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ORIGINAL RESEARCH

Developing consensus for definitions of key veterinary-specific quality improvement (QI) terms using an eDelphi-study method

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Abstract

Background: Quality improvement (QI) methods are a continuous process of iterative tests to improve the quality of a service or product. Using common language has been linked to the successful implementation of QI in human healthcare. This study aimed to assimilate and achieve consensus on veterinary-specific definitions for terms associated with quality care and QI methods in UK veterinary practice.

Methods: A four-round modified eDelphi process with a panel of 50 UK veterinary practice stakeholders was used to generate consensus. The panel selected or suggested the definition they best felt 'fitted' each term. Consensus was reached if there was >70% agreement, and terms were eliminated if there was <15% selection.

Results: Thirty-one panellists completed all three rounds of eDelphi; eight participants completed an optional feedback round. From 14 terms, 10 reached consensus, leaving four unresolved definitions.

Conclusions: A majority of terms reached consensus; 90% were new or amended definitions proposed by panel members. Utilising plain English refined by stakeholders will allow successful implementation of QI in veterinary healthcare. Not all terms achieved consensus, highlighting a need for further research to enable successful integration of QI principles as seen in human healthcare.

INTRODUCTION

Continuous improvement in quality-of-care delivery is a key aspect of any healthcare service, whether it is for humans or animals. Quality improvement (QI) methods are a continuous process of iterative tests used to monitor and improve the quality of a service or product.[1]

Providing the highest quality veterinary care is what any professional strives to do; in veterinary care, this can often be a delicate balancing act between meeting the owners' financial resources and emotional needs while simultaneously striving to meet the animal's clinical needs. QI methods have been used within worldwide healthcare services, including the National Health Service (NHS), for over two decades to address a variety of issues and goals.[2,3] When employed correctly, they can provide a framework flexible enough to cope with the complicated systems involved in healthcare but supportive enough to assist professionals to provide the very best care and continue to improve even upon good performance.[4,5] Several studies conducted in the NHS showed a QI framework introduced at a university hospital resulted in higher quality outcomes as well as enabling the flexibility of QI initiatives to be applied across a variety of departments and disciplines.[6–10] QI initiatives do exist within veterinary medicine; however, their use is sporadic and not as established in mainstream practice culture as in human medicine. Often the range of methods employed is limited compared to human healthcare settings. The reporting of these activities in published veterinary literature is varied, typically more demonstrative of the activity of advocates and experts than universal adoption, and there is a lack of a comprehensive overview of QI techniques employed by veterinary professionals in published literature.[11–14]

Clear effective communication and common language has been linked in several studies to the successful implementation of QI initiatives in human healthcare.[15–17] The Healthcare QI Partnership (HQIP)[1] identifies 12 key QI methods best suited to healthcare settings, and this has been instrumental in helping establish common QI language within the NHS. While the HQIP has established QI frameworks and training in use in the NHS, such frameworks do not exist as clearly within veterinary medicine. Studies conducted separately at the University of Nottingham, as part of a PhD project funded collaboratively with CVS Equine, and by RCVS Knowledge showed a variety of factors affecting the adoption of QI within UK veterinary practice. Confusion around the terms and language used to describe these methods presented as a prominent barrier for the application of QI methodology in veterinary practice.[13,14] The aim of this study was to define key terms of importance to QI, using language understandable to all stakeholders. Using evidence-based methodology alongside expert opinion will encourage widespread uptake across the profession.

METHODS

The eDelphi process

The modified Delphi methodology is a group consensus approach to access a geographically dispersed group of experts; it systematically uses a combination of literature review, stakeholder opinion and the judgment of field experts to reach agreement.[18,19] A modified four-round eDelphi process was utilised to generate consensus among a panel of stakeholders three iterative rounds of online questionnaires, with a fourth round used to gather feedback (Figure 1).

Recruitment of panel

The target population for the eDelphi was first opinion practice stakeholders, including vets, veterinary nurses and animal owners. These stakeholders were targeted to meet the overall aim, which was to identify terms that best represented QI approaches for those involved in the application of QI for the benefit of animal care. All participants were invited to volunteer their interest through a short questionnaire distributed via a social media campaign and advertised with a press release by RCVS Knowledge, University of Nottingham and Centre for Evidence-Based Veterinary Medicine (Appendix A). The questionnaire included questions such as: current job role, type of work performed, whether they worked at a corporate or independent practice, current knowledge and use of QI in their work (Table 1). An adjusted survey was used for pet owners (PET), who were recruited specifically through social media (Appendix A). The questions included the type and number of animals owned, their current profession and if they had ever had contact with QI in any capacity (Table 2). Snowball sampling was used to widen the recruitment, with participants encouraged to pass the questionnaire link on to anyone they knew who might be eligible to take part.

Panel selection

A target of 50 participants was chosen to ensure maximum representation and allow for the inevitable drop out of participants throughout the process.[20–22] A random selection of individuals from the recruitment questionnaires was invited to participate. The overall makeup of the panel was balanced on job role, type of work and, for owners, animals treated/owned and previous experience of QI (Tables 1, 2 and 3). By recruiting a larger panel of 50 participants, rather than the minimum typically recommended, allowed the possibility of accepting a lower threshold of agreement to achieve consensus (>70%) as members not in agreement would be less likely to represent a single demographic.[23]

Selection of initial terms and definitions

A list of 67 terms related to QI was identified by RCVS Knowledge from the glossary of terms produced by NHS Scotland QI HUB along with suggestions and comments from the RCVS Knowledge QI Advisory Board. This list of terms was shared with the research group consisting of three representatives from The University of Nottingham (FR, MB and JB) and two representatives from RCVS Knowledge (AD and CG). To select the terms to be included in the eDelphi, each member of the group independently analysed and voted from the list of terms based upon whether they felt that there was no single unified term applicable to the veterinary profession or if the term prominently featured in RCVS (Royal College of Veterinary Surgeons) Practice Standards Scheme (PSS) or the RCVS Code of Conduct. After this process was completed, an open discussion among the panel was conducted, for members to present opinions and evidence to produce a final list of terms for inclusion in the eDelphi process. This was made based on the agreement of the majority (>60%) of the research group, as well as discussion and comparison of existing resources (Appendix B). This process ensured the terms put to the panel were both relevant to veterinary practice and policy and required further research to produce a veterinary relevant definition. After this process, 14 terms were nominated to be put to the eDelphi panel.

