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Case Study

A case study of the patient wait experience in an emergency department with therapy dogs

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Abstract
The quality of patient healthcare is a growing concern in Canada's hospital emergency departments (ED) due to increasing wait times and associated adverse outcomes. A developing body of literature indicates that therapy dogs can positively impact the patient experience. In 2016, members of our team partnered with the Royal University Hospital (RUH) in Saskatchewan to become the first ED in Canada to integrate a visiting therapy dog to positively impact the patient wait experience. The aim of this preliminary case study was to examine if and how this unique initiative impacted patients' feelings during their ED wait. A brief questionnaire was completed with one-hundred and twenty-four patients pre and post-therapy dog visit and a research observer documented the encounters. Quantitative and qualitative analysis of the data revealed that visiting with a therapy dog in the ED appeared to improve patients' feelings. Specifically, patients' perceived comfort levels increased and their distress levels decreased, and the encounters were considered by patients to be a welcome distraction from the stressful ED environment. Our team, comprised of clinicians, researchers, therapy dog handlers and patient advocates documented the advantages and challenges of implementing the initiative. The outcomes support further study of patients' wait time experiences in the ED and the utility of a visiting therapy dog.

Keywords
Patient experience, healthcare, therapy dog, emergency department wait time, qualitative and quantitative methods

Introduction

Animal assisted interventions (AAI) is "a broad term… commonly used to describe the utilization of various species of animals in diverse manners beneficial to humans".[1] Participating canines are often referred to as therapy dogs. Although they may not be involved in formalized therapy programming, their presence has been identified as potentially therapeutic .[2] Therapy dogs most often visit in public health settings for motivational, educational, therapeutic and recreational benefit .[2] The AAI field has expanded over the past decade, with some research showing benefits in medical settings, including inpatient hospitals,[3,4,5,6] pediatric oncology [7,8,9,10] and geriatric psychiatry .[11,12,13] Other AAI research has not been as supportive, mainly criticizing inadequately developed methodologies.[14] Accordingly, there is a need for additional, rigorous health-care specific research in the area .[14,15,16,17,18,19] At the same time, there has been increased scrutiny in Canada concerning emergency department patient healthcare because of such factors as increasing wait times and associated adverse outcomes.[20] There is also a growing call to recognize the patient experience as an important indicator of quality healthcare.[21,22] The limited research[23,24,25] in this developing area has mainly focused on quantitative assessments of patient satisfaction[26] and so there is a need to expand the scope.

Our preliminary case study, including 124 ED patients, explored if and how a visiting therapy dog in a hospital emergency department in Saskatoon, Canada impacted

patients' feelings during their ED wait. A brief questionnaire was completed with patients pre and post-therapy dog visit and a research observer documented the encounters, including key observations from the therapy dog handler. Quantitative and qualitative analysis of the data revealed that visiting with a therapy dog in the ED improved patients' feelings, specifically their perceived levels of comfort and distress and was a welcome distraction for patients from the stressful ED environment. Our team of clinicians, researchers, therapy dog handlers and patient advocates documented the advantages and challenges of implementing the initiative. The outcome of this study encourages further research on patients' experiences of waiting in the ED, including the potential benefits of incorporating a visiting therapy dog. Our team's focus on the patient wait experience is distinct from the ongoing health system need to decrease the actual ED patient wait time. Quite simply, therapy dogs are not an answer to problematic ED wait times.

Background

Emergency Department Wait Time

The current monitoring approach for ED system performance focusses on wait time to receive acute (i.e., short-term) care. With ED wait times increasing in Canada over the past decade, adverse outcomes on patient health have ranged from delayed pain management to increased morbidity and mortality due to patients leaving the ED without being assessed.[20,27,28] Long wait time to initial physician assessment is the most common reason patients leave a hospital ED in North America.[29] Patient and family dissatisfaction with wait times is likewise a primary cause of assault on ED nurses and other personnel.[30,31] In other words, long wait times negatively influence how patients feel during their ED experience.

