on a farm, and viewing it solely as a physical document, and a farmer's active involvement in the process of health planning and the implementation of change as a result (Escobar & Demeritt, 2017; Selle et al., 2014). Looking beyond agriculture, it has also been recognised that regulatory checklists and audits, and the data collection for these, can become a box-ticking compliance exercise rather than an instrument to check a business' processes, and prompting introspection to advance positive change in those processes (Arcot & Bruno, 2006; Reddy, 2019). It has also been recognised that a one-size-fits-all regulatory approach is not optimal as the nature of individual businesses are so diverse (Arcot & Bruno, 2006).

In Northern Ireland (NI), sheep farming is generally undertaken in parallel to other livestock enterprises, or off-farm work, because of small individual flock sizes, and overall low economic returns currently achieved from sheep farming (DAERA, 2023a, 2023b, 2023c). The NI sheep sector suffers from both volatility in input costs and output prices received (NI Sheep Industry Taskforce, 2023). The average gross margin in 2020/21 was £66 pre-breeding ewe, rising to £92 in 2021/22 (DAERA, 2023c). This gross margin must cover farm fixed costs, return on investment and unpaid family labour before a true profit can be drawn or reinvested (DAERA, 2023c). However, neither this margin nor rise is attained equally across all the NI flock, with the bottom 25% of hill farmers only generating a gross margin of £42 in 2021/22, a fall of £9 on the previous year. The main reason cited in the annual report on farm incomes for the smaller profit margin in lower performing flocks was the value of lamb sales per ewe they generated (DAERA, 2023c). The average NI flock size is just over 100 breeding ewes, with fewer than 30 flocks of over 1000 breeding ewes (DAERA, 2023a). Only 4400 of the approximately 10,000 sheep flocks in NI are members of the industry-owned, Northern Ireland Food Chain Certification's Farm Quality Assurance Scheme (FQAS-NI). However, of these, 95.5% are also registered for the FQAS-NI beef scheme; thus, there are only approximately 200

sheep-only farms currently engaged with the FQAS-NI (LMC [Livestock & Meat Commission for Northern Ireland], 2022, pers. comm.). In addition, there are proprietary schemes, which, in the main, build on the FQAS-NI membership with additional elements that are either compulsory or voluntary, with financial bonuses paid reflecting the level the farmer achieves on assessment. There is no bonus on offer for fat lambs sold through livestock markets or into the export market currently for FQAS-NI qualified lambs (LMC, 2022, pers. comm.).

Within the sheep sector, HPs and health planning are termed flock health plans (FHP) and flock health planning (FH planning). This study, using mixed methods, looks at attitudes to the FHP, FH planning, and the relationships between these and QASs in the NI sheep sector, both through farmers' and veterinarians' eyes. This will start to address the limited research into the impact of, and barriers to, progressive FH planning in this predominantly extensive, pasture-based sheep farming system. Following identification of the areas of success that exist, and barriers to wider uptake and influence of FH planning on the NI sheep sector, we address lessons for future policy direction in this sector which may be applicable more widely in similarly structured non-intensive pasture-based systems in other parts of the world.

## 2 | MATERIALS AND METHODS

The data presented here are part of a wider, mixed-methods project, which utilised a scoping questionnaire, interviews and discussion groups to investigate medicine use and stewardship in the NI sheep flock. Prior to commencement of the research, a single over-arching research ethics approval was granted by the Harper Adams University research ethics committee (approval number: 0010-202,101-PGMPHD).

An internet-based questionnaire with a mixture of open and closed questions was developed and promoted, as both a scoping exercise to gather information on farmers' knowledge and opinions of, and behaviours relating to, flock health, including FH planning, in addition to a series of specific questions focused on sheep scab (Crawford et al., 2022).

Responses from the questionnaire were downloaded question by question and transferred into Microsoft® Excel® (Microsoft, 2018) spreadsheets. Free text qualitative responses were separated from the quantitative data and exemplar quotes identified. Statistical analysis was conducted using Genstat for Windows version 20 (QSR International Pty Ltd, 2020).

Participants for all interviews, and stakeholder and veterinarian discussion groups were recruited through a range of gatekeepers as well as through advertisement online and through snowball sampling. Farmer discussion groups were recruited from an existing Northern Irish industry programme, College of Agriculture, Food and Rural Enterprise's (CAFRE) Business Development Groups (BDG) (CAFRE, 2014) and in addition to the farmer members, the BDG coordinator for that group also participated in the discussions.

Interviews were undertaken with 27 farmers, and 15 veterinarians between July 2021 and July 2022. A semi-structured approach to interviewing was adopted and a standardised interview guide was

prepared and piloted (Appendix S1). Initial interviews were conducted face-to-face, but COVID regulations (DoH, 2020) in the autumn and winter of 2021 restricted face-to-face meetings, and internet video calls (Zoom Meetings, 2020) were subsequently used for interviews until restrictions ended, after which participants were offered the choice of face-to-face or internet video call.