To identify possible definitions, two databases (Medline and CAB abstracts) were searched for both human medical and veterinary literature. If numerous

[1] The Healthcare Quality Improvement Partnership (HQIP) is an independent organisation led by the Academy of Medical Royal Colleges, The Royal College of Nursing, and National Voices - an organisation which represents doctors, nurses and patients within the National Health Service in the UK.

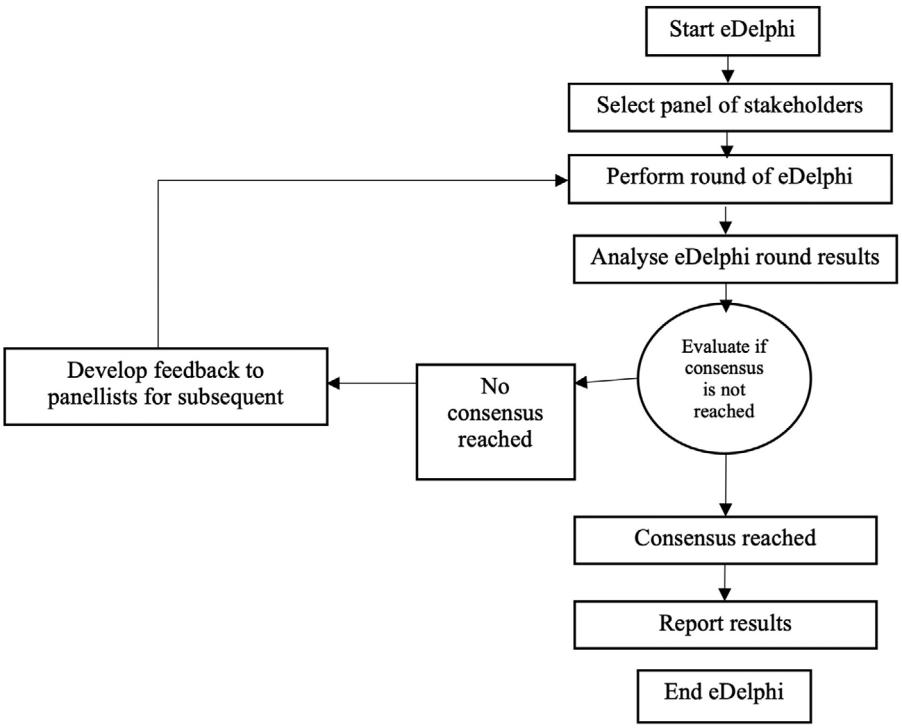

FIGURE 1 Flow chart demonstrating the basic eDelphi process followed for this study; a maximum number of rounds are carried out based on the progress of the consensus

TABLE 1 Demographic criteria used to select eDelphi veterinary professionals for the quality improvement (QI) consensus panel

Job role/current profession	Qualified veterinary surgeon (QVS) Clinical director/practice owner (CD/PO) Registered veterinary nurse (RVN) Administrator (Admin) Practice manager (PM) Receptionist/client care (RRCC) Auxiliary staff (Aux)
Type of work performed at current practice	First opinion Referral University Ambulatory Charity
Practice ownership/management	Corporate Independent University Charity
Type of animal treated by practice/owned (pet owners)	Small animal (e.g., cats, dogs, rabbits, guinea pigs etc.) Exotics (e.g., reptiles, pet fish etc.) Equine (e.g.: horses and donkeys) Farm (e.g., cattle, pigs, goats, sheep, alpacas etc.).
Prior knowledge of Quality Improvement methods either in veterinary or another industry	Previous experience in veterinary medicine Previous experience in another industry No previous experience of QI

definitions were available for one term, priority was given to those most frequently used in published literature. Where there were insufficient definitions found in the published literature search, definitions used in policy documentation or education were also utilised. Selected definitions were then put to the research group without alteration. After discussion among the research group, each term had a minimum of two and a maximum of three of the most frequently used definitions in the literature. Some terms needed minor adjustment to be relevant to the veterinary field, for example, replacing the term patient with client.

Consensus parameters

Prior to commencing the eDelphi process, it was agreed within the research group to set a consensus level of >70% agreement among the eDelphi panel before a term could be considered 'accepted'. This

TABLE 2 Demographic criteria used to select eDelphi pet owners for quality improvement (QI) consensus panel

Type of animal owned	Small animal (e.g., cats, dogs, rabbits, guinea pigs etc.) Exotics (e.g., reptiles, pet fish etc.) Equine (e.g.: horses and donkeys) Farm (e.g., cattle, pigs, goats, sheep, alpacas etc.).
Prior knowledge of Quality Improvement methods either in veterinary or another industry	Yes No Do not know
Involvement in client feedback activities, by providing feedback (positive or negative) to a veterinary surgery. This may have been a phone call, complaint or compliment letter, social media review or client satisfaction survey	Yes No
Length of time owning animals	1–10 years 11–20 years 21–30 years 31+ years

TABLE 3 Breakdown of the eDelphi demographics by stakeholder role in a veterinary practice that the researchers aimed to achieve in the quality improvement (QI) consensus study

Role in the veterinary profession	Percentage of panel	Number of people
Qualified veterinary surgeon	20%	10
Registered veterinary nurse	22%	11
Pet owners	12%	6
Clinical director/practice owner	10%	5
Practice manager	10%	5
Receptionist/client care team	10%	5
Administration staff	10%	5
Auxiliary staff	6%	3

cutoff was selected based on previously published Delphi studies and the most common levels applied. Definitions were also required to meet a minimum threshold of <15% agreement to be put forward to the successive round. This threshold was selected as a balance between eliminating unpopular choices to focus the panel towards consensus, and ensuring that if all members of the three main demographic groups (clinical veterinary professionals, client care team/administrators and pet owners) all selected a single choice that this would remain (pet owners represented 12% of the panel at the outset).

