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Veterinary herd health management—Experiences and perceptions among Swedish dairy cattle veterinarians

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ABSTRACT

Cattle veterinarians have long been encouraged to take on a role as proactive health consultants. However, the process so far has been slow in Sweden and elsewhere, and only a rather small proportion of cattle work conducted by veterinarians involves veterinary herd health management (VHHM). The aims of this exploratory study were to explore Swedish cattle veterinarians' interpretation of VHHM services and to understand the factors that might affect the extent to which cattle veterinarians perform VHHM. Six focus group discussions with cattle veterinarians complemented with 5 individual telephone interviews with clinic managers were conducted in 2020. In total, 33 cattle veterinarians participated, all employed by the largest employer of Swedish cattle veterinarians: Distriktsveterinärerna (Swedish Board of Agriculture). Participants were chosen from 6 geographical regions with the aim to present variations in gender, age, country of education, proportion of dairy cattle work at the clinic, experience in the veterinary profession, and experience in work with dairy herds and in VHHM. The focus group discussions and interviews were recorded and these recordings were transcribed and analyzed thematically. Participants interpreted VHHM as work associated with the process of advising and included both ad hoc advising and more strategic forms of services. Prebooked visits per se were not seen as VHHM. We identified 4 different themes among the factors affecting the extent of VHHM services: (1) farmer *trust and demand*; (2) veterinary *competence*; (3) *time* available for VHHM*;* and (4) the individual veterinarian's *commitment and motivation.* To gain farmers' trust and to create a demand for VHHM services, the results of VHHM work and the veterinarian's competence were deemed central by the participants. The veterinarians' skills in communication and relation building were considered especially important. Some farmers were perceived as having little interest in, or lacking deeper knowledge about, VHHM services. The promotion of VHHM services was mentioned as an important factor to increase farmer demand. Participants described VHHM as work demanding high skills and continuous capacity development. Veterinarians' personal commitment and motivation were also described as important for the extent to which VHHM services were performed. This was in turn affected by the psychosocial work environment (e.g., workload, interest and recognition from farmers and managers, and acceptance, priority, and support by colleagues and managers). Clinic managers had a central role in the extent to which VHHM services are offered by an individual veterinarian due to their responsibility for staff scheduling, which highly affects the conditions for capacity development, intercollegiate networking, and cooperation. Lack of time was a major barrier for VHHM. On-call duty time and subsequent compensatory leave affected the total time available, and participants described time conflicts between VHHM and emergency services; moreover, it was perceived as challenging to find sufficient time for capacity development in several different species for veterinarians working in mixed practice. The slow development toward more proactive approaches for cattle veterinarians can be explained by the numerous different factors that together constrain the veterinarian to the traditional role of diagnosing and treating sick animals.

Key words: herd health management, dairy cattle, qualitative research, veterinarians' perceptions

INTRODUCTION

Nowadays, veterinarians play a key role in supporting dairy farmers in their preventive efforts; in fact, farmers consider the veterinarian to be their main advisor in animal health (Espetvedt et al., 2013; Pothmann et al., 2014). Cattle veterinarians are increasingly taking the role of a herd health advisor, thereby improving animal

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health and welfare, productivity, and, as a consequence, sustainability. However, the process has hitherto been slow, at least in Sweden and in United Kingdom (Hall and Wapenaar, 2012). To support further improvements in animal health, welfare, productivity, and sustainability, it is important that veterinarians continue to increase their engagement in veterinary herd health management (**VHHM**).

In June 2021, the Swedish dairy cattle industry included 3,000 dairy cattle enterprises with an average herd size of 102 cows; specifically, 46% of the enterprises had ≥75 cows and 10% had ≥200 cows (Swedish Board of Agriculture, 2021). In 2020, 2,147 of the Swedish dairy cattle herds were affiliated to the National Milk Recording Scheme; these affiliated herds had an average herd size of 94 cows and the average milk production was 10,700 kg of ECM. (Växa Sverige, 2021). Most Swedish dairy enterprises are family businesses and their revenues are mainly derived from milk production, although some enterprises combine incomes from dairy production and related activities such as forestry, contracting, or tourism (Swedish Board of Agriculture, 2020). Swedish veterinarians have reported a low demand for VHHM from dairy farmers (Rawley, 2015). However, a study investigating experiences and attitudes of Swedish dairy farmers toward VHHM reported that the farmers indeed see a need for support in herd health management (Svensson et al., 2018). Farmers, however, may not always find veterinarians to be logical partners in this work; for example, some farmers identified many obstacles to hiring a veterinarian for VHHM such as veterinarians' poor knowledge of VHHM methodologies (Svensson et al., 2018). Veterinarians are traditionally called out by farmers for treatment of sick animals; however, Svensson et al. (2018) found that Swedish farmers expected VHHM to be initiated mainly by veterinarians and that an experienced lack of autonomy in decision-making was another reason for them to not engage a veterinarian in VHHM. Farmers also reported veterinarians as having poor knowledge of practical farm routines and farm economy, which affected the perceived usefulness of veterinarians' advice (Svensson et al., 2018).