Discussion groups were held between June 2022 and February 2023 and involved 178 farmers in 13 groups; 12 veterinarians in two discussion groups; and a final discussion group comprising of eight farming representatives (discussion guide available as Appendix S2).

Following a brief explanation of the overall programme of research and assurances of confidentiality, consent was sought and received for electronic audio recording (Olympus VN-713PC handheld digital recorder) of all interviews and 10 of the discussion groups. Contemporaneous written notes were made during the remaining discussion groups as well as for the three interview participants (all farmers) who declined consent for electronic recording of their interview. All recorded interviews and discussions were transcribed in full and coded following further re-reading of the transcripts utilising Nvivo 10 (QSR International Pty Ltd, 2020). A grounded theory approach was taken to coding the transcripts (Lingard et al., 2008), with themes being developed inductively from the data. Following initial coding of the interviews, segments pertinent to themes addressing FHPs, FH planning and QASs were further analysed and exemplar quotes were identified. Exemplar quotes from the survey are prefixed S; those from interviews of sheep farmers SF; veterinarians, V and those originating from discussion groups DG. Each prefix is followed by a unique participant, or discussion group, identifier. Additional quotes, which parallel the results below, are presented in Appendix S3 to provide greater insight.

## 3 | RESULTS

### 3.1 | Questionnaire

One hundred and twenty-two valid questionnaires were retrieved from the online platform and analysed. The demographic details of the respondents have previously been published and demonstrated an ageing, predominantly male sheep farming sector in NI (Crawford et al., 2022). Preventative flock health responses are summarised in Table 2 and 72 (64%) respondents indicated they had an FHP which they referred to and used regularly. The only behaviour that was statistically linked to having an FHP was the response to the question 'Do you inject all sheep with footrot using long-acting antibiotic?' however, the association was negative (Fisher's exact;  $p < .001$ ), that is those with an FHP were less likely to use long-acting systemic antibiotic therapy to manage foot rot than those without an FHP. One farmer commented how he had recently modified his lameness management:

S30: I used to be more hands on, but I tend to leave them to it now. I used to turn all ewes and routinely

**TABLE 2** Basic demographic information about the Northern Irish sheep farmer and veterinary participants in the interviews and discussion groups investigating medicine use in Northern Irish sheep flocks.

Data source		Female	Male
Questionnaire (n = 122)		14 (11%)	104 (85%)
Interview	Veterinarian (n = 15)	4 (27%)	11 (73%)
	Farmer (n = 27)	2 (7%)	25 (93%)
	Industry stakeholder (n = 13)	3 (23%)	10 (77%)
Discussion groups	Veterinarian (2 groups)	6 (43%)	8 (57%)
	Farmer (13 groups)	7 (4%)	171 (96%)
	Industry stakeholders (3 groups)	4 (27%)	11 (73%)

pare feet but advice I have gleaned suggests it is as well to forget about clipping feet in the majority of cases.

In other free text questionnaire responses, farmers described a calendar-based approach to sheep health management, with certain tasks to be undertaken at set points throughout the year; they considered this to be their health plan. Farmers also expressed their self-reliance and belief in their ability to manage flock health without external interference:

S16: January is scanning time. February is worm and fluke dosing and preparing for lambing. February and March - Vaccinate (first and second doses) for toxoplasmosis [sic] and clostridial diseases. April and May is lambing. June and July we use a spray on for the prevention of fly strike. August to October we cull where necessary (any ewes not fit for breeding again). November 1st - rams go to the ewes.

S13: I look after my flock well and do what works. Years of experience. If I was to listen to my vet, he would put me out of business! All they want to do is sell you stuff.

S21: Not much I have not seen that can go wrong with sheep - I know when one is happy, and another is not.

## 3.2 | Interviews and discussion groups

### 3.2.1 | The participants

Farming participants in the interviews and discussion groups were predominantly male (Table 3) and drawn from a wide range of geographical locations throughout NI (Figure 1). Veterinarians' practices were also widely spread throughout NI (Figure 1) and a greater number of female than male veterinarians participated (Table 3). Veterinarians' experience ranged from one to over 30 years since graduation.