Terms without consensus or definition options

Due to the likelihood of dropout in each round, there was the possibility that a single definition could remain which did not achieve consensus but was the only option remaining after other choices were eliminated (for example, option A 34/49 [69%] participants; option B 7/49 [14%] participants, option C 6/49 [12%] participants). In this case, the subsequent round included the remaining definition plus an option to not select this definition. Therefore, the panel were given the option of still maintaining autonomy of their opinion, while not forcing them into choosing an option they did not feel was appropriate and remaining true to the methodology followed for the other terms.

SURVEY DISTRIBUTION

Questionnaires were distributed via automated email using the platform Online Surveys (https://www.onlinesurveys.ac.uk, Jisc, Bristol, UK). Each panellist on the eDelphi specifically consented to participate at the start of each questionnaire. All panellists were also advised that their responses would be confidential and anonymous, and that participation was voluntary. This study was carried out as part of PhD research and was approved by the ethics committee at the School of Veterinary Medicine and Science at the University of Nottingham (ethical approval number: 217818103). Panellists were assigned a code related to their job role (e.g., 'Admin 4' for administrator 4 and 'PetO1' for pet owner 1). This enabled any comments to be left anonymously. Only the first author had access to the list of names, emails and codes, and these codes were automatically captured by the survey platform when the participant logged in to complete the survey.

The panel were asked to complete each round of the questionnaire within four weeks. Non-responders were sent reminders after three weeks and, where necessary, after a further 10 days. Each participant was sent personalised email links to the survey so that completion could be tracked, and targeted reminder emails could be sent. Panellists were encouraged in these emails to request more time if required or ask for assistance in accessing and completing the surveys if needed.

Round one

In the first round of the eDelphi, the panel were presented with 40 literature-based definitions to vote on (Table 4), arranged in specific sections of similar

TABLE 4 A list of the 40 literature definitions relating to quality improvement (QI) terms presented to eDelphi panellists in round 1

Term to be defined	Literature-based definitions offered
Section 1 – Definitions relating to quality care	
Quality veterinary care	• Providing a service that is accessible to animal and owner, enabling them to receive the care needed and ensuring that care is effective.[24,25] • Providing health services for animals and their carers that increase the likelihood of desired health outcomes and are consistent with current professional knowledge. Quality care should be safe (avoiding harm to patients during the course of care), effective (providing service based on evidenced-based medicine to all who could benefit and avoiding providing services to those who will not benefit), patient-centred (providing care that is respectful of and responsive to the needs, values and wishes of the owner but prioritises the health and welfare of the patient), timely (reducing wait and harmful delays), efficient (avoiding waste), equitable (providing care that does not vary in quality because of gender, ethnicity, geographic location or socioeconomic status) and support the care-giver experience (providing care which supports a sense of fulfilment and pride for the caregiver).[26] • Providing a delicate balance between health and wellbeing of the population (vaccination, castration and health programmes), sustainable finance (affordable care), sustainable use of environment and resources (avoiding waste of equipment, ideas and energy), providing the best possible evidence-based care for the individual animal while also meeting client needs and wishes.[27,28] (*This basic description is used by the Royal College of Physicians to describe quality care in human healthcare, with adjustment to include client wishes and need, where here the client is the animal owner/keeper/bill payer to make this applicable to veterinary care)*
Quality Improvement	• Quality Improvement initiatives must bring clarity to what quality care is (there must exist clear and accepted definitions of what quality care is in order to measure care delivered), measure and publish examples of quality care (the system can only improve what is measured, there must be transparency on outcomes, and information must be robust, relevant and timely), reward quality care (by incentivising and recognising quality care when it is measured as such participation in activities will be encouraged), encourage leadership for quality care (leadership not only nationally but locally – in house is essential for QI to be embedded, encouraged and rewarded appropriately), innovate quality care practices (continuous QI requires innovative approaches to delivering and measuring care as they present themselves - it is a continuous process) and finally safeguard quality care that already exists (any system striving for improvement must also recognise and protect the standards of care when they are met and maintained).[29] • A formal, systematic and cyclical evaluation of a programme or system of care, administration or experience that is carried out with the intention of monitoring or improving the quality of the care or service provided to the client and patient.[1,13,30] • The combined and unceasing efforts of everyone – healthcare teams, patients and their owners/carers, researchers, payers, planners and educators – to make the changes that will lead to better patient outcomes (health), better system performance (care) and better professional development.[31]
Clinical effectiveness	• Doing the right thing, in the right way, for the right patient at the right time.[32,33] • Clinical effectiveness includes monitoring and improving the outcomes of patients and service users, by ensuring health professionals are up to date in their practices, properly supervised where necessary and implementing the best practice and quality.[34] • The application of the best available knowledge derived from research, clinical experience and client preferences to achieve optimum processes and outcomes of care for patients.[35,36]
Patient safety	• The absence of preventable harm to a patient during the process of health care and reduction of risk of unnecessary harm associated with health care to an acceptable minimum. An acceptable minimum refers to the collective ideas of given current knowledge, resources available and the context in which care was delivered weighed against the risk of non-treatment or other treatment.[37] • A discipline in the health care professions that applies safe scientific methods towards the goal of achieving a trustworthy system of health care delivery. Patient safety is defined as an attribute of health care systems that minimizes the incidence and impact of adverse events and maximises recovery from such events.[38] • The reduction of risk or unnecessary harm associated with health care to an acceptable minimum.[39,40]
Clinical governance	• A framework through which an organisation is accountable for continually improving the quality of their services and safeguarding high standards of care by creating an environment in which excellence in clinical care will flourish.[41,42] • Clinical governance provides mechanisms to identify problems and then to find, implement and sustain meaningful solutions. The component parts of clinical governance could easily be compared to a jigsaw puzzle; each piece is interlinked with the others, rather than sitting by itself in isolation. Each piece requires all the others to be in place before the picture is complete, for example, clinical guidelines, clinical effectiveness and audit, lifelong learning, client choice, collaboration and teamwork, research and development, evidence/information, implementation and risk management all form veterinary clinical governance.[42] • Clinical governance is a continuing process of reflection, analysis and improvement in professional practice for the benefit of the animal/patient and the client/owner.[43]