In Sweden, cattle veterinarians are mainly employed by large organizations, although private practitioners dominate in certain regions. The largest employer of cattle veterinarians in Sweden is the Swedish Board of Agriculture (Distriktsveterinärerna; **Dv**). The Dv runs approximately 60 clinics across Sweden and has approximately 350 veterinarians employed, out of which approximately 50 work mainly with cattle. Assignments are regulated in a parliament ordinance (Swedish Parliament, 2019) that states Dv should provide veterinary health care services to production animals on all days of the year and at all times of day. The organization should also deliver veterinary services at the primary care level (with limited equipment and without possibility for inpatient care) to small animals and horses. In sparsely populated areas, veterinary service that goes beyond the primary care level is allowed for small animals and horses. The Dv provides all types of services to dairy cattle farms, including VHHM and other herd-level services such as biosecurity programs and fertility and udder health services. The second largest employers of Swedish cattle veterinarians are regional dairy associations; across Sweden, these associations employ approximately 30 veterinarians who work only with cattle and mainly with general VHHM services, the types of herd-level services mentioned above, but may also offer prebooked treatment visits. The regional dairy associations do not provide on-call duty services. During the past 5 years, the number of self-employed cattle practitioners has increased in Sweden, and in 2019, there were 56 self-employed dairy cattle veterinarians participating in the main VHHM network. The services provided by self-employed cattle practitioners vary; specifically, most offer diagnosis and treatment of sick cattle and many also provide treatment services regarding other farm animals, horses, and small animals (mixed practice clinic). A few self-employed cattle practitioners also provide 24-h on-call duty services. Their engagement in VHHM varies. In some regions of Sweden, there is competition among veterinarians. Some farms, however, engage both veterinarians employed by the regional dairy association and Dv or a self-employed cattle practitioner.

It is expected that the assignments of these organizations would affect employees' work tasks. Veterinarians from regional dairy associations, which historically have not provided veterinary treatment of acutely sick animals, are likely to perform more VHHM services in cattle herds compared with veterinarians who also provide acute treatments. The extent of VHHM services provided is likely to be affected by the interests, competency, and perceptions of the individual veterinarian. The extent of such services also depends on how VHHM is defined. Svensson et al. (2018) reported that Swedish dairy farmers had difficulties in providing a clear definition of preventive veterinary services. Furthermore, dairy cow densities in Sweden vary considerably between regions from 0 to 7 cows per kilometer^2. Therefore, the proportion of services offered to dairy cattle in a mixed practice clinic varies.

The aims of this exploratory study were (1) to explore the interpretation of VHHM services by Swedish cattle veterinarians at mixed species clinics and (2) to understand factors that might affect the extent to which such cattle veterinarians perform VHHM.

MATERIALS AND METHODS

We used a qualitative design with focus group discussions (**FGD**) with dairy cattle veterinarians. The FGD were complemented with individual interviews with veterinarians in managerial positions. Each participant joined one FGD or interview. Each FGD was carried out in a meeting room arranged for this purpose, except for one FGD that was organized digitally (Microsoft Teams) with each participant joining from a separate screen (due to biosecurity reasons related to COVID-19). The individual interviews were carried out via telephone to the veterinarian's workplace due to long distances. The FGD and individual interviews were recorded using dictation machines.

Swedish law (Swedish Parliament, 2003) states that research involving human subjects should be reviewed by a regional ethical board if the study collects sensitive personal data according to the EU data protection regulation (European Parliament, 2016) or personal data about violations of the law. Sensitive personal data are defined as data about racial or ethnic origin, political opinions, religious or philosophical beliefs, trade-union membership, health, sexual life or sexual orientation, genetic data, and biometric data, processed solely to identify a human being. Because no such data were collected in the present study, it was not subjected to an ethical review. Participation in the study was voluntary and informed consent was provided for all participants before the start of the FGD and individual interviews. No information regarding consent, veterinarians who declined, or those who eventually participated was fed back to the persons who suggested participants for the study (including the second author). Participant information was anonymized in the data management process. The second author (who was from the same organization as the interviewees) only had access to anonymized data.

Study Team

The study team consisted of 2 veterinarian researchers in cattle medicine (CS, HL) and one researcher in social sciences (SK). All researchers were women, had PhDs, and had experience in focus group interview methods. The 2 veterinarians both had long experience of practical VHHM. The social science researcher had more extensive experience in various interview techniques and in qualitative analyses, especially in behavioral studies. HL was a large animal practitioner at Dv, colleague with all participants, and part of the Dv cattle managerial team, whereas CS and SK were senior university researchers.

Selection of Veterinarians

We contacted Dv as the largest employer of Swedish cattle veterinarians working in mixed species practices and providing acute veterinary services, as well as VHHM. Another reason for using only Dv veterinarians was that we conducted the study within a mobility project involving the Swedish University of Agricultural Sciences, therefore Dv and our funding only applied to activities within those 2 organizations.