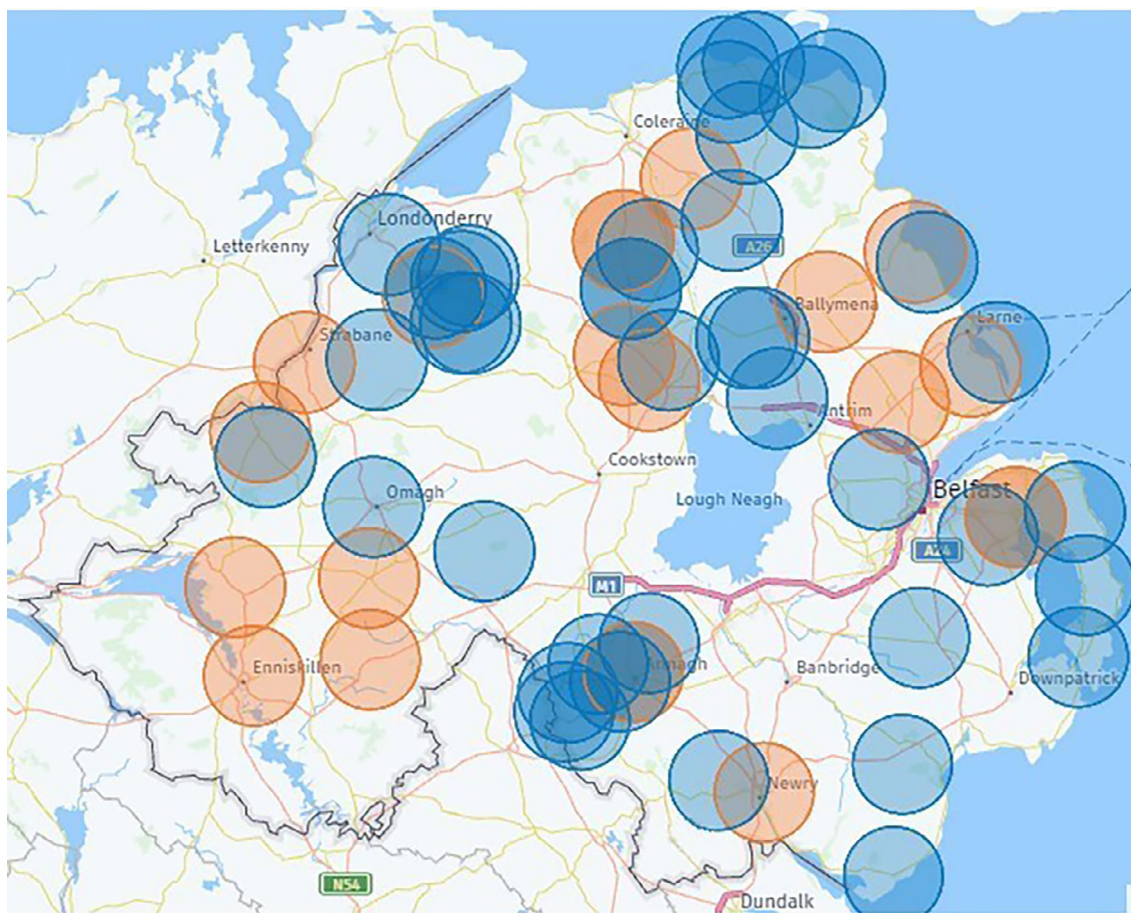
**TABLE 3** Responses from Northern Irish sheep farmers in a questionnaire asking questions about aspects of preventive healthcare measures they undertake in their flock.

	Yes	No
Do you test sheep to see if sheep scab is present in your flock? (n = 100)	2 (2%)	98 (98%)
Do you inject all sheep with footrot using long-acting antibiotic? (n = 99)	51 (52%)	48 (48%)
Do you routinely trim ( $\pm$ spray) the feet of sheep with footrot? (n = 113)	62 (55%)	51 (45%)
Do you routinely give lambs oral antibiotics at birth? (n = 107)	37 (35%)	70 (65%)
Do you inject ewes with antibiotics in the run up to lambing to prevent abortion? (n = 108)	23 (21%)	85 (79%)
Do you test faecal samples to decide when wormers should be used? (n = 114)	35 (31%)	79 (69%)
Do you test faecal samples to see if wormers are effective? (n = 109)	19 (17%)	90 (83%)
Do you vaccinate your flock against toxoplasmosis? (n = 94)	51 (54%)	43 (46%)
Do you vaccinate your flock against enzootic abortion in ewes (EAE)? (n = 97)	59 (61%)	38 (39%)
Do you vaccinate your flock against footrot? (n = 80)	26 (33%)	54 (67%)

## 3.3 | Summary

A wide range of opinions was elicited during the interviews and discussion. In general, farmers considered their health plan as a static document, an important condition to fulfil quality assurance audits; and a requirement to facilitate trading. Farmers did not see their FHP as impactful on their farming practice, and recognised that their record-keeping was often sub-optimal. Veterinarians saw potential in the concept of an ongoing interactive health planning process, but were hindered by poor farmer engagement, record-keeping and farmers' unwillingness to pay for such services. Some veterinarians expressed the opinion that they were too busy for this advisory work. Both parties agreed that further incentivisation to participate in FH planning and support to implement agreed plans would be beneficial, as currently little clear reward for their efforts could be demonstrated.