(Continues)

TABLE 4 (Continued)

Term to be defined	Literature-based definitions offered
Section 2 – Definitions relating to methods of Quality Improvement	
Clinical audit	• The collection of data prospectively or retrospectively in health care settings to answer a specific question relating to the delivery of clinical care. The ultimate aim of clinical audit should be to improve the care delivered to patients and the service delivered.[44] • A systematic 'cycle' that involves measuring care against specific criteria, taking action to improve it if necessary, and monitoring the process to sustain improvement. As the process continues, further improvements can be made.[45] • A quality improvement cycle that involves measurement of the effectiveness of healthcare against agreed standards for high quality and taking action to bring practice in line with these standards to improve the quality of care and health outcomes.[29,46]
Significant event audit	• A retrospective audit that looks at one case in detail, from beginning to end, to either increase the likelihood of repeating outcomes that went well or decrease the likelihood of repeating outcomes that went badly.[47] • Individual cases in which there has been a significant occurrence (not necessarily involving an undesirable outcome for the patient) analysed in a systematic and detailed way to ascertain what can be learnt about the overall quality of care and to indicate changes that might lead to future improvements.[48] • A process in which individual episodes (when there has been a significant occurrence either beneficial or deleterious) is analysed in a systematic and detailed way to ascertain what can be learnt about the overall quality of care, and to indicate any changes that might lead to future improvements.[49–51] *This definition was created as an amalgamation of various definitions all used by this author in different publications.*
Morbidity and mortality rounds (also known as M&M's, morbidity conferences, mortality conferences)	• A regular periodic conference usually held to review cases seen that resulted in poor or avoidable outcomes, used as a learning exercise for all members of staff involved.[52] • A forum where adverse outcomes can be discussed. They have the potential to improve patient outcomes, quality of care, attitudes towards patient safety, and they contribute to the education of clinical staff. M&M meetings are deemed an important component of clinical governance that provide both the necessary administrative assurances that poor outcomes are being monitored and addressed and the environment in which learning from them may take place.[53–56] • An open forum for the collaborative review of adverse events without fear of retribution or blame. The primary goals should be improving patient care and maximising the educational benefits of a shared experience.[57]
Section 3 – Definitions relating to administration, direction and guidance.	
Management	• The coordination and administration of tasks to achieve a goal. Such administration activities include setting the organisation's strategy and coordinating the efforts of staff to accomplish these objectives through the application of available resources.[58] • The process of ensuring efficiency and accuracy with which outcomes are achieved by the people and systems that deliver them.[59]
Leadership	• Taking responsibility for case management, client communication and the coordination of the team of veterinary nurses and receptionists who facilitate their roles.[60] • Leadership is principally concerned with key tasks and perspectives, but it also has its personal side, which should not be neglected. Personal leadership refers to our inwardly focused efforts to succeed, conceptualising an individual's values, interests and aspirations. Management leadership involves coping with complexity, coping with change by using communication and conflict-resolution skills and diplomacy and motivational skills.[61,62]
Guidelines	• Systematically developed statements to assist the clinician and carer in making decisions about appropriate healthcare for specific circumstances.[63] • A written statement describing the best clinical practices for specific scenarios in patient care. These are based on the professional judgement of a given group of veterinary professionals (developers) in a given practice area and designed to improve the decision-making process.[64] • Systematically derived statements that help practitioners to make decisions about care in specific clinical circumstances. These should be research- or evidence-based. Guidelines should provide extensive, critical and well-balanced information on the benefits and limitations of various diagnostic and therapeutic interventions so that the clinician can carefully judge individual cases.[65]
Protocol	• Rules of how to proceed in certain situations. They provide health care practitioners with parameters in which to operate. The term 'code of practice' may be used synonymously with clinical protocols. A code comprises a set of laws or rules. Codes of practice may be formulated by statutory organisations, professional bodies, employers or voluntary organisations. They may cover a diverse range of issues or focus on a specific process or issue[66] • A written plan that specifies procedures to be followed in defined situations. A protocol represents a standard of care that describes an intervention or set of interventions. Protocols are more explicit and specific in their detail than guidelines, in that they specify who does 'what', 'when' and 'how'.[67] • Rigid statements allowing little or no flexibility or variation. A protocol sets out a precise sequence of activities to be adhered to in the management of a specific clinical condition. There is a logical sequence and precision of listed activities[68]

(Continues)

TABLE 4 (Continued)

