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ORIGINAL RESEARCH

Type and impact of clinical incidents identified by a voluntary reporting system covering 130 small animal practices in mainland Europe

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Abstract

Background: Veterinary healthcare can be a complex process and may lead to unwanted, potentially harmful patient safety incidents as a consequence, negatively impacting both the practice team and client satisfaction. The aim of this study was to identify how such incidents impact cats and dogs by analysing reports gathered in a large-scale voluntary incident reporting system.

Methods: Descriptive statistical analysis was used to study a total of 2155 incident reports, submitted by 130 practices on mainland Europe.

Results: Incidents caused harm in more than 40% of reports. Medication-related incidents were the most frequent type of incident recorded (40%). Treatment-related incidents were the most common type of incident causing patient harm (55%). Anaesthesia-related incidents were the most severe type of incident, resulting in patient death in 18% of these reports. Most incidents were reported from hospital wards, and a significantly higher proportion of cats were harmed by incidents compared to dogs.

Conclusion: This study demonstrates that patients are regularly harmed by incidents, with medication-related incidents being most common. In depth understanding of incident data can help develop interventions to reduce the risk of incident recurrence.

INTRODUCTION

The advancement of veterinary diagnostics and treatment has evolved a complex picture of care in practices, with many more options and opportunities available to clinicians and pet owners. The organisational structure of veterinary practices has also changed, ranging from small solo veterinarian practices to specialist hospital groups owned by multi-billion US dollar corporations.[1] In parallel, the 'humanisation' of animals has increased, and pet owners have enhanced expectations around accessibility and quality of care, as well as transparency of communication around the options available.[2,3] As a result of the COVID-19 pandemic, the pet population has increased even more, and it is likely that demands and expectations will continue to rise.[4]

There are risks associated with all types of healthcare, and consequently potential for unintentional harm to occur.[5] The World Health Organization (WHO) defines these events as patient safety incidents: 'an event or circumstance that could have resulted, or did result, in unnecessary harm to a patient'.[6] Makary and Daniel[7] suggest that patient safety incidents may be the third leading cause of adult death in the US after cancer and heart disease. It is clear that similar patient safety incidents (simply called 'incidents' within this paper) occur in veterinary healthcare.[8] It is important that the profession records and investigates these events in order to deliver the expected high standards of care and maintain the health and wellbeing of animal patients.

Morbidity and mortality meetings, malpractice claims, medical record review, practice surveillance, audits and incident reporting systems are examples of methods used to capture information relating to patient safety incidents.[9–12] All have varying ability to identify different types and causes of incidents.[13]

Incident reporting systems provide a structure for incident processing and analysis, generating unique insights from the perspective of the practice team.[14] This information can be extremely valuable for local management and a timely response to critical issues. On an organisational level, aggregated data enable identification of common risks, patterns and insights which facilitate informed decision making.[15]

Patient safety and the process of capturing and learning from incidents is an emerging field of research in veterinary medicine. In the UK, a previous study analysing data from litigation claims and focus group interviews identified causes of incident such as cognitive limitations, owner contribution and lack of technical knowledge, and risk factors such as the animal requiring surgery.[8] In the US, a study exploring 560 voluntary reports collected in three practices (including two teaching hospitals), found that medication-related incidents were most common and suggested that incidents were more likely to reach patients and cause harm in teaching hospitals.[16] Incidents have also been found to have a negative impact on the well-being of veterinarians as second victims of an incident, including reduced clinical confidence, reduced job satisfaction, feelings of guilt and sleep deprivation.[17]

No similar research exists from mainland Europe, and current studies are limited by the size of their data sets. The aim of this study was to analyse reports gathered in a large-scale voluntary incident reporting system from a European multi-practice organisation. Indirectly, this study aims to increase understanding about how data can assist veterinary organizations trying to reduce the risk of incident recurrence.

MATERIALS AND METHODS

This study used voluntary incident reports from a large group of small animal veterinary practices in Europe. The reports, collected in a pre-existing company-specific incident reporting system, were quantitatively analysed to identify impact on patients. Inclusion criteria were developed to ensure that appropriate reports were included for analysis.