**FIGURE 1** Approximate locations of the farmers (blue), and the veterinary practices (orange) whose veterinarians, contributed to the interviews and discussion groups investigating medicine use in Northern Irish sheep flocks.

### 3.4 | Farmers' viewpoint

#### 3.4.1 | The plan: A physical document, a checklist, a requirement

Farmers and veterinarians expressed both negative and positive sentiments about FHPs and FH planning, with the majority of both linking the physical FHP with QASs and minimal reference to ongoing, reflective FH planning. The FHP was seen simply as part of the farm's requirements to achieve compliance with their QAS standards for audit purposes; a physical document, or a list of tasks. Revision of the FHP was seen, in most cases, as superficial, a process which they may or may not be actively engaged with, as outlined by the following comments:

V06: Farm Quality Assurance have started that thing where they give you this wee A4 sheet of paper – farmers have to get it filled in, and that is more coming down the line of heading towards a health plan, but it is not just a proper plan yet.

SF68: The flock health plan, the health plan as such is probably done for the Farm Quality Assurance. It is part of it now, so it has to be done.

SF62: We have a flock health plan. Whether I pay it a lot of attention to it is another thing. We sort of follow the flock plan our vet prepared for us. Not rigidly.

SF50: I had to bring it (*the FHP*) in to get the veterinarians to update it. That is part of the requirements now, brought in since my last inspection. You had to go and check through it annually.

SF66: Well, usually they (*the veterinarians*) would send it out. I would say I need a flock plan, need it updated and they will do it. Whether that is the right way or not, but it will get you through the Farm Quality Assurance.

SF33: I've probably done my revision to it every year with someone when I'm getting in my list of antibiotics.

All farmers who had an FHP, or were involved in some form of FH planning, were members of a QAS and no farmers who were outside QASs mentioned participating in FH planning. Positive comments about FH planning were obtained from a small number of farmers.

Some were willing to avail of additional services from their veterinarian to gain a better insight into their flock health, over and above an advisory consultation. There were specific points that farmers highlighted that their veterinarian had encouraged them to change, through the process of the development and revision of their FHP:

SF68: One of the younger veterinarians from my practice undertook my most recent review. He was leaning on me, trying to get me to stop using Spectam [spectinomycin 50 mg mL<sup>-1</sup> oral solution, CEVA] in my lambs.

SF69: Because we are part of a programme which obliged us to have a health plan, we have a really good one. We sat down with the vet and went over a year and came up with scenarios for every different situation. It was about trying to reduce your reliance on drugs, which kinds of flies in the face of what the vet wants, because he probably wants to sell us more drugs!

DGF14: The annual health review with the vet is time and money well spent, even if they don't find anything wrong when blood tests are done – it is time and money well spent knowing you are going in the right direction.

Not all farmers, however, saw a need for a written plan, content that following the same pattern year on year would suffice. They expressed the view that they already had the necessary knowledge in their head, although some also expressed interest in writing a plan. Others acknowledged that there might be benefits from having an actual plan of what to do throughout the year, even if this came with reservations:

SF63: There wouldn't really be a health plan to be honest. I suppose it's all in my head, if that makes sense.

SF29: I would be interested in sitting down at the start of the year and saying 'Right. This is what we need to do here.'

### 3.4.2 | On-farm records

Farmers were open in their appraisal of the deficiencies in their on-farm records, citing time constraints and workload for their failure to maintain accurate records of mortality, morbidity and medicine use. They also talked about their inability to extract information from the records they did maintain. During an interview, this was clearly demonstrated when a farmer struggled through his paperwork for over 2 min trying to identify the product used to dose ewes around lambing time. Veterinarians also highlighted this issue and its impact on their ability to deliver FH planning:

SF62: The Farm Quality Assurance book system has got all the information but is not the easiest to quickly extract stuff back out of at times.

V13: I don't think that there are that many farms that are keeping accurate records of what mortality and morbidity, such as lameness, they have in their sheep.

V17: Data was scarce to be honest with you. It was just him recalling what he could remember. They don't record a lot of the mortality, certainly men [sic] around here anyway. If you ask him, it is just 'Oh I've x amount died,' but sure, it is just a guess really! Or 'X amount had scour or whatever, you know.' I don't think they really keep that much in the line of records really.

## 3.5 | Veterinarians' viewpoints

Veterinarians overall were positive about the potential that FHPs and, in particular, FH planning, offered their clients. They recognised that there were important topics to raise with sheep farmers and that some farmers were open to a discussion about the content of their FHP during reviews. However, they also were quick to identify problems with the current level of engagement from their sheep farming clients in the process, their willingness to pay a reasonable fee for such advisory work and even the veterinarians having sufficient time to deliver the work:

V13: With the annual review of the FHP and use of antibiotics you have good subjects to talk about. You could talk about watery mouth management, lameness management, vaccinations for abortion and anthelmintics, and they are very real issues there that the industry are facing. There needs to be more guidance to farmers on these topics.