Term to be defined	Literature-based definitions offered
Checklists	• Lists of vital actions which need to be completed before, during or after a procedure. By compensating for the limits of our memory, they can act as a trigger to remind us of crucial steps that are easily overlooked.[69,70] • An organised tool that outlines criteria of consideration for a particular process. It functions as a support resource by delineating and categorising items as a list—a format that simplifies conceptualisation and recall of information.[71] • An algorithmic listing of actions to be performed in a clinical setting, the goal being to ensure that no step will be forgotten.[72,73]
Standard operating procedures (SOP)	• A set of steps that a person or group of people must perform to complete a job by removing variation. It is a process document that details the way an operator should perform a given function.[74] • A set of written and detailed instructions that document a routine or repetitive activity followed by an organisation to achieve uniformity of the performance of a specific function. SOP avoids variations regardless of the operator and time of operation; provides individuals with the information to perform a job properly, facilitates consistency in quality of an end-result, addresses safety concerns; and minimises chances for miscommunication even if there are temporary or permanent personnel changes.[75] • Written documents describing routine procedures carried out in veterinary practices. A properly constructed SOP can improve practice efficiency, possibly save money, act as a training manual for staff and, as a last resort, be used by the practice to defend itself should any charges of wrongdoing be levied.[76]

terms together. Panellists were also given the option to propose their own definition for each term; no context or explanation was required but a reference for new definitions was requested where possible. Results from round one were reported anonymously back to the research group; all comments and new definitions were anonymised. Cumulative percentage scores were used to determine agreement levels, and thus, the definitions that had not reached the minimum threshold of 15% agreement were not put forward to the second round. Any non-responders were eliminated from the study at this point.

Round two

In round two, panellists were instructed to re-read all the definition options presented and were informed of the presence of new definitions that were not present in the first round. These 'new' definitions were presented as they were written by the panel member that suggested it, with alterations only made to correct spelling or grammatical errors. Alongside these new definitions, none of the definitions presented from round one that were still included were altered. The eDelphi panellists were given the chance to provide feedback and comments at the end of each section of the eDelphi which were then fed back to the research panel. The same processes for distribution, reminders and analysis were used as in round one; however, participants only had three weeks to complete the second round.

Round three

After concluding round two and analysing the results, the panel were given the final list of definitions to vote on. The definitions that had failed to reach the minimum agreement threshold of 15% were eliminated, but no other definitions were altered or added at this stage. For this round, the panel were given the percentage agreements for each term remaining from the previous round, so they had some idea as to how other panellists had voted, as well as the percentage agreement for those terms that had been 'accepted'.

Round four

Panellists were invited to participate in a concluding questionnaire after round three. At this stage, panellists were informed of which definitions had reached consensus through the eDelphi process and were given the opportunity to leave feedback. Feedback questions specifically focused on the reasons why the participants thought some terms had not reached agreement, an opportunity to provide suggestions for how to improve existing definitions that had failed to reach consensus, and general feedback about the process.

RESULTS

Participants

One-hundred and sixty-nine responses were received to the initial recruitment questionnaire, and 50 were invited to take part in the panel in accordance with the proportions required for each role. Thirty-two panellists completed all three rounds of voting with each of the demographic groups represented at each stage of the process (Table 5).

Round one result

Forty-two out of 50 participants responded fully to the round one questionnaire. Ten of the literature-based definitions failed to reach the 15% consensus required to be put forward in round two and so were eliminated. Thirty-six additional definitions were proposed as alternatives by the panel. These were a combination

TABLE 5 The number of participants from each demographic group responding to each round of the eDelphi study

	Round 1	Round 2	Round 3	Round 4
Registered veterinary nurses	7	6	4	0
Veterinary clinicians	9	9	7	1
Practice manager	4	3	3	0
Clinical directors/practice owner	5	5	5	3
Administrators	5	4	3	3
Receptionists/client care team	4	4	3	0
Auxiliary staff	2	2	2	0
Pet owners	6	6	5	1
Total	42	39	32	8

of adjusted definitions from the ones provided (e.g., wording or sentences altered), as well as entirely new definitions suggested. The collection and analysis of round one results combined with research group discussions occurred over a 2-week period. The panellist feedback on the entire first round showed strong engagement from participants and good insight into the thought processes used to arrive at new definitions:

> *'With most of the questions I was often torn between the more detailed definitions which I felt were helpful in providing a fulsome explanation; and shorter terms that were less verbose and maybe less pretentious/pompous.* **QVS 7**

> *'Emphasis has to be on continuous improvement and preferably with patient/client involvement, reference to shared values should be made to give a whole picture view of veterinary practice'.* **PetO4**

Round two results

Thirty-nine panellists completed the second round eDelphi. At the conclusion of round two, four of the proposed terms had reached the sufficient level of consensus (70%) and were accepted (quality veterinary care, Significant Event Audit, M&M round, and guidelines). Thirty-two offered definitions failed to reach the required minimum 15% consensus and were eliminated. This left 44 definitions to progress into round three. For two terms, imposing the minimum threshold of agreement meant the removal of all but one definition. Feedback again signposted to the implementation of some of the activities in veterinary practice and the context within which QI was being applied.

> *'Workplace cultures are still not devoid of bullying and intimidation; nor of discrimination, there is the real danger that fear, and intimidation can manifest in subtle ways when audits and reviews are conducted because of this any definitions need to include the wording about safe and retribution free environments'.* **RVN4**

> *'In one definition you have put "pets". It should be "animals", as we also treat commercial animals at our practice'.* **PM1**

Round three results

Thirty-two panellists completed round three, at the end of which, 10 definitions had reached an acceptable level of consensus (70%) or above (Table 6), with only four failing to reach consensus (clinical effectiveness, QI, management, and leadership). Of those reaching consensus, nine of the 10 agreed definitions were original or adjusted definitions suggested by panellists in round one, only the definition for guidelines reached consensus with a literature-based definition chose by the research panel. For full overview of process and results see Figure 2.

Round four

Eight panellists took part in a fourth round where they were asked for comments regarding the terms that failed to reach consensus (perceived reasons for non-consensus and suggestions for improving definitions) and general feedback on the entire process. Comments ranged from issues with a single term within a definition provided to the fundamental understanding of what the term represented (Table 7).