A 2012 Canadian Institute for Health Information (CIHI) report concluded that, in comparison with 11 other countries with similar health systems, Canada had the highest percentage of patients waiting four or more hours in the ED. This is 31% higher than the average of the comparison countries. ED length of stay has increased 11% in Canada from 2015/16 - 2016/17, and 17% from five years earlier.[20] According to the CIHI report, Saskatchewan's big-city emergency rooms had the second longest wait times in Canada.[20] A 2010 study found that Saskatchewan patients wait an average of five hours in the ED.[32] The Saskatchewan Ministry of Health acknowledges this concern, including ED Waits and Patient Flow as a key priority in its 2017-18 strategic plan.[33]

In 2010 the Saskatchewan government invested in a system-wide Lean transformative process, a manufacturing-based philosophy focused on streamlining service delivery by reducing waste and waits.[34] It focusses on a reduction in time and undue process to receive a quality service or product. An independent review concluded that the adoption of a Lean initiative did not improve the quality of patient care in SK.[35] A 2016 systematic review of Lean initiatives in healthcare arrived at the same conclusion, with the authors stating: "While some may strongly believe that Lean interventions lead to quality improvements in healthcare, the evidence to date simply does not support this claim".[36,p.150] Likewise, in a recent examination of hospital quality improvement, Tothy et al.[37] identified inconsistency between streamlined process-focused quality improvement efforts like Lean and efforts to improve the patient care experience. In short, there is significant room for improvement in both the patient wait time and experience of waiting.

Without a substantial decrease in patient wait times on the horizon, and despite targeted efforts at this, this may be even more reason for attention to be paid to the patient wait experience. Although not thoroughly researched, some studies have suggested that the management of patient expectations of waiting may be beneficial to improving the overall wait experience and decreasing negative health outcomes.[21,38,39,40] This focus shifts emphasis solely from system efficiency and toward an acknowledgment and centering of the patient wait experience. This is not a substitute response to long ED wait times which is rooted in necessary system change, such as increased staffing and care coordination. However, the creative and cost-efficient introduction of a visiting volunteer therapy dog may be a viable way to assist with improving the patient wait experience.

Emergency Department Patient Wait Experience

Prolonged ED wait times are commonly associated with negative emotions and feelings among patients.[31] Emotions are physiological states that result from an intense experience, whereas feelings are subjective reactions to emotions. That is, a "feeling is a mental portrayal of what is going on in your body when you have an emotion and is the byproduct of your brain perceiving and assigning meaning to the emotion".[41, p.6] Patients generally experience the ED as a stressful environment that induces negative emotions and feelings. Contributors include uncertain diagnoses, overcrowding and long wait times.[31] A recent study of Israeli emergency departments concluded that one in four patients expressed negative feelings, including those associated with a long wait time.[31] A systematic review of qualitative literature concluded that patient experience in the ED is impacted primarily by the emotional needs of patients.[24] Negative feelings, particularly anxiety and stress, can also be intensified when patients encounter uncertainty regarding their pain,[42] which is the primary reason individuals attend a hospital ED in Canada.[43]

A study by Byrne and Heyman[44] and others[45] found that patient stress and anxiety can be reduced through

supportive interactions with hospital staff who exhibit polite, helpful and caring attitudes and behaviours.[46,47,48,49] The same supportive environment has been identified for reducing patient pain.[50,51,52] Coakley and Mahoney[3] and others[53,54,55] reference how a therapy dog can facilitate relationships between staff and patients. Research has also identified how dogs in general, including therapy dogs, can induce positive feelings (including joy, love and calmness) in stressful environments.[54,56,57,58,59,60,61] Based on this collective understanding, it is hypothesized that visiting therapy dogs in a hospital ED in this study will favorably impact patients' wait experience by increasing their positive feelings. The outcome could have important implications for patient experiences and healthcare in Canada's strained EDs.

Therapy Dog Initiative

In 2016 the Royal University Hospital (RUH) in Saskatoon, Saskatchewan was the first ED in Canada to integrate a visiting St. John Ambulance therapy dog to help improve the patient wait experience. RUH is a major teaching hospital connected to the College of Medicine at the University of Saskatchewan. RUH is also the trauma and tertiary care centre for the province. The ED is a 24-hour service, averaging 150-200 adult visits per day, and is the busiest ED in the province. Over the past decade, therapy dogs have visited various departments at all three Saskatoon city hospitals (e.g., pediatrics, palliative care, rehabilitation, mental health). As an umbrella organization, the Saskatchewan Health Authority (Saskatoon) has adopted progressive policies that enable pets of personal family/friends to visit patients in its hospitals.[62]

The St. John Ambulance Therapy Dog program has been in existence since 1992 in Canada and 2007 in Saskatchewan, and the first therapy dog visited the RUH ED in January, 2016. Volunteer teams in the therapy dog program consist of a certified (tested and passed) therapy dog and handler. The goal of the therapy dog program coincides with that of the organization—to offer charitable, humanitarian care to the sick and injured. The program aims to offer support and love/comfort to individuals with whom the dogs visit .[63] The therapy dog and handler informally visit with individuals in settings such as senior care homes, schools and hospitals to provide a positive experience. This is referred to as an animal assisted activity.[64]

In addition to regular St. John Ambulance therapy dog program visiting policies and procedures (e.g., hygienic dog grooming), supplementary guidelines were developed to ensure the health and welfare of patients, staff, the therapy dog and handler entering the RUH ED. An example is handler and patient hand sanitization before and after each visit. A standardized visiting protocol across patients was also developed and followed closely (i.e., patient interacts with the therapy dog, handler shares information about the therapy dog, asks about patient's pets, and offers a trading card of the therapy dog at the conclusion of the visit). An ED patient and therapy dog interaction is approximately ten minutes, which is common for animal assisted activity therapy dog visits generally and in healthcare settings.[3,65]

Method

Study Participants

The study population was a convenience sample of adult patients at the RUH ED on 31 of 39 Monday mornings between March and December, 2016. Patients in the ED were invited to participate in the study by the data collection team; a Research Assistant explained the study, the requirements (approx. 10 minute visit with a therapy dog, verbal completion of a brief questionnaire), and obtained participant consent. Patients were not required to participate in the study to visit with the therapy dog, although no patients that wanted to visit with the therapy dog declined participation in the study. Patients were excluded from the study if they were unable to provide consent or were imminently moving from the ED for a medical procedure. Patients were waiting in curtained off rooms in the typically noisy RUH ED, so confidentiality was high but not guaranteed. One therapy dog, a 4-year old English Springer Spaniel breed, visited with patients from 10:00 am to 12:00 pm in all areas of the ED. The therapy dog and his handler were chosen based on their experiences in other research projects, visiting skills, endurance (e.g., two hour period) and availability.

A total of 124 participants of a potential 205 approached took part in the study (60%). The average age was 55, ranging from 18 to 97 (SD=21.7). Seventy (56.5%) identified as female and 54 (43.5%) as male. The four main reasons for attending the ED was heart concerns (chest pain, palpitations) (22, 17.7 %), followed by psychiatric illness (17, 13.7 %), abdominal pain (13, 10.5%) and orthopedic concerns (fractures, MSK pain) (13, 10.5%). To situate our patient profile, an analysis of 2016/17 fiscal year RUH ED data by a Saskatchewan Health Authority (Saskatoon) data analyst likewise identified pain (heart, injury, digestive and circulatory systems) as the primary problem for which patients presented to the RUH ED. This illness category was similar for females and males.[66]

On average, patients were at the ED for 17.9 hours before visiting with a therapy dog, ranging from 30 minutes to 78 hours. It is important to point out that some of the ED patients were waiting for their initial consultation with a physician while many others were waiting to be admitted to the hospital or to see a specialist (e.g., internal medicine, orthopedic surgery) and would have received initial health care (e.g., administration of medication). The wait can be difficult for patients and families and a visit with the

therapy dog is welcomed by some. The average length of the therapy dog visit was 10.8 minutes, ranging from 3 to 30 minutes. Sixty-four (51.6%) participants had a pet at the time of their visit, including 49 (76.6%) dogs, 19 (29.7%) cats, and 3 (4.7%) other species of pet. Ninety-seven (78.2%) participants had a pet in the past, including 82 (84.5%) dogs, 18 (18.6%) cats, and 10 (10.3%) other species of pet.

Data collection

Both qualitative and quantitative methods were used to collect data in a modified intrinsic case study format. Case studies are typically bound by time and activity and researchers develop in-depth analysis in a real-life context.[67,68] A modified format was applied in this study because offering a therapy dog initiative in the RUH ED is new to both practice and research. It is important in exploratory research to gain firsthand knowledge from engaged participants. Preliminary data was collected with a pre-selected case consisting of ED patients visiting with a therapy dog.[69] An intrinsic design was chosen because of the uniqueness of the phenomena being examined. Crowe shares that the intrinsic "case is selected not because it is representative of other cases, but because of its uniqueness, which is of genuine interest to the researchers" [68, p