V02: A lot of farmers just want to come in and hand you the piece of paper and walk away with it [signed], without doing all the paperwork.

There are a lot of our sheep farmers where we're not even ever on their farms.

V07: Quite honestly, farmers hand them in the day before they need them saying 'I need this done' and we do a fairly generic one usually.

V20: Veterinarians haven't the time to do that and being able to charge for it is another problem. We haven't time to do sheep.



DGV02: It is difficult to get any sort of fee for it. We do charge a fee, but, as others say, it is very nominal. You go through their records, and you try to engage them, [but they are] not really up to engagement very often, the farmer responds that they have to have this for tomorrow or next week. So, no time to have a detailed conversation now. Or they leave it in the clinic and say, 'I'll lift [collect] that on Friday.'

### 3.6 | Advisory visits

Veterinarians who had experience working in countries other than NI identified that the work patterns in NI practices, with a significant reactive ('fire-brigade') caseload, made scheduling preventative and advisory work problematic:

DGV01: My practice would break down, because you just wouldn't get veterinarians to scheduled advisory visits, with the volume of emergency calls we have.

Both farmers and veterinarians mentioned the ongoing conversation throughout the year when the farmer presented an emergency case, such as a lambing or caesarean section. However, when asked to give details of the nature or frequency of the conversations, veterinarians indicated that most 'caesarean chats' were personal:

DGV01: They would just be chatting about what is going on in their life and your life rather than the actual medical stuff and flock side of it.

Farmers who advocated the importance of these discussions with their veterinarians, when pressed for specific details, indicated that they had only had one such visit, on average, per year. Another participant even suggested that, having a good relationship and getting to know your veterinarian well was a sign that there must be problems with a farm's management [you were having to contact the veterinarian too frequently].

Another barrier to engagement with FH planning identified by veterinarians during a discussion group was the fear some farmers had about documenting on-farm health problems in case it was seen at some point by state officials and used against them:

DGV01: Farmers discuss their problems with us, we tell them what to do or discuss what we think what we could be doing or how to do this. But the idea of writing it down scares them. That list of problems is something the state agriculture department might see. It creates a documented record that some things are not perfect on the farm.

### 3.7 | Incentivising FH planning and its implementation

Two schemes were mentioned by veterinarians and farmers where, in the past, FHPs had been specifically promoted and incentivised. The first scheme brought a specialist sheep veterinarian to each farm alongside the farm's regular veterinarian, and included follow-up visits over a 3-year period. The second, linked to CAFRE's Business Development Groups (BDGs), included the funding of an initial veterinary visit, from the farmer's own veterinarian only, and the creation of a flock-specific HP utilising a pre-prepared template, but no follow-up visits.

V07: It was actually astounding what we discovered about our clients and what they discovered about us when we had two or three hours to spend with them and somebody else was paying [for it]. And certainly, we got a lot from it, and the clients definitely got a lot from it, because there were some things that people who we thought were top-class outfits were doing very badly, things that we were able to correct quite easily.

However, farmers and veterinarians both indicated that these schemes had failed to transition from the creation of an initial FHP to an ongoing process of FH planning. Veterinarians, in particular, reported that the delivery of the BDG-linked scheme was suboptimal, as they were required to complete farm visits and FHPs during a short window in the early spring, which they identified as their busiest season:

DGV01: Even when the BDGs made you go out and do the FHPs they just wanted to get them done quickly. They squeezed them in, but it seemed to fall at a bad time of year. They wanted it all done by 31st March. I remember literally lambing a sheep on the farm while trying to remember what I needed to fill in in the paperwork when I left. And the farmer was asking 'What was the point in that?' It was rushed, just put something down. We ended up on Google Earth doing the maps because we were not supplied with farm maps. It was just terrible timing. It was just a one off, we were not paid to go back and do any follow-up.

There was little enthusiasm from the farmers about the benefit of the FHPs generated by this scheme, despite BDG co-ordinators feeling that all their group members would have a good plan. Farmers stated that there was no significant review of their FHPs as part of the ongoing programme, nor of their implementation. Farmers indicated how there needed to be an implementation plan as well as the written FHP.

### 3.8 | Incentivisation

All those participating in interviews and discussion groups recognised the lack of incentives for farmers to become more engaged in a FH planning process. Even those who saw the FHP as essential to QAS highlighted that when the FQAS-NI was launched, there was a financial benefit to participation, but that bonus had been withdrawn, and it was difficult to clearly demonstrate any tangible benefits to farmers:

SF72: I joined the FQAS nearly at the beginning. It was only a box-ticking exercise. But I was seeing no financial benefit because my lambs all are weighed, and I am paid for them there and then. So, I have resigned from the scheme.