Specific feedback relating to the eDelphi process was generally complementary:

> *'In general, I felt that this was a very thought-provoking opportunity and that many of the concepts felt like they referred to qualities and behaviours I look for in others, try to ensure happen in any work I am responsible for setting up, leading or carrying out; and that I try aspire to in my own professional life.* **QVS1**

TABLE 6 Terms and associated definitions that reached consensus during the eDelphi study on Quality Improvement (QI) term

Term	Accepted definition	Percentage level of consensus	Round consensus reached
Section 1 - Definitions relating to quality Care			
Quality veterinary care	'Providing health services for animals and their carers that increase the likelihood of desired health outcomes and are consistent with current professional knowledge. Quality care should be safe (avoiding harm to patients, owners and caregivers while providing care), effective (providing care based on scientific knowledge and professional standards to those animals that would benefit, avoiding underuse or misuse of treatments), patient-centred (providing care that is respectful of and responsive to the needs, values and wishes of the owner but prioritises the health and welfare of the patient), timely (reducing wait and harmful delays), efficient (avoiding waste), equitable (providing recommendations and care that do not vary in quality based on animal and owner characteristics) and support the caregiver experience (providing care which supports a sense of fulfilment and pride for the caregiver)'.	76.3%	2
Clinical governance	A framework through which an organisation is accountable for continually improving the quality of their services and safeguarding high standards of care by creating an environment in which excellence in clinical care will flourish. Clinical governance is a continuing process of reflection, analysis and improvement in professional practice for the benefit of the animal/patient and the client/owner.	96.9%	3
Patient safety	The absence of preventable harm to a patient and reduction of risk of unnecessary harm associated with health care to an acceptable minimum. It relies on an understanding that all staff while committed to helping patients at all times are nevertheless human and capable of making unintentional mistakes. Patient safety is therefore focused upon identifying safety incidents and learning, such that the same error is not made again by a different operative.	96.9%	3
Section 2 - Definitions relating to methods of quality improvement			
Clinical audit	The collection of data prospectively or retrospectively in health care settings to answer a specific question relating to the delivery of clinical care. The ultimate aim of clinical audit should be to improve the care delivered to patients and the service delivered, through a cycle of measuring, improving and monitoring.	93.8%	3
Significant event audit	'A process whereby significant occurrences (not necessarily involving an undesirable outcome for the patient) in individual cases are analysed in a systematic and detailed way to ascertain what can be learnt about the overall quality of care given and to indicate changes that might lead to future improvements'.	76.3%	2
M&M round/conference	**'**An open forum for the collaborative review of adverse events **or** unexpected outcomes in patient care, without fear of retribution or blame. The primary goals should be improving patient care and maximising the educational benefits of a shared experience'.	81.6%	2
Section 3 - Definitions relating to administration, direction and guidance			
Guidelines	'Systematically derived statements that help practitioners to make decisions about care in specific clinical circumstances. These should be research- or evidence-based. Guidelines should provide extensive, critical and well-balanced information on the benefits and limitations of various diagnostic and therapeutic interventions so that the clinician can carefully judge individual cases'.	86.8%	2
Protocols	Rigid statements allowing little or no flexibility or variation in the process being described. A protocol sets out a logical sequence and a precise series of activities to be adhered to. Generally applied to processes rather than treatment of conditions for example infection control, controlled drugs register, x-ray exposure records as a rigid protocol cannot be applied to a living patient who is not rigid.	81.3%	3
Checklists	Short, organised, lists of specific vital actions to be completed at a certain stage in a procedure. Contains only those actions which are both safety critical and often missed. It functions as a support resource by outlining criteria for consideration in relation to a particular process by categorising items into a list, simplifying conceptualisation and recall of information.	75%	3
Standard operating procedures (SOP)	Written documents describing routine procedures, both clinical and non-clinical, carried out in a veterinary practice. A properly constructed SOP can improve practice efficiency, possibly save money, act as a training manual for staff and, as a last resort, be used by the practice to defend itself should any charges of wrongdoing be levied.	75%	3