For the FGD, Dv identified 6 geographical regions where groups of 4 to 6 cattle veterinarians could easily gather and provide contact information to their cattle veterinarians in these regions. We aimed for a large variation of veterinarians to capture different experiences, attitudes, and opinions on VHHM when recruiting participants for the FGD. We therefore sought to invite persons of different gender, age, work experience (including extent of VHHM service in their work), and country of education, and we were helped in this effort by the cattle managerial team at Dv. Additional sampling criteria included the ability to participate in a FGD in Swedish on a specific date and time and willingness to share one's own experiences, thoughts, and opinions. The sampling process continued until a minimum of 5 veterinarians in the same region had fulfilled the criteria and had provided their informed consent. One person did not join the FGD due to illness and another person did not attend because of service to an acutely diseased cow.

We avoided mixing veterinarians with and without managerial positions in the FGD, as fear of negative reactions from a superior may cause a person to give a response that does not align with their true attitudes, beliefs, thoughts, or behaviors (response bias). Veterinarians with a managerial position were therefore interviewed individually. To allow for a large variation, the Dv cattle managerial team suggested clinic managers from clinics with different proportions of cattle services and with different experiences in working with cattle. Inclusion of new respondents continued until saturation was achieved in the interviews.

No information regarding consent, veterinarians who declined, or those who eventually participated was fed back to the Dv cattle managerial team or to HL in the study team. Participants in the FGD were offered reimbursement for travel costs as well as free coffee and lunch, and Dv agreed to cover salary costs for the time spent by all interviewees.

The participants received an invitation email in which the purpose of the study and its methodology were described, clarifying that we were not looking for right or wrong answers, but rather sought to explore the diversity of perceptions and opinions. The partici-

pants were also informed that the interviews would be recorded.

Data Collection

Focus Group Discussions. All FGD were facilitated by the first author and followed the same format. The last author was also present (due to biosecurity reasons, she joined digitally in one FGD) and took notes during the discussions. No other persons in addition to the 2 researchers and the participants were present during the FGD. The participants were welcomed and introduced to the purpose and format of the FGD. They were informed that the recordings would be transcribed and that transcripts and notes would be anonymized before they would be accessed by the second author, HL. Participants were also informed that the material when analyzed would be reported at the group level or by anonymized quotes.

Interviews started with a round of introductions where the researchers (CS, SK) presented themselves and their research interests. CS declared her interest in methodology in VHHM and SK described her previous study on farmers' decision-making in mastitis prevention that participants might have heard about or participated in. Some of the participants had met CS in a previous study, as a teacher during their veterinary education and as a fellow veterinarian. The participants were asked to describe what they particularly liked about their job. Participants were then asked to share their thoughts and opinions and to discuss the issues raised by the facilitator. For all FGD, the following questions were raised:

(1a) According to your personal opinion, what are your main work tasks?
(1b) According to your personal opinion, what are your main work tasks in dairy herds?
(2) Which of the work tasks that you and other veterinarians (within as well as outside your own organization) perform in dairy herds would you classify as being preventive (VHHM)?
(3) Considering different categories of veterinarians, who should, in your opinion, perform VHMM services? Why do you think this should be the case?
(4) What are your views about the extent of VHHM services in dairy herds in your work as of today and how do you think it **should be** in the future? Why do you think this extent is suitable for your future work? How do you think the extent of VHHM services **will be** in the future as compared with today?
(5) What are the obstacles/challenges for yourself and your colleagues to achieve this future extent of services?
(6) What do you think are the success factors for veterinarians who perform a lot of VHHM services today?
(7) What would motivate you and your colleagues to perform more VHHM services?

The interview guide was developed jointly by the 3 authors based on their experience and tested within the research team, and questions were also discussed with another member of the Dv managerial team, but were not pilot tested on other veterinarians before the FGD or interviews. Each FGD lasted approximately 1.5 to 2 h, and before concluding, the participants were invited to add additional aspects about VHHM to the discussion.

Individual Interviews. All interviews lasted between 30 min and 1.5 h and were carried out by the first author (CS) who took notes. Interviews were all carried out after the first FGD had taken place, followed a similar procedure, and used the same questions as in the FGD. However, for question 4, the interviewees were asked to respond from their perspective as clinic manager and for question 5, they were asked to mention what role they believed the clinic manager should have to further develop VHHM work at their own clinic.

Participant Characteristics. Data on participants' backgrounds were collected in conjunction with the FGD and individual interviews. The participants were asked to complete a 1-page questionnaire gathering data on gender, year of birth and graduation, country of education, and estimated number of years they had been working with dairy cows and with VHHM. They were also asked to estimate the proportion of their work, expressed as percentage of a full-time employment, that they devoted to VHHM and the proportion of cattle services in relation to service with other species at their clinic.

Data Analysis

Focus Group Discussions and Individual Interviews. The interviews were transcribed and imported into NVivo 11 (QSR International). Transcripts were not returned to participants for comments. All data relating to the first aim (exploring the interpretation of VHHM services) were compiled and aggregated based on a specific mentioning of VHHM. For the rest of the data, the aim was to find the core in relation to the topic being investigated and to un-

cover this core with sufficient context, as suggested by Alvesson and Sköldberg (2000) and it was therefore analyzed thematically; codes were established concerning the different goals being pursued. This was carried out in an inductive analysis process where the first and last authors first individually read notes and transcripts, and then discussed their initial code lists until an agreement was reached. These codes were then used for coding in NVivo 11 by the first author. A constant comparative method (Glaser, 1965) was used for exploring themes and linkages in and across the codes. Coded data extracts were then reexamined to review themes and explore relationships between themes. This step of the analysis was performed by the first and last authors. Finally, all 3 authors examined the themes and discussed their meanings and how they fitted together until an agreement on the formulations and the relationship between themes was reached. To facilitate the presentation of the results, codes associated with each theme were merged into subthemes. Participants were not contacted to provide feedback on the results.