DGV01: Back when the FQAS started, it was meant to be a carrot for rewarding things being done better, rather than a stick for hitting them with for not having their paperwork up to date. There is no carrot in it now, it is a stick. A necessary evil.

In both interviews and discussion with farmers and veterinarians, there was a specific suggestion that helping farmers appreciate the financial costs of disease might focus farmers' minds on the benefits of a preventative approach:

V06: I do feel, if you put the cost of treatment and management issues in money terms to them, it starts making them understand, maybe we should do something different.

## 4 | DISCUSSION

Lowe (2009) suggested that a preventative approach to veterinary care would provide attractive work for UK veterinarians, which would generate income for both the practice and their farming clients. However, for the majority of sheep farmers participating in this study, current FHPs and FH planning are failing to deliver the proactive, collaborative and preventative FH planning envisaged. This is despite years of policy research and direction that have suggested this should be the roadmap to improving sheep health and welfare (Woods, 2011).

Others have observed that some farmers assume the FHP is just a list of vaccinations and anti-parasite treatments (Atkinson & Neale, 2008), rather than a comprehensive and dynamic action plan for continually improving the health and welfare of the flock. While these regular management steps are important (Lovatt, 2004; Sibley, 2000), this 'list mindset' may have inadvertently been reinforced in NI by the FQAS-NI's flock health template. The template consists of one-third of a side of A4 paper per flock per year. There are columns for calendar month and rows with titles such as 'Clostridia vaccination', 'Check/treat Lameness' and 'Round Worms' for

the farmer and their veterinarian to indicate when such health measures should be undertaken (LMC, 2018). Further, there is an association in the mind of farmers between the FHP, QASs and the importance of having a physical document filed away for audit purposes. This suggests that NI sheep farmers focus on the FHP, and its review, as an obligation for regulatory purposes, as has been noted elsewhere (Escobar & Demeritt, 2017; Hubbard et al., 2007). Veterinarians also identified this attitude in their clients. The lack of association between the presence of an FHP and a range of sector recommended preventative behaviours in the questionnaire responses further reflect this lack of impact. This echoes previous observations that FHP/FH planning is still failing to have a significant impact within the sheep sector (Bellet et al., 2015; Lovatt, 2015). It is difficult to explain the apparent paradox, whereby farmers with a FQAS FHP do not promptly treat sheep suffering from infectious lameness, by administering parenteral long-acting antibiotics; an issue with an FHP would highlight current best practice.

Veterinarian participants here identified limited, meaningful contact with sheep farmers as a major barrier to better FH planning. They considered the QAS annual review of the FHP as an opportunity to engage with farmers on preventative health matters. However, only half of sheep flocks in NI are linked to a QAS-driven FHP review, and veterinarians described how these reviews were often brief, superficial and tended to focus on the farmer's beef enterprise.

Farmers and veterinarians participating in this study highlighted a range of economic considerations related to FP planning and QASs. Principal among these was the failure of these schemes to deliver the promised compensatory price premium. Small numbers of farmers indicated they had chosen to leave QASs as they found them burdensome and/or without financial reward. Further, most veterinarians reported being unable to receive sufficient remuneration for this work, and others stated they simply didn't have time for sheep work. This is particularly pertinent given the current economic state of sheep farming in NI, where gross margins are small, and linked to low output per ewe (DAERA, 2023c). It may be that many of these flocks with low output could benefit most from proactive FH planning; however, they are worst placed, financially, to invest in the professional fees, vaccine and equipment that might benefit them in the long run. This phenomenon whereby the least able cannot afford the investments needed to improve their lot and generate sustainability in the long-term has been recognised in the 'Boots Theory' of socio-economic unfairness (Pratchett, 1993). Further, participation in QASs created a cost burden to sheep farmers which has been previously identified (Smalley, 2023) and was also identified by farmers participating in this study. These are therefore ongoing and multi-national barriers to QAS growth and adoption of FH planning. This conflict can only be resolved through improved financial returns to farmers, either through the marketplace or through state support – 'public money for public goods' (Smalley, 2023). QAS managers and owners may need to consider the role and emphasis they place on the FHP and on developing an FH planning mindset as farmers and veterinarians have failed to adopt continuous and tailored improvement FH planning in response to changing on-farm conditions.

Positively, veterinarians identified specific areas such as vaccination to prevent infectious abortion, improved lameness control and reduced use of prophylactic oral antibiotics in neonatal lambs, which they chose to target during reviews to improve farmer medicine stewardship and flock health. These areas aligned with industry recommendations to improve welfare and reduce antibiotic use in sheep (RUMA, 2021). Farmers too mentioned in interviews and discussion groups that these had been specific examples of where veterinarians had been making recommendations, and some had partially or fully adopted these recommendations. Therefore, veterinarians in NI who are focused on sheep preventative medicine are creating an awareness of key AMS (antimicrobial stewardship) intervention points with the limited number of farmers that they engage with. This parallels the recently demonstrated ability of veterinarians to influence the provision of analgesia for sheep (Crawford et al., 2023).