Terminology and incident model

The terminology and the model for the incident process has been informed by the conceptual framework for the International Classification of Patient Safety developed by the WHO.[6] The model facilitates analysis and comparison by categorisation of patient safety information using standardised terminology. It aims to capture multiple types of incidents originating from different mechanisms (Table 1).[5]

TABLE 1 Definition of terminology from an incident reporting system used in a large group of small animal veterinary practices in Europe

Terminology	Definition
Accident	An unexpected event in a tightly coupled complex system resulting in an accident. It may or may not result in patient harm or death. For example, unexpected valve failure in an anaesthesia machine despite checking and correctly following maintenance routines.
Adverse reaction	Unexpected harm arising from a treatment.
Death incident	An incident that results in patient death.
Harmful incident	An incident that resulted in harm to a patient (temporary, permanent harm or patient death).
Intended	A deliberate act. For example a violation of a routine by skipping a step to save time.
Near-miss incident	An incident that occurred but did not reach the patient. For example preparing to inject the wrong patient but noticing before delivering the injection.
No harm incident	An incident reached the patient, but no harm resulted.
Non-patient safety-related incident	An incident that did not involve a live patient. For example, a report about a member of the staff who was bitten by a patient or an incident report regarding an unhappy customer.
Patient safety incident	An event or circumstance that could have resulted, or did result, in unnecessary harm to a patient.
Permanent harm incident	An event that caused permanent harm. For example, removal of wrong limb.
Preventable	Avoidable in the particular set of circumstances.
Temporary harm incident	An event that caused temporary harm to the patient. For example, accidental damage to skin during clipping prior to surgery.
Unpreventable	An event that could not be avoided or prevented. For example an adverse reaction to a drug previously unreported.
Unsafe act	Errors and violations committed at the 'sharp-end' of the system. Likely to have a direct impact on the safety of the system. For example, using an equipment without proper training.
Violation	Deliberate deviation from an operating procedure, standard or rule.

Note: Adapted from the World Health Organization (WHO) conceptual framework for International Classification of Patient Safety (ICPS).[6]

The incident reporting system

The incident reporting system was developed in 2018, structured according to the definitions outlined in Table 1, to collect data as part of an overall strategy of quality improvement and patient safety. The aim is to increase understanding about these incidents at both practice and organisational level. The system is a cloud-based digital programme with password protected log-in. All members of practice teams are given the opportunity of training about the reporting system and how to use it. This training consists of online webinars and group training sessions. Teams are reminded about the system in newsletters and during practice meetings. The digital report form is built on free-text

TABLE 2 Incident form report fields from an incident reporting system used in a large group of small animal veterinary practices in Europe

Mandatory fields	Voluntary fields
Incident description (filled in during incident reporting)	
Date of incident	Time of day incident occurred (drop-down menu)
Species of patient (drop-down menu)	ASA-score[a] (drop-down menu)
Degree of patient harm (drop-down menu)	Location of incident (drop-down menu)
Type of incident—see Table 3 (drop-down menu categorised on two levels, overall and detailed)	What actions were immediately taken to reduce impact of incident (free-text field)
Describe what happened (free-text field)	What does the author think is the actual reason for why it happened and what could be done to prevent it from reoccurring (free-text field)
Root cause analysis (filled in during incident analysis)	
Was the incident preventable? (drop-down menu (low/medium/high))	Should the incident be shared within the organisation? (check box)
What were the underlying cause/s behind the incident? (free-text field)	
Has the incident been discussed with the entire practice team? (free-text field)	

Note: ASA-score = ASA physical classification, a grading system for determining preoperative health of surgical patient developed by the American Society of Anaesthesiologists.[18]

fields and drop-down menus (Tables 2 and 3), hosted on a secure server. The reporter can select language as appropriate (Danish, Dutch, English, German, Norwegian or Swedish). Some fields are mandatory, and some are optional (Table 2). Information regarding country, practice and the report author is automatically recorded. Before the system was launched, a pilot scheme was undertaken by a panel of stakeholders in different countries in order to ensure functionality and validity of the questions.

The system has three levels of interaction covering the process of incident analysis; the first collects information about the incident, the second is a step-by-step investigation of the incident including root cause analysis, with action plan generation to prevent recurrence. The third and final step is a review of implemented actions and verification of the effectiveness of these changes. This study analyses and reports results about data collected from the first level of the incident analysis process.

The anonymity of the system varies with only two countries optionally able to report incidents anonymously. Anonymous reports maintain the automatic recording of country and practice, but no record of the author is collected. All practices in the group, both first opinion and referral, have access to the system and are invited to use the system.