The provided quotes were chosen to best exemplify the data and were translated from Swedish by the first author. Quotes were modified with (xxx) representing omitted text and square brackets representing replaced or added text.

Participant Characteristics. Descriptive statistics for the background data of the participants were calculated using Excel (2018, Microsoft Corp.). The median (25th and 75th percentiles) ages and years in the veterinary profession were calculated together with the proportions of male and female participants and categories related to years of experience and proportion of cattle work at the clinic.

RESULTS

Participant Characteristics

In total, 5 FGD were carried out with 5 (2 FGD) or 6 participants for a total of 28 participants. In addition, 5 clinic managers were interviewed. Altogether, 33 veterinarians educated in 11 different European countries

Table 1. Participant characteristics of 33 Swedish cattle veterinarians participating in focus group discussions or individual telephone interviews

Variable	Category	Respondents [%, (n)]
Gender	Female	54.5 (18)
	Male	45.5 (15)
Place of education	Sweden	57.6 (19)
	Other European country	42.4 (14)
% of dairy cattle work at clinic	≤20%	12.1 (4)
	>20–≤40%	18.2 (6)
	>40–≤60%	39.4 (13)
	>60%	24.2 (8)
	Do not know	6.1 (2)
% of VHHM[1] of full time	<20%	48.5 (16)
	>20–≤40%	30.3 (10)
	>40–≤60%	12.1 (4)
	>60%	6.1 (2)
	Do not know	3.0 (1)
Years working with dairy cattle	≤1	6.1 (2)
	>1–≤5	30.3 (10)
	>5–≤10	15.2 (5)
	>10–≤15	24.2 (8)
	>15	24.2 (8)
Years working with VHHM	<1	30.3 (10)
	>1–≤5	24.2 (8)
	>5–≤10	15.2 (5)
	>10–≤15	9.1 (3)
	>15	18.2 (6)
	Do not know	3.0 (1)
Variable	Continuous	Range; median; 25, 75 percentiles
Age		27–63; 37; 32, 44
Years in veterinary profession		1–33; 10; 3, 15

[1]VHHM = veterinary herd health management.

participated. Descriptive statistics of their characteristics are presented in Table 1.

Interpretation of Veterinary Herd Health Management Services

Participants interpreted VHHM services as work associated with the process of advising farmers and farm staff about issues related to management of the herd or of a group or category of animals. Areas for veterinary advice were vast and were comprised of dairy management and animal health in a broad sense. Calf health, hoof and udder health, fertility, parasite control, feeding and feeding-related diseases, cow traffic in automatic milking systems housing, review of management routines, milking technique, biosecurity, and barn design were areas specifically mentioned.

Veterinarians' advising could be provided at different levels, either in a more organized and strategic manner as a prebooked advisory visit or spontaneously while carrying out routine services such as dehorning calves or treating sick animals. However, prebooked visits per se were not seen as VHHM. For a prebooked visit to be regarded as VHHM, it should include advising on group or herd level and not just consist of service assignments (e.g., dehorning calves, conducting pregnancy checks, or diagnostic testing).

> There is a conceptual confusion [among veterinarians (xxx)] but I think that for a long time it was perceived that what you do on prebooked visits is some kind of advising, which I myself do not agree with at all (xxx) or at least, it is not a guarantee that you do it. (Veterinarian 1; FGD A)

Prebooked service visits could, however, provide opportunities for advising.

> It is obvious that VHHM is not to dehorn a calf.

> At the same time as you dehorn a calf, because it is such routine work, one can discuss quite a lot. Many of my cattle farms where I dehorn, at the same time that I dehorn I talk about calf health. (Veterinarians 3 and 5; FGD C)

To compile data (e.g., from statistics, examinations, and test results) and to use these to further improve animal health and production together with the farmer was seen as an essential part of VHHM by some vet-

Table 2. Examples of work perceived as veterinary herd health management (VHHM) by 33 Swedish dairy cattle veterinarians participating in focus group discussions or telephone interviews

Example
To draw conclusions from health records, clinical examination of cows at high risk of disease, observations of all groups of animals in the herd, and animal welfare declarations
Analyzing herd health statistics
Specific advisory efforts when you set goals and follow-up measures taken
Whenever you address the group or herd perspective in healthy or subclinically affected animals
Helping farmers increase their production, solve herd health problems, and prevent herd health problems from occurring
Larger advisory efforts such as Health Package Milk (VHHM program)
Longer advisory visits when you do more than carry out service measures
VHHM related to delegated drug use visits
Biosecurity services such as Safe Farm (biosecurity program)
Whenever you actively help the farmer to improve their animal health and improve farm economy—you can make small efforts or make them as big as you want to
Holistic advising efforts
Participate in the farm council
Seize cows starting to increase in SCC—address the issue when it is in its infancy
Investigating and discussing causes of clinical disease cases at treatment visits to prevent problems from reoccurring
Extending discussions from individual cows to the whole group of animals to prevent more cases from occurring
Alerting farmers about patterns of seasonal outbreaks or accumulating cases
Reduce or eliminate acute disease cases
Answer questions about animal health from farmers and other herdspersons about other issues than the animal we are treating
Discussing animal health issues while having a coffee together with the farmer
Cow tail advising—giving advice while conducting examinations or performing service assignments
Be a sounding board to farmers planning to build a new barn or rebuilding and expanding old barns
Checking the calves' total protein levels and securing colostrum routines before prescribing vaccines
Systematically investigating conditions and routines for animals at high risk or during periods of high risk of disease and setting up a plan to reduce morbidity with or without the use of vaccines
Vaccinations programs
Developing a strategy to handle upcoming herd health problems
Giving courses for herdspersons and organizing meetings for the exchange of experience between herdspersons
Accompanying farmers on herd visits and congress and exhibition tours
Telephone counseling about various herd health problems

erinarians. The VHHM services were mainly provided during herd visits with preparatory and analysis work being done at the office. However, it was mentioned that discussions with farmers could also take place over the phone and digitally. Examples of veterinary work perceived as VHHM are given in Table 2.

Factors That May Affect the Extent of Veterinary Herd Health Management Services

Participants seemed to agree that the proportion of work devoted to VHHM should increase and also thought that it indeed would increase in the future. Increasing farm sizes and increasing farmer demand has necessitated such a development. However, in all FGD, a concern was raised about the total workload and how their clinics were not sufficiently staffed to manage all of its other assignments.

Four themes were identified among factors that were perceived to affect the extent to which cattle veterinarians carry out VHHM services: (1) farmer *trust and demand*; (2) veterinary *competence*; (3) *time* available for VHHM; and (4) the individual veterinarian's *commitment and motivation*. Figure 1 describes the relations between themes and Table 3 gives the subthemes within the 4 themes. The discussions in the individual interviews (clinic managers) addressed similar topics and confirmed the ideas put forward in the FGD.

Trust and Demand. The participants considered that having the farmers' trust was crucial for being hired for VHHM services as well as for farmers' adherence to the veterinarians' advice. They described trust as a farmer-veterinarian relationship that took considerable time to build. Trust was perceived to be highly dependent on the knowledge, experience, and skills of the individual veterinarian, but also the success of the work that was performed. Communication skills were considered particularly important in this process. Trust was therefore described as difficult to establish for a veterinarian who was new to the farmer and especially difficult for a recently graduated veterinarian. However,

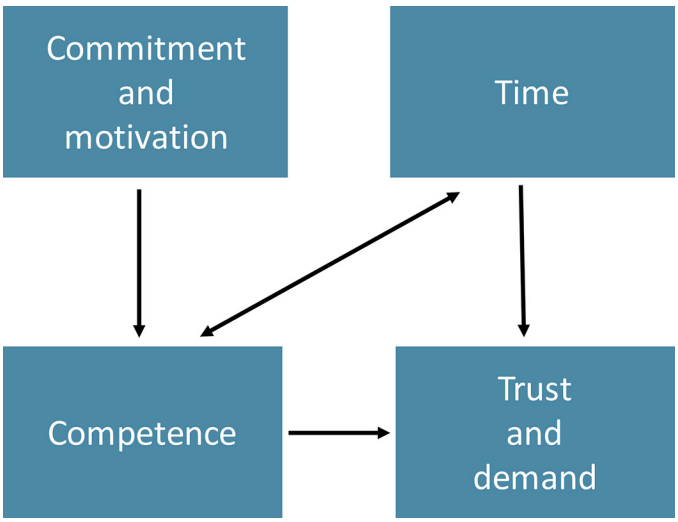

Figure 1. Illustration of the relations between themes identified by thematic analysis of veterinarians' (n = 33) perceptions regarding the extent of veterinary herd health management services.

Table 3. Subthemes within each theme identified by thematic analysis of veterinarians' (n = 33) perceptions regarding the extent of veterinary herd health management (VHHM) services

Time	Commitment and motivation	Trust and demand	Competence
Staffing and scheduling	Personal interest in VHHM	Farmer-veterinarian relations	In the individual veterinarian
Cooperation	Self-esteem and courage	Communication	In the organization
Workload	Workload	Success	Through external cooperation
Time conflicts	Effect of advice	Veterinarians' reputation	
Dairy cow density	Recognition of results and efforts	Farmer tradition	Capacity development
Priorities	Development opportunities and career paths	Long-term work	Veterinary education
Clinic short-term profitability	Status of, priorities of, and identity in VHHM	Competition and pricing	
Charge for preparatory and finishing work	Understanding of VHHM by colleagues and managers	Services and work methods	Data availability
	Intercollegiate exchange and collaboration	Marketing	
		Requirement or support from industry or government	

trust could be established faster and more easily if another farmer spoke well about the veterinarian or if the veterinarian had a trusted mentor. Farmers' trust and demand was also dependent on the veterinarian's ability to allocate time and to give priority to their VHHM visits.

Participants reported that some farmers lacked interest in or were not acquainted with the VHHM services that veterinarians provide. Promotion efforts by the individual veterinarian as well as the clinics and the organization (e.g., farmer meetings, campaigns) was highlighted as important to increase farmer knowledge about and interest in VHHM services.

> We need to tell the farmer what we can do. (Clinic manager 3)

Although some veterinarians considered farm economy to be the main factor limiting the demand of VHHM services, others reported that the issue of economy was never raised by the farmers when VHHM services were discussed.

Competence. The participants described VHHM as a highly qualified veterinary assignment demanding a high level of theoretical knowledge and practical skills. Several skills were considered important, including cattle medicine, VHHM methodology, interpretation of animal health statistics, farm routines and technique, and informing farmers about the benefits of VHHM services. Participants repeatedly returned to the importance of communication skills and building personal relationships.

> In fact, more important than excellence [in cattle medicine] is to be able to communicate a message, that can be rather simple, and to reflect together with the farmer. (Clinic manager 5)

The participants meant that the extent to which VHHM services were performed was not only affected by the competence level of the individual veterinarian, but also by the level of competence at their clinic and within the rest of the organization; moreover, a high level of competence could also be achieved through external collaborations with, for example, the regional or national dairy association. Easy and continuous access to capacity development and in-service training was mentioned as important to be able to perform VHHM services.

Time. Lack of time was described as a major obstacle for VHHM; in fact, veterinarians reported time conflicts when trying to balance a high workload. A time conflict between VHHM and emergency services, such as treating sick cows, was an important constraint. Rest time after on-call duty was another factor limiting available time. For veterinarians working in mixed practice, time conflicts were also reported between VHHM and horse or small animal practice. These veterinarians also experienced difficulties in getting enough time for capacity development in several species, resulting in a perceived lower overall competence level.

Participants described VHHM as time consuming, requiring time for both preparation and after-visit paperwork. Veterinarians sometimes found it difficult to charge the farmer for work that was not carried out on-farm, resulting in VHHM being associated with low productivity (i.e., billable time). Several participants also described that they experienced farm animal practice and VHHM work to be of lower priority at their clinics. They reported that veterinary colleagues and nurses often disturbed them by requesting their help with acute disease cases while they were doing VHHM preparation work. This made it difficult for them to allocate sufficient time to prepare themselves for their visits, thus affecting the quality of their VHHM work. To stay economically viable given their need to provide 24-h emergency services, despite decreasing numbers of dairy farmers and a lower demand for acute services among farmers, many clinics had increased their services for small animals. This shift toward small animals may also have increased due to a perceived lack of veterinarians, especially those with competence in farm animals, as well as a high staff turnover.

> They [clinic managers] may reason that because it's easier to recruit veterinarians to work with small animals then they would earn more money by taking in another person on small animals (xxx), where the market for veterinary services is even higher and difficult to meet (xxx) than to recruit and train a cattle veterinarian where demand is not as obvious. Farmers do not explicitly call about this [VHHM services]. It is a more qualified veterinary task to work with VHHM on a dairy farm than with emergency treatments in small animals. It is easier for the clinic to earn more money there [in small-animal practice] and it takes less from the veterinarian. (Clinic manager 5)

Commitment and Motivation. The individual veterinarian's own personal commitment and motivation were reported by the participants to be important success factors for performing a high amount of VHHM services.

> That they are a driving force, finding it [VHHM] fun and interesting. That they are not just confin-

> ing themselves to treating a mastitis [cow], but seeing the patterns in the disease cases on the farm. Let's do something more than just selling penicillin. (Clinic manager 4)

The commitment and motivation of veterinarians may be challenged and depleted, resulting in less VHHM being performed. Participants mentioned several reasons for a reduced commitment and motivation for VHHM, such as a high workload, farmers not being particularly open to the veterinarian's advice, or VHHM work being perceived as having low priority and receiving low acceptance from clinic managers and colleagues. According to the participants, the clinic manager had an important role in nourishing the commitment. This could be done, for example, by offering capacity development and by scheduling more time for VHHM work, intercollegiate exchange, and collaboration. Also, participants reported that it is of vital importance to get credit for one's advice and to see efforts from the farmer.

> I've been to this farm and they [the owners and their staff] think their calves never before have looked this good, and [it is great for me to hear that they think there has been a positive development] after I've been visiting them for 3 years and [despite that I myself] think they look more or less as they did when I started. (xxx) It's important that I too get feedback. Naturally, otherwise I will get tired. But if one gets feedback then perhaps I've done something good after all. And then perhaps it's worth continuing. (Veterinarian 5; FGD C)

To start working with VHHM was considered particularly challenging. Participants thought this required good self-esteem and courage, as well as support from more experienced colleagues and from clinic managers.

DISCUSSION

Interpretation of Veterinary Herd Health Management Services

Veterinary herd health management was associated with the process of advising, and for at least some of the participants this included compiling data and using these data to improve animal health and production. Prebooked visits per se were not seen as VHHM, although such visits could provide good opportunities for advising. This interpretation contrasts Swedish dairy farmers' understanding of VHHM. Farmers had difficulties in defining herd health management and VHHM, but they described the latter as anything nonurgent and services that could be prebooked a week in advance. Their interpretation thus also included scheduled treatment visits and services such as dehorning of calves. (Svensson et al., 2018) The different interpretations may raise problems in the veterinary-client communication about VHHM and may potentially affect farmers' demand for VHHM.

On the other hand, the study participants' interpretation of VHHM, particularly when performed in a more organized and strategic manner, aligns well with the definition of herd health management by Green et al. (2012) as "a method to optimize health, welfare and production in a population of dairy cows through the systematic analysis of relevant data and through regular objective observations of the cows and their environment, such that informed, timely decisions are made to adjust and improve herd management over time" (p. 2). Strategic and systematic approaches to VHHM applying a holistic perspective on herd health have a long history in Sweden (Plym Forshell, 1993; Hult and Sandgren, 2003) but seem to be less developed elsewhere. Ritter et al. (2021) described that on regular scheduled herd health and production management visits, which are generally performed 1 or 2 times per month on most Canadian dairy farms, 51% of the time was devoted to pregnancy diagnostics and 30% was spent on preparations, transitions, and leaving. Similarly, Derks et al. (2013) described how visits in Dutch VHHM programs focused on pregnancy checks and fertility diagnosis, but also included advice on fertility on 71% of farms. In Denmark, herd health advisory visits are mandatory for herds with at least 100 adult cattle. These visits are associated with delegated drug use and have a focus on examination of at-risk animals (Lind et al., 2012). British veterinarians described how their role has moved toward that of a disease prevention advisor. However, their advice was mostly delivered on an ad hoc basis while visiting a farm on an emergency call or on a visit concerning fertility or tuberculosis testing. Some offered advice in a more systematic way when working with annual herd health plans (Ruston et al., 2016). Veterinary herd health management work has also been described in relation to various biosecurity programs such as Johne's disease or bovine viral diarrhea programs (de Lauwere et al., 2020). Systematic and strategic biosecurity programs targeting individual pathogens have been in use in Sweden for a long time. Currently a general biosecurity program (Safe farm, Smittsäkrad besättning; Ohlson and Andersson, 2017) is offered to dairy herds and was mentioned as an example of VHHM by study participants (Table 2). It remains to be investigated which approaches to VHHM are most effective.

Factors That May Affect the Extent of Veterinary Herd Health Management Services

Participants agreed that VHHM should increase in the future because diagnosing and treating individual animals was not perceived as the most efficient veterinary services to promote the health of farm animals as herd sizes increase. The slow pace at which veterinarians have adopted their new role in VHHM may threaten the sustainability of dairy production. Alternatively, it may lead to nonveterinarian health advisors expanding their markets, a situation recognized by British large-animal veterinarians as a risk to their businesses (Ruston et al., 2016).

The 4 themes that were identified among factors influencing the extent of VHHM services (*trust and demand*, *competence*, *time*, and *commitment and motivation*) illustrate the complexity involved in expanding VHHM services. This complexity also explains the slow transition of the veterinarian's role on dairy farms.

Trust and Demand. Previous studies have also identified trust as a factor influencing farmers' interest in VHHM services (Ruston et al., 2016; Svensson et al., 2018) and their adherence to the advice from such services (Svensson et al., 2019b; Bard et al., 2019). Trust takes time to build and cannot be assumed, but needs to be gained. In the present study, the knowledge, experience, and skills of the individual veterinarian, but also the success of the work, were reported to affect farmers' trust. The importance of success stories in building farmers' trust was also reported by Ruston et al. (2016). Communication and relationship-building capacities of the veterinarian were deemed to be very important for building trusting relationships. However, the literature reveals that veterinarians' communication seems to rest on a directive communication style (Bard et al., 2017; Ritter et al., 2018; Svensson et al., 2019a), which signals an unequal power distribution between veterinarians and their clients. Such a style may have negative effects on veterinarian-client relations. Communication training focusing on shared decision-making or emphasizing client autonomy such as that used in motivational interviewing may offer solutions for the future veterinarian (Svensson et al., 2020).

Poor marketing efforts were also reported as a factor limiting VHHM services because farmers may lack knowledge about these services. Similarly, Ruston et al. (2016) reported that British veterinarians did not promote their VHHM services because of fear that this would reduce their creditability toward clients. Increasing information and promotion efforts seem to be important aspects for increasing the extent of VHHM, which is in accordance with the findings by Derks et al. (2013) and Svensson et al. (2018).

Competence. Our participants stressed that VHHM services demand high knowledge and skills, and capacity development was a recurrent theme in the discussions. Swedish farmers identified skills and knowledge as an important factor for their interest in hiring veterinarians for VHHM services (Svensson et al., 2018), and the veterinarians in the present study likewise highlighted that methodology in VHHM and communication skills were important competences. An increasing focus on veterinarians' communication skills has been noted in recent years (Kleen et al., 2011; Cake et al., 2016; Ritter et al., 2019). Together, these findings suggest that communication training should receive additional focus in veterinary education as well as in continuing education because this may increase VHHM efforts.

Time. Veterinary herd health management was perceived as time-consuming work in comparison to the diagnosis and treatment of sick animals. Participants reported it difficult to find time for preparatory and finishing work and also found it difficult to charge for such work. These are likely to be barriers for performing VHHM services if time is restricted, workload is high, and time conflicts arise, conditions that that are not unusual for veterinarians. Participants described VHHM as long-term work both in terms of building trust and in terms of seeing the results of preventive efforts on animal health on individual farms. It is easy to see that investing in trust-building and promotion activities may conflict with an organizational demand on the clinic to make short-term profit. This may result in clinics focusing their business on treatments in companion animals where demand seems to be never-ending and where less resources are needed. Being on call 24 h a day has been discussed as a constraint to delivering more proactive services by British veterinary clinics (Statham and Green, 2015).

Staffing problems and the resulting high workload for existing staff were factors mentioned by participants as affecting the available time for VHHM. Concerns have been raised about the shortage of farm animal veterinarians internationally (Adams et al., 2015; FVE, 2020). Participants reported that the extent of VHHM was also highly affected by the priority given by colleagues and managers to this type of work, and several participants reported their perception that the clinic did not prioritize farm animal practice and VHHM. The preventive ethos of the clinic and organization thus seem to be of importance for the extent of VHHM and can be influenced by organizational work.

Commitment and Motivation. Veterinarians' commitment and motivation to work with VHHM seem to have a central role for increasing VHHM work and are closely related to veterinarians' perceived need to build trustful relationships with farmers to carry out

this work, and they are also affected by the available time for VHHM. In a study of nontechnical skills in veterinary medicine and successful economic performance of veterinary practices (Ilgen et al., 2003), veterinarians reported that they spent time on staff and business management nearly as frequently as on direct treatment of animals and working with their owners. When the veterinarians rated (Likert scale) the importance of different work tasks, personnel management was rated right after treatment of animals and contact with animal owners. Analysis of the factor of commitment and motivation from an organizational perspective suggests that high quality of organizational veterinary work and satisfying and productive VHHM work can be obtained by improving employee motivation (Timmreck, 2001). In addition, Ernst et al. (2004) showed that the time to carry out an assigned job, confidence in one's own abilities, and the tasks assigned all influence job satisfaction, which is often correlated with motivation.

The leadership and motivation literature (e.g., Isaac et al., 2001; Schubert Hancock, 2008) provides frameworks for veterinary organizations to work with individual's efforts to attain both individual and organizational goals. In particular, VHHM services may need to be designed so that individual veterinarians can experience meaningfulness in the work, responsibility and knowledge of the results of their own efforts, as well as how their efforts fit those of others in the organization and services offered by their clinics, their organization as a whole, and even overall society (Hackman and Oldham, 1980).

In recent years, increasing problems of poor resilience in the profession and high risk of suicide and stress-related disease in veterinarians world-wide has brought the work environment of veterinarians into focus (Gardner and Hini, 2006; Nett et al., 2015; Whitnall and Simmonds, 2019). Female veterinarians and less experienced veterinarians have reported the highest levels of stress (Mastenbroek et al., 2014). Adam et al. (2015) suggested that support and training of young veterinarians in the transition period from university, as well as training and support in staff management to clinic managers, are especially important for retaining young veterinarians in farm animal practice. The present study indicates that support to young veterinarians and clinic managers may also a be central incentive for young veterinarians to start with VHHM work, thus increasing the extent of VHHM work. Furthermore, nourishing the personal commitment and motivation for VHHM in veterinarians with more experience by offering feedback, continuing capacity development, intercollegiate discussions, and developmental opportunities seems to be very important for the extent to which VHHM services are performed.

Methodological Considerations

Focus group discussions are suitable when there is a potential that participants can encourage each other to advance in consideration of a particular topic or phenomenon, such as VHHM (Robson, 2011), and when potentially delicate matters are to be discussed. It is generally not recommended to mix different hierarchical groups within FGD, which is why we conducted individual interviews with clinic managers. We thought it was important to include both aspects in the study. To ensure consistency between data and presentation of findings, we recorded interviews, transcribed the recordings, had 2 researchers present during FGD, and had 3 researchers with different background reading transcripts and analyzing data.

Only veterinarians within Dv were interviewed in the present study, but different clinics within Dv are managed quite independently. However, it cannot be excluded that the results may have been different if private clinics had been included or if veterinarians working almost exclusively with VHHM and not in mixed practice with on-call duty time had also been included.

CONCLUSIONS

Swedish cattle veterinarians interpreted VHHM as services associated with the process of advising and did not perceive prebooked visits per se as VHHM. The extent to which VHHM was performed was influenced by farmers' trust and demand, time available for VHHM, and the veterinarians' competence, personal commitment, and motivation for VHHM. These themes are linked to a wide range of factors, which may explain why progress into the preventive role of veterinarians has been slow. We suggest increased promotion activities regarding VHHM, support to and mentorship for less experienced veterinarians, and continuous capacity development including communication training and training in methodology of VHHM to veterinarians of all skills levels to increase VHHM efforts by dairy veterinarians. Staff and business management training for clinic managers and intercollegiate discussions and other actions supporting the preventive ethos of the clinics may also contribute to higher levels of VHHM being performed.

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