Alongside limited contact with sheep farmers, veterinarians also identified a lack of authoritative on-farm data as a significant barrier to delivering FH planning. Both these findings echo earlier work in England and Wales, suggesting both that the issues faced by veterinarians in NI are not unique and there has not been substantive, widespread progress in the past decade (Atkinson & Neale, 2008; Bellet et al., 2015).

Potential reasons for the failure of the NI sheep farmers and their veterinarians to progress from a static FHP to FH planning may include limited motivation, opportunity, or capability (Michie et al., 2011). The FH planning process should involve both the identification of areas that require further focus as well as an agreed-upon plan to implement the proposed changes. Failure to centre this process on the farmers' needs and abilities may weaken the farmer's sense of ownership of, and motivation for, the proposed changes in flock management. This risks the failure of implementation of the proposed changes or jeopardises the sustainability of the change (Bell et al., 2009; Clark et al., 2001; Ritter et al., 2017; Speksnijder et al., 2017). However, in most interviews and discussions with both veterinarians and farmers, it appears that veterinarians were dictating the conversation and promoting their own areas of concern rather than actively seeking the farmers' concerns (Escobar & Demeritt, 2017), suggesting veterinarians may benefit from developing relevant communication skills and strategies to focus such advisory visits on farmer needs and not solely on their expert viewpoint of the farm's needs (Hamilton, 2018).

Furthermore, as farmers here called for not just a plan but assistance in implementation, it is possible that even the FHPs that have been agreed on are not being implemented consistently, and as such represent a partial wasting of professional resources engaged in their development (Hamilton, 2018; Smalley, 2023). Any implementation plan should include some form of target-setting or monitoring to assess effectiveness, or the reasons for a failure (Clark et al., 2001; Lovatt, 2004; Sibley, 2000).

Previously, it has been recognised that aspects of welfare may not always be optimised in a health focused FHP (Hubbard et al., 2007; Sørensen et al., 2001). The required in-depth vet–farmer understanding cannot be achieved by an FHP being developed or

reviewed in the cursory off-farm manner, at times without any veterinary–farmer consultation, as described by many of the participants of this study. Veterinarians explained how these consultations brought into clear focus the specific, individual needs of the flock, permitting them to see livestock, their housing and other facilities in situ (Selle et al., 2014), as well as observation of the technical husbandry skills of the farmer (Hall et al., 2022), thus reinforcing the centrality of such interaction in the FH planning process (Bellet et al., 2015; Lovatt, 2004, 2015; Noble et al., 2020; Sibley, 2000; Walster, 2012). Thus, the on-farm consultation should enhance the veterinarian's ability to assess both health and welfare, addressing the concerns that welfare may be overlooked (Hubbard et al., 2007). Veterinarians also reported that during such consultations they identified specific areas of practice they had previously been unaware of, but were able to simply remedy.

The annual review, while recognised here as being of some benefit, may not deliver the frequency of focused interactions required to develop the continuous improvement mindset and skills for reflective FH planning (Clark et al., 2001). Further, it has previously been suggested that it can take longer than 12 months for a farmer to appreciate the positive benefits of a proactive approach to health planning (Osmond, 2009). Farmers may therefore need repeated exposure, more frequently than once a year, to the reflective planning process, with implementation support (Smalley, 2023) over an extended period of time (Clark et al., 2001). This might then allow them to see that their FHP should not be considered a static document but part of a process that can deliver positive change in their farm (Clark et al., 2001; Escobar & Demeritt, 2017; Selle et al., 2014; Speksnijder et al., 2017).

However, having frequent reviews with a veterinarian, on an individual farm basis, may be prohibitively expensive in light of the current economic situation on most NI sheep farms (DAERA, 2023b), especially when coupled with farmers' reluctance to pay for advisory services as found here. Regardless of economic considerations, an enhanced frequency of veterinary involvement in FH planning may be impossible to resource because of the workforce limitations identified by veterinarians. This staffing issue was also borne out in farmer discussions, where in some areas they reported struggling to engage a vet at all, never mind one with an interest in sheep. Further work is required to quantify the size of the deficit in the veterinary workforce, leading to this inability to service the needs of the sheep sector in a manner that is financially viable to both parties. This may require the state and industry to develop business models to address these deficits, particularly in light of proposals in England and elsewhere to make extended on-farm advisory visits part of future farm support measures (DEFRA, 2022). The high proportion of sheep farmers in NI who also work off farm during traditional opening hours of veterinary practices will further serve to complicate delivery of advisory consultations.