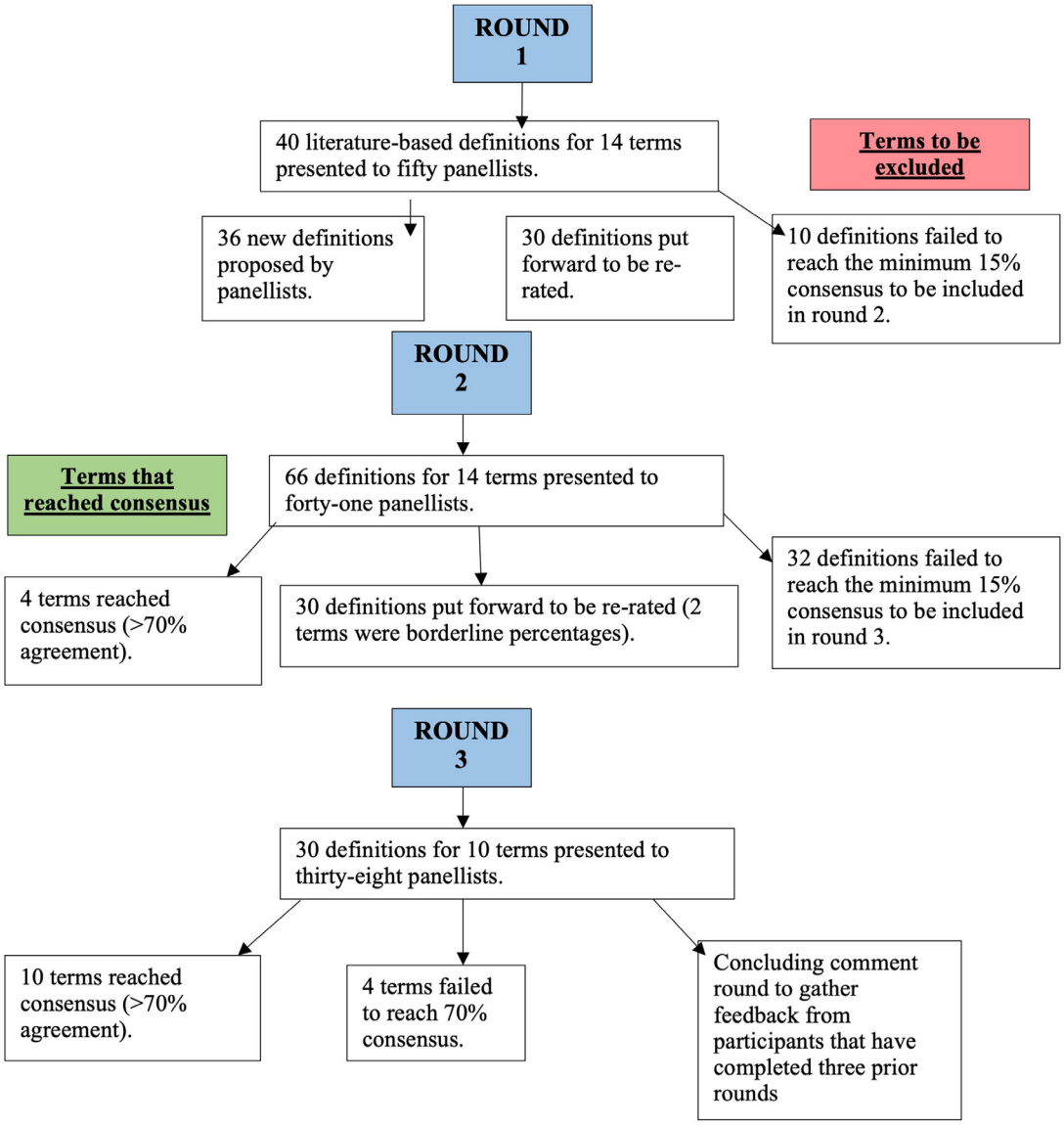

FIGURE 2 A schematic demonstrating the process followed and the results gathered from the eDelphi on Quality Improvement (QI) terminology

> *'I do feel strongly that this needs to be in plain English and accessible/usable for all of the clinical team. My opinion is that the Delphi seeks to produce clear and accessible consensus/guidelines that help within general/clinical practice'*. **Admin1**

DISCUSSION

This is the first research undertaken to formulate a specific and comprehensive list of QI terms and corresponding definitions to be utilised in veterinary medicine. It represents the views of a wide range of veterinary professionals, from diverse backgrounds, education levels and practices across the UK. This research is especially pertinent as it represents the opinions of clinical (veterinary surgeons, registered veterinary nurses and clinical directors/practice owners) and non-clinical representatives (receptionists/client care team, administrators, practice managers and auxiliary staff), as well as animal owners. An agreed and consistent language should support the development of QI within the professions. This common language will hopefully lead to an increased understanding across the industry, regardless of professionals' individual settings. The results will also assist within the context of clinical governance through the Practice Standards Scheme (PSS) and the Royal College of Veterinary Surgeons (RCVS). The outcomes of this work will form the basis of a glossary of QI terms specifically relevant to veterinary practice, leading to a clear and relevant educational resource for veterinary practices and educators alike. Ultimately, this work should facilitate improved outcomes for patients and higher quality care delivery.

The results of this study provided consensus on the majority of the terms selected. Many of the definitions reaching consensus were those suggested by other panel members in round one. This shows that the existing definitions gathered from literature, primarily from QI in human medicine, do not necessarily

TABLE 7 Terms that failed to reach consensus and corresponding comments from participants regarding their perceptions as to why they felt the term failed to reach agreement

Term that did not reach consensus	Feedback comment participants
Quality Improvement	• *'QI doesn't need to be applied only to care that is failing, it can be applied to well-managed areas of care with a view to improving them further. I suspect therefore the initial statement didn't achieve 70%'.* **ClinD/PracO1** • *The first definition is best but should lose the words 'iterative' and also the phrase 'failing in some way'. Iterative is not a 'plain English' word - I had to look it up and don't feel this phrase would help in general practice. The phrase 'failing in some way' is wrong - QI can be used to refine and improve any clinical process/procedure and not just ones that are assessed as 'failing' the whole point is QI can help the team improve outcome and reduce problems - regardless of how perfect or imperfect the procedure is to begin with.* **ClinD/PracO5**
Clinical effectiveness	• *Client perspective is also vitally important in assessing welfare outcome for their animal (they know them best in many aspects) but the term 'client preference' doesn't for me equate to ensuring animal welfare. Client preference does have a role in terms of clients being able to deliver treatments and maintain nursing care like rest or the integrity of wound dressings but isn't equal to an evidence-based perception of the positive or negative impact of the outcome for the patient.* **QVS1** • *'Financial aspects of care should be included in clinical effectiveness and not be secondary as they are rarely secondary to owners or clinicians'.* **PetO4** • *Reference to efficacy, efficiency and effectiveness might be helpful.* **ClinD/PracO1**
Leadership	• *'Leadership encompasses both personal conduct and attitude as well as strategic thinking, directing but also motivating others to achieve aims. But then also including the 'others' in developing the aims, reviews etc. Leadership is a complex concept, I think. So, for me the failure to reach consensus is down to the participants having their own personal biases or understandings of leadership, either through personal experience or the professional environment they operate in and/or learn from'.* **QVS1** • *I think we need a plain language simple understood and accessible guidelines. I don't think I've ever used the word comportment, and I'm in a key leadership role.* **ClinD/PracO5** • *There needs to be more about support and encouragement, motivation and vision.* **ClinD/PracO4**
Management	• *Definition 1 is excellent but as I have stated elsewhere, is perhaps not accessible enough to participants who perhaps have not had formal education in the terms used throughout the QI project and in particular around leadership and management.* **QVS1** • *'Possible confusion of "veterinary management" and just "management"'.* **Admin1**

Abbreviation: QI, quality improvement.

translate into veterinary practice and that the panellists taking part in this eDelphi had a reasonably good understanding of QI prior to undertaking this study. Due to this knowledge, panellists were able to collectively suggest appropriate new terms that most agreed were fit for purpose. This correlates with previous findings of studies that show that although understanding of QI methods is variable across the veterinary industry,[1,13,30] some professionals in veterinary practice do have excellent understanding and knowledge of QI.

This study has shown that terms that are in regular use and familiar reached a consensus with less difficulty. Significant event audit, M&M rounds and guidelines all reached consensus promptly with little disagreement. Even across the different job roles and types of veterinary work performed by the various members of the panel, 10 of the 14 terms did reach consensus. This research goes one step further than previous studies to potentially signpost towards specific areas of QI where a better understanding exists and, conversely, areas where further insight is needed.

This panel was unable to reach an agreement on a veterinary-specific definition for the term QI. QI is used in other industries as an umbrella term for various methods of iterative tests used to continuously monitor and improve the quality of a service or product.[1] Historically, however, the veterinary sector has not always considered QI in this way, with previous focus on the methods that could be used, and less on the overarching concept of QI. Consequently, individuals are likely to be more familiar with specific QI methods such as checklists, M&M rounds, significant event audit and clinical audit.[44,77–81] This may indicate that the veterinary profession's understanding of QI is still evolving. Another consideration is that in veterinary practice there are owners as well as animals to consider which inherently means not all aspects of QI may translate from human medicine. Additionally, there is evidence from the few published studies on this subject that demonstrates a disparity in knowledge, education and understanding of QI between different groups of workers in veterinary practice.[13,30] It is therefore likely that if there is a lack of understanding regarding QI between different stakeholder groups then it will be more difficult to reach an agreed definition.

Many of the definitions put forward by the panel for both management and leadership detailed the

qualities a person performing these tasks needed, rather than the actual definitions of the terms in relation to QI in veterinary practice. Both terms can be challenging to clearly define. Often opinion, ethos and philosophy will all influence a person's view on what constitutes good management and leadership.[82–84] Clearly defining management and leadership is a contentious topic, with all options provided to the panellists failing to even reach 50% agreement in the final round of voting, which again signposts to the fact that further research is required to fully explore these concepts and what they represent for the veterinary professions. Involving a broader range of individuals, including those from organisations such as the Veterinary Management Group, will be critical moving forward.

The term 'clinical effectiveness' did not achieve consensus, perhaps because it does not have a universal definition applicable to all stakeholders in the veterinary profession. A definition often used is that clinical effectiveness is about doing the right thing at the right time for the right patient,[32] which inherently means that this is likely to differ between job roles within a veterinary practice and may explain the lack of consensus.

The mix of professionals and pet owners involved in this eDelphi study increased the heterogeneity and diversity of the group. Studies in the field of human medicine have found that the inclusion of patients (lay people) in such research studies provide a unique perspective not otherwise presented by the professionals.[85–87] Hussler et al. noted that the feedback provided by lay people can be hugely beneficial, enabling full representation to be achieved. In veterinary medicine, the inclusion of animal owners is a proxy for the animal viewpoint, as the actual receivers of care (the animals) cannot voice their experiences. Additionally, a key aspect of providing a quality veterinary service is in understanding the experiences of paying clients; therefore, it was essential for their inclusion in the panel to ensure their views were represented. In this study, the pet owners that participated provided invaluable views and feedback across the process that could not have come from other panel members.

Study limitations

All the predetermined demographic conditions were met with the initial panel of 50 individuals selected. Although the eDelphi methodology is recognised as supporting agreement among a group of professionals, it is only ever truly representative of the views of those who have participated in the eDelphi. It is possible that the findings and outcomes of this eDelphi could have been different, had the panel had a different configuration; however, the researchers spent a long time considering the study design that was to be employed (e.g., size and structure of the panel), and how it would be executed to ensure the eDelphi would adequately represent the breadth of the veterinary professions.

A great strength of any Delphi style study is the flexibility it gives participants to adapt and adjust their views and answer over the course of several rounds of questioning. The ability to amend or alter participant views at each round is also paired with the risk that participants will alter their views or answers solely to comply with what they think or know the majority view in the group is (known as the bandwagon effect).[88,89] To protect against this, all feedback and comments left were communicated back to the participants with total anonymity; by doing this, there was a limited chance of the participants with strong personalities or those holding a more senior job role shaping the view of others intentionally or otherwise. It is possible that despite this, there was a bandwagon effect particularly in the final round where participants were presented with the agreement percentages for each definition available, although the participants had no way of knowing who had voted for what, so the impact of these percentages was minimised.

If similar studies were to be repeated, it may be beneficial to provide panellists with the opportunity to communicate directly with each other through an anonymised online discussion forum. This could have aided the contextualisation of the terms, promoting group learning experience and discussion, potentially resulting in reaching agreed definitions sooner. Delphi studies are commonly employed when more objective forms of evidence either do not exist or when there are controversies around a topic.[88–90] Using this justification an eDelphi was an appropriate methodology to use for this study given the aim of this work.

CONCLUSIONS

This study describes a novel piece of research aiming to lay the foundations for key QI definitions that are specifically for use in veterinary practice. By involving a broad range of stakeholders, the definitions that reached agreement are applicable to and understood by a variety of people across job roles and contexts. This would make these definitions easier to embed as a concept into mainstream veterinary practice, as well as being ideal for use in education and policy. Future work should focus on those terms where uncertainty is still present.

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AUTHOR CONTRIBUTIONS

Freya Rooke was responsible for participant recruitment, carried out the research, analysed the data collected and wrote the manuscript. All other authors provided critical feedback and helped to shape the manuscript. All authors contributed to study design.

ETHICS STATEMENT

All research was approved by the SVMS UoN CARE (Committee for Animal Research and Ethics).

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest that could be perceived as prejudicing the impartiality of the research reported.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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SUPPORTING INFORMATION

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