Inclusion criteria and data cleaning

All complete reports recorded by active users between April 2018 and September 2020 were included for analysis (Figure 1). Duplicate reports were amalgamated into a single entry. Reports identified by the primary researcher (LS) as non-patient safety-related incidents (for example, incidents postmortem or involving a member of the staff and not a patient) were evaluated by a second reviewer (AB) for validation before exclusion. Any disagreements in categorisation were resolved by discussion and agreement between LS and AB. A process of recategorisation was performed during initial data set cleaning for two scenarios: (1) reports which had been categorised as 'other care-related incident' were recategorised by LS, and (2) reports of similar incidents which had been differently categorised were recategorised for harmonisation. Practices in Austria and Germany belong to the same business area, therefore results from these two countries are presented together.

Measures

Variables analysed were type of incident, degree of harm, location, species and harm/no harm (Table 4). The variable harm combines temporary and permanent harm, as well as incidents causing death. The variable no harm combines no harm and near-miss incidents.

Data analysis

Standard descriptive statistics were employed to characterise key findings using Microsoft Excel (CA, USA, 2018) and IBM SPSS Statistics for Windows, version 26 (Armonk, NY, USA, 2019). *Z*-score test was used to test difference in proportions.[19] *p*-Values less than 0.05 were considered statistically significant.

RESULTS

A total of 2155 incident reports from 130 different practices in seven different countries were reported during the defined 29-month period of analysis. The median number of reports per practice was three

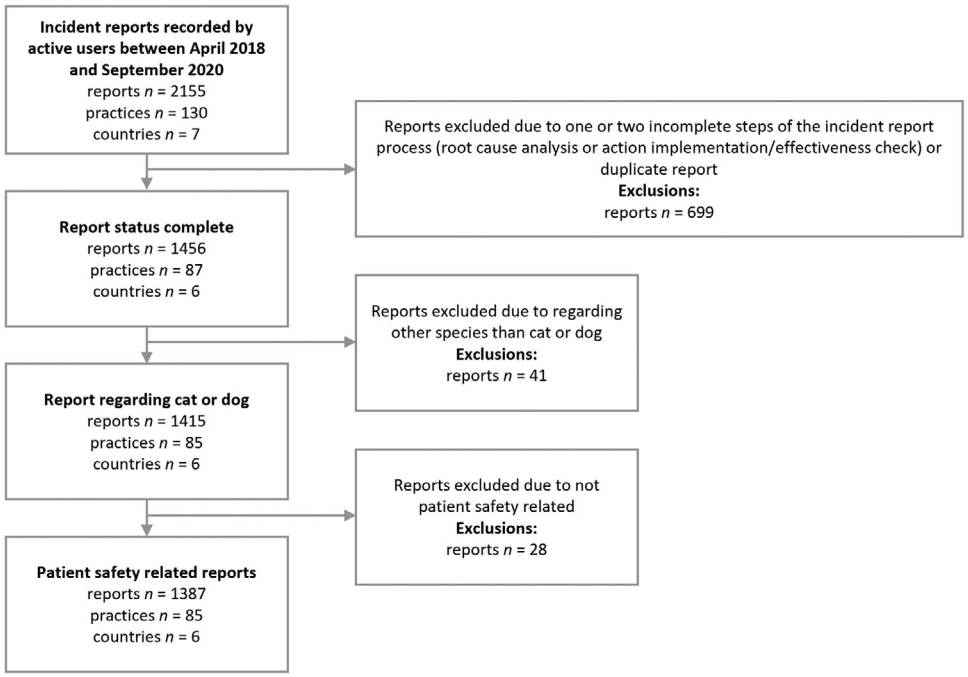

FIGURE 1 Flow chart summary of the application of predefined inclusion criteria used in the analysis of incident reports from a large group of small animal veterinary practices in mainland Europe

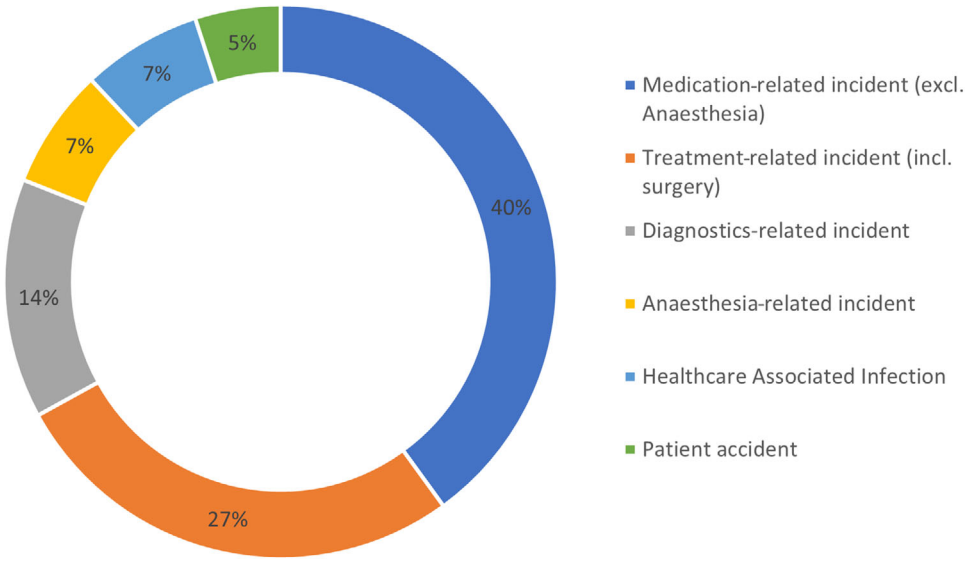

FIGURE 2 Distribution of types of incidents in an incident reporting system used in a large group of small animal veterinary practices in mainland Europe

(interquartile range = 7). Sixty-four percent ($n = 1387$) fulfilled the inclusion criterion and were included in analysis. Type of incident was recategorised in 8% ($n = 105$) of reports. Sixty-nine percent ($n = 952$) of reports came from Swedish practices (Table 5). In two countries, anonymous reporting was possible and this option was utilised in six out of 49 reports. Free-text fields describing the incidents ranged in length between five and over 600 words.

Harm and species

Incidents caused harm in 42% ($n = 587$) of reports. In cats, incidents caused harm in 48% ($n = 222$) and in dogs 39% ($n = 365$), the difference was statistically significant (Z-score = 3.154, $p = 0.002$). The degree of harm is presented in Table 6.

Type of incident

Medication-related incidents were most commonly reported, representing 40% of the total number of reports analysed ($n = 550$), of which 27% ($n = 147$) caused harm and less than 1% ($n = 3$) resulted in patient death (Table 7 and Figure 2). Wrong dose or dosing frequency, failure to administer or omitting dose, or wrong drug used were the three most common subtypes of medication incidents (Table 8).

TABLE 3 Incident types and subtypes from an incident reporting system used in a large group of small animal veterinary practices in Europe

Anaesthesia-related incident
Adverse drug reaction
Wrong patient anaesthetised
Wrong gas used
Wrong flow/concentration
Wrong administration route used
Failure to monitor
Gas contaminated
Wrong dosage
Medical device/equipment-related incident (anaesthesia)
Diagnosis-related incident
Diagnosis not performed when indicated
Diagnosis incompletely/inadequately performed
Diagnosis performed on wrong patient
Diagnosis performed on wrong body part/side/site
Wrong diagnostic procedure performed
Wrong diagnosis made
Medical device/equipment-related incident (diagnostics)
Healthcare-associated infection organism/location
Bloodstream
Surgical site
Airway (e.g., pneumonia)
Gastrointestinal
Intravascular catheter
Urinary tract
Other
Medication-related incident (excl. anaesthesia)
Wrong patient medicated
Wrong drugs used
Wrong dose/dosing frequency
Wrong administration route used
Contraindication
Wrong storage (e.g., faulty cold-chain)
Failure to administer/omitted medicine or dose
Expired medicine used
Adverse drug reaction
Medication not available
Medical device/equipment-related incident (medication)
Patient accident
Patient ran away/breaks out
Patient fell/patient dropped
Mechanical force (blunt, piercing, e.g., bites from other patient, skin injury/shaving, other)
Thermal mechanism (e.g., burned)
Threat to breathing
Exposure to chemical or other substance
Other specified mechanism of injury
Treatment-related incident (incl. surgery)
Treatment not performed when indicated
Treatment incompletely/inadequately performed
Treatment performed on wrong patient
Treatment performed on wrong body part/side/site
Wrong treatment performed
After-treatment plan not complied to/was missing/was inadequate
Medical device/equipment-related incident (treatment)

TABLE 4 Independent variables for analysis of an incident reporting system used in a large group of small animal veterinary practices in Europe

Type of incident	Degree of harm	Location	Species	Harm
Anaesthesia	Near-miss	Consultation room	Cat	Harm
Diagnostics	No harm	Hospital ward	Dog	No harm
Healthcare-associated infection	Temporary harm	Laboratory/ diagnostic imaging area		
Medication (excl. anaesthesia)	Permanent harm	Not given		
Patient accident	Death	Outside hospital/at home		
Treatment (incl. surgery)		Other		
		Rehab/ physiotherapy room		
		Surgery area		
		Waiting room/reception		

TABLE 5 Reporting practices and number of reports per country in a small animal European multi-practice organisation

Country	Practices (*n*)	Incidents (*n*)	Total (%)
Sweden	20	952	69
The Netherlands	33	197	14
Norway	18	172	12
Austria, Germany[a]	10	49	4
Denmark	4	17	1
Total	85	1387	

[a]Possible to register incidents anonymously.

TABLE 6 Degree of harm in cats and dogs from an incident reporting system used in a large group of small animal veterinary practices in mainland Europe

	Cat		Dog		Total	
	n	%	*n*	%	*n*	%
Near-miss	50	11	163	18	213	15
No harm	188	41	399	43	587	42
Temporary harm	180	39	307	33	487	35
Permanent harm	11	2	21	2	32	2
Death	31	7	37	4	68	5
Total	460		927		1387	

TABLE 7 Types of incidents in cats and dogs from an incident reporting system from mainland Europe

	Cat		Dog		Total	
	n	%	*n*	%	*n*	%
Medication-related incident (excl. anaesthesia)	156	34	394	43	550	40
Treatment-related incident (incl. surgery)	133	29	239	26	372	27
Diagnostics-related incident	62	13	136	15	198	14
Anaesthesia-related incident	46	10	56	6	102	7
Healthcare-associated infection	33	7	57	6	90	6
Patient accident	28	6	44	5	72	5
Diagnosis-related incident	2	0	1	0	3	0
Total	460		927		1387	

TABLE 8 Types of incident and top three subtypes within each category from an incident reporting system from mainland Europe

Type of incident	*n*
Medication-related incident (excl. anaesthesia)	420
Wrong dose/dosing frequency	230
Failure to administer/omitted medicine or dose	122
Wrong drugs used	68
Treatment-related incident (incl. surgery)	292
Treatment incompletely/inadequately performed	165
After-treatment plan not complied to/was missing/was inadequate	64
Treatment not performed when indicated	63
Diagnostics-related incident	135
Diagnostics incompletely/inadequately performed	74
Diagnostics not performed when indicated	46
Diagnosis incompletely/inadequately performed	15
Anaesthesia-related incident	71
Medical device/equipment-related incident (anaesthesia)	30
Failure to monitor	25
Wrong dosage	16
Healthcare-associated infection	85
Surgical site	69
Other	12
Airway (e.g., pneumonia)	4
Patient accident	49
Other specified mechanism of injury	27
Mechanical force (blunt, piercing, e.g., bites from other patient, other)	11
Patient fell/patient dropped	11
Total	1052

Anaesthesia-related incidents were most severe, representing 7% of total reports analysed (n = 102), of which 18% (n = 18) resulted in patient death. In anaesthesia-related incidents, the degree of patient harm in cats was significantly higher compared to dogs (Z-score = 3.245, p = 0.001).

Where incidents occurred

Most incidents (40%, n = 549) occurred in the hospital ward, followed by the surgical area (20%, n = 275) and consultation room (11%, n = 151) (Table 9). In the hospital ward, the most common type of incident was medication related (61%, n = 335), followed by treatment-related incidents (23%, n = 128). In the surgery area, treatment-related incidents (38%, n = 107) and anaesthesia incidents (28%, n = 76) were most common.

There was no statistically significant difference between degree of harm for dogs and cats in the ward (41%, n = 80, 37%, n = 130, Z-score = 0.993, p = 0.322), but a statistically significant difference was present for incidents in the surgery area (58%, n = 60, 45%, n = 77, Z-score = 2.037, p = 0.04).

DISCUSSION

This study provides an overview of the types, degree of harm and location of incidents reported in veterinary practices through an analysis of voluntary incident reports collected in a multi-practice incident reporting system in mainland Europe. The analysis identifies that medication-related incidents were the most common type of incident submitted while treatment-related incidents were the most common type of incident causing patient harm. Anaesthesia-related incidents were most severe. Most incidents were reported from hospital wards. The data also suggested that cats are more likely to suffer harm from incidents than dogs.

Medication-related incidents are the most frequent type

In this study, medication-related incidents represented two-fifths of total incidents recorded, of which one-third resulted in patient harm. This finding is slightly lower compared to a previous study by Wallis et al.[16] where 55%–69% were medication related. This could be as a result of different classification methods; however, both studies underline medication-related incidents as most common. The medication process is incident prone[20] and constructed of seemingly uncomplicated yet interdependent steps, such as prescription, documentation, calculation, dispensing and administration of drugs. Both written and verbal communications are required in these processes, but both of these are highly susceptible to errors which give rise to incidents.[21–23] Analysis of similar

TABLE 9 Location of incidents and type of incidents from an incident reporting system in mainland Europe

	Medication-related incident (excl. anaesthesia)	Treatment-related incident (incl. surgery)	Diagnostics-related incident	Anaesthesia-related incident	Healthcare-associated infection	Patient accident
Hospital ward	335	128	29	11	14	32
Surgery theatre	49	107	13	76	15	15
Polyclinic/consultation room	55	33	51	6	2	4
Outside the practice/at home	34	42	4	1	42	5
Not given	28	18	16	NA	12	2
Other	17	16	23	5	2	4
Waiting room/reception	30	21	21	1	2	4
Laboratory	NA	1	37	NA	NA	NA
Diagnostic imaging procedure	1	4	7	2	1	4
Rehab/physiotherapy room	1	2	NA	NA	NA	2
Total	550	372	201	102	90	72

data in human healthcare has identified medication-related incidents as one of the most common types of incidents.[24] It has been suggested that improved labelling, multimodal interventions (such as bar-code readers, colour-coded syringes, reorganisation of workspaces) and independent verification could reduce incident probability.[25,26] These approaches are receiving increasing consideration in veterinary practice.[27,28]

Treatment-related incidents are the most harmful type of incident

Treatment-related incidents include a wide range of incidents, from treatments not performed at the appropriate time (for example, incidents in routine feeding or care) to incomplete or inadequate treatment during surgery (for example wrong site surgery or incorrectly used equipment). Half of these incidents resulted in patient harm and almost 10% resulted in patient death. This finding is similar to a previous study where surgery was a high-risk area of litigation in an analysis of veterinary professional indemnity insurance claims.[8] Studies in human healthcare also identified surgical incidents as one of the most common and expensive type of incident.[29–31]

Knowing the types, severity and location of treatment-related incidents can help identify areas for improvement and may inform research to explore the causality of these events. There are likely multiple factors contributing to the reasons for treatment-related incidents, but one factor could be the increase in new healthcare technologies, requiring advanced equipment and new technical skills.[32] Fifty-six percent of reported incidents were due to incompletely or inadequately performed treatments. To reduce risk of recurrence, actions such as making practice teams aware of different types of incidents and frequency, alongside other interventions such as checklists and further training may be helpful.[33]

Location of incidents

The paper by Oxtoby et al.[8] identified that most severe incidents occur in the surgery area, findings which were confirmed by this study. The largest number of incidents were recorded as occurring in the hospital ward, of which most were medication related. This may be because most medications are administered in the hospital ward, however this needs to be further explored. The ward environment is also where patients will be located for the majority of their stay at the practice while awaiting surgery, during recovery or being treated medically. This combination of factors and the repetitive nature of activities in the hospital ward may influence the high frequency of incidents recorded in this location.

Cats are more likely harmed by incidents than dogs

Findings suggest that incidents were more likely to cause harm in cats compared to dogs, an important consideration bearing in mind many practices treat more dogs than cats.[34] In anaesthesia, for example, cats were harmed in more than half of incidents within which more than half (n = 14) resulted in death. In dogs, only one-quarter resulted in harm, within which almost one-third (n = 4) resulted in death. Studies of peri-anaesthetic deaths have identified similar findings where cats died between two and five times more often compared to dogs.[35,36] The reason behind cats being more prone to harm needs to be further explored but the literature has suggested that cats may be clinically more complicated to diagnose[37] and treat.[38] In addition, a small body size increases the risk of hypothermia and drug overdose, alongside increased difficulties related to endotracheal intubation and reduced accuracy of anaesthetic monitoring.[39,40] The handling of species in practice also differs; dogs are regularly exercised while cats remain in their cages, potentially resulting in less

interaction and reduced opportunity for assessment. Further research is needed to explore and evaluate these factors in the context of reducing incidents in cats.

Incident categorisation

Unclear terminology within incident reporting systems can create confusion and weaken learning opportunities.[41,42] Education in what should be reported, who should report and how are factors identified as important in previous studies as improving the quality and quantity of data collection.[43] These findings were mirrored in this study. The data cleaning process underlined lack of clarity for the 'other care-related incident' category, as reports originally put in this category could fit in other categories. Additionally, a category for 'missing or inadequate documentation' was identified as a missing option. On a local level categorisation may matter less, as the main goal is identifying practice-specific improvements. However, on a national or international level, when data from several practices is aggregated, accurate categorisation becomes more important. The findings from this study suggest that a review of categories is recommended before data analysis commences, to avoid misguiding inferences.

Culture of reporting

Under-reporting of incidents is a significant problem in many industries, with estimated reporting rates ranging from 50% to 90%.[9,44,45] In this study, most reports came from Swedish practices while the Netherlands had more reporting practices. The increased reporting rate in Swedish practices may be a result of anecdotally larger practice teams in this country although this requires formal evaluation. The higher number of reports from a small proportion of practices, and the difference in length of reports, reveals characteristics about reporting and suggests variations in reporting cultures. Oxtoby and Mossop[46] identified the culture, influence of organisational system and emotional effect of incidents as barriers to reporting. In human healthcare, studies have shown that doctors are more reluctant to report incidents which involved a violation of a protocol with a negative outcome as a result.[47] This study did not explore the reasons for differences of incident disclosure between countries. However, factors such as language, mandatory reporting and national cultures may all influence reporting behaviour. The option to report anonymously could also impact on rates of disclosure, although interestingly only 12% of reports utilised this function in practices where this was possible within the system. All these factors require further investigation.

FURTHER DATA ANALYSIS

This study provides an analysis of the first step of the incident process with collecting and categorisation of incidents. The next step for improving patient outcomes is to make further use of the collected data to provide a deeper understanding of the causes of patient safety incidents. This requires analysis, action prevention planning, sharing of learnings and verification of intervention effectiveness.

Developing robust mechanisms for learning and sharing of learnings on a local, national and international level is also required to make use of incident data and make reporting worthwhile. Future studies could further explore system engagement by questionnaires to staff or interviews/focus groups.

STUDY LIMITATIONS

This study is limited by the inherent subjectiveness and reporting bias that comes with voluntary reporting systems.[13] Voluntary self-reporting is likely to have relatively large measurement errors because factors other than those being measured will influence how people respond to the questions. Incidents during care are likely to be under-reported due to the sensitive and complex nature of incident[48–50]; thus, it can be assumed that some of the actual incidents that occurred were not reported meaning that this study is likely to only represent a small portion of actual incidents.[12] Despite limitations in the data collected, reporting systems are nevertheless extremely useful to identify local safety risks and to share lessons learned within and across organisations.[13,46] It is of course important to understand the incident within the context of the system in which it occurs.

CONCLUSION

This study identifies certain characteristics of patient safety incidents which occurred in a range of small animal practices in Europe. The understanding of degree of harm, type and location of incidents provide insight into where to focus deeper analysis, and ultimately where to commence safety interventions. Knowing that incidents are more likely to cause harm in cats may play a central role in prediction and prevention of future incidents. Additional research around root causes, actions for prevention and how national differences may impact reporting are needed to increase depth of understanding to help inform the entire picture of incidents in veterinary care.

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ETHICS STATEMENT
Ethical approval was granted by the University of Lincoln, School of Health and Social Care ethics committee (2020_3498).

AUTHOR CONTRIBUTIONS
All authors participated in the design of the study. LS carried out data collection, performed the statistical analysis and drafted the manuscript. AB reviewed data analysis. All authors critically read and modified subsequent drafts and approved the final version.

CONFLICTS OF INTEREST
LS works for AniCura as a group medical development manager. AB works for AniCura as a surgeon. There is no conflict of interest.

DATA AVAILABILITY STATEMENT
Data were made available for authors under confidentiality agreement with AniCura and are not available for sharing.

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