As there was no funding for follow-up visits in the CAFRE BDG programme, veterinarians felt this was an opportunity lost to progress the relationships they were beginning to forge with the programme farmers. This programme also brought small groups of sheep farmers

and advisors together bi-monthly and could act as a familiar model for developing small, problem-specific, goal-focused groups of farmers wishing to embark on FH planning with professional advisors in a more resource-effective manner, as has proved effective in other agricultural settings (Clark et al., 2001; Vaarst et al., 2007). Such sheep-specific discussion groups, focused around a veterinary practice, have proven beneficial in other regions (Noble et al., 2020).

Given the low level of recorded data on many farms identified during this study, flexible, novel and creative approaches may need to be developed, in consultation with farmers, to identify what data they are willing and able to gather before any FHP review. Data collection could form an initial target of the FH planning process as others have recommended (Clark et al., 2001). The suggestion made for future farm support measures in Scotland, to incorporate an element of data and knowledge exchange into requirements to access maximal financial support (Park, 2022), may be one avenue to address this. Although any records generated may not be sufficiently comparable between farms unless a validated scoring system or independent observer is used, such as that which has been developed for cattle mobility scoring (Bell & Huxley, 2009). But it is anticipated that the records may act as an internal reference for farm improvement (Dobbs, 2005), potentially stimulating greater involvement in data collection and benchmarking as farmers see the benefits of, and develop and hone, these skills (Clark et al., 2001).

There is now additional focus on farming due to the increased focus on ensuring optimal efficiency of farmed livestock, to mitigate the negative environmental effects associated with their rearing. Before additional schemes are implemented to address these environmental concerns, an effective mechanism must be developed to identify and facilitate the changes in farming practice needed (Sargison, 2020). As such, lessons should be learnt from previous iterations of FH planning before new schemes are promoted to address environmental concerns.

Finally, the observation that farmers may need a disaster to prompt them to seek help is a significant challenge for the industry to address. This attitude has been identified recently in NI farmers' attitudes to human health and safety risk taking (Rouse, 2022) as well as in sheep farmers' behaviour elsewhere (Bellet et al., 2015), suggesting that a wider, international, cross-industry process, to change fundamental and persistent attitudes and behaviours may prevent multiple sectors attempting to understand and address related issues independently. However, despite this, the situation is not without hope, as there is evidence here and elsewhere that considerable progress can be made in changing attitudes and farmer behaviour towards adopting FH planning where the desire in both farmers and their veterinarians exists, particularly when incentives and tools are provided (Sibley, 2000).

#### 4.1 | Limitations

Any study focused on voluntary participation has the inherent risk of bias. The significant numbers of farmers and veterinarians engaged

through the questionnaire, interviews and discussion groups attempt to minimise such risks and help to triangulate the findings. Additionally, as the interviews and discussion groups covered a wide range of medicine-related topics, some participants may not have had the full opportunity to explore and express all their beliefs and behaviours relating to FHPs and FH planning. To tackle this potential problem, semi-structured interview guides were used, and each interview, or discussion group, rounded off with the opportunity for participants to expand on any topic or add further topics or information they felt appropriate.

## 5 | CONCLUSION

New solutions and processes need to be found to engage sheep farmers, and their veterinarians, in a reflective process of continual flock improvement. This is especially true for the predominantly extensive, data-poor flocks, often managed by part-time farmers, found in the NI sheep sector.

The advent of QAs may have unintentionally changed the focus from improvement of sheep health and welfare, to the fulfilment of externally imposed requirements. This has led to a narrow focus on the physical health plan *document* rather than the health *planning process* and its outcomes. Developing new terminology and messaging, to clearly separate these different elements in the mind of farmers and veterinarians, may be beneficial. This should help prevent a farmer, on hearing about FH planning, thinking of their FHP and saying either 'Got one' or 'Tried that, didn't work.'

Veterinarians have the potential to positively impact the preventative healthcare of their clients' flocks. However, a solution needs to be developed that incorporates a sustainable funding mechanism, and also sufficient suitably skilled veterinary workforce for this work. This support could be tied to mandatory data collection and sharing, to provide proof of the benefits of the process through benchmarking progress on individual farms and between farms. Additionally, these data can act as a public good, informing ongoing national policymaking on wider aspects of the health of the national flock and food provenance. Consideration will need to be given to how the costs of funding such work can be shared between the state and the full length of the supply chain, including consumers.

Finally, policymakers and industry leaders need to be cognisant that farmers are not a homogenous population, and the same incentive will not equally motivate all farmers, nor will the same processes or arguments engage all farmers. As the sheep sector in NI currently lacks the depth of production data other sectors have worked hard to collate, FH planning approaches in the NI sheep sector could be more targeted at farmers that are keen to engage, but with flexibility to adapt to the interests of all farmers, regardless of the availability of records at the outset.

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### CONFLICT OF INTEREST STATEMENT

PR is member of the Editorial Board of *Annals of Applied Biology*. The remaining authors declare they have no conflicts of interest.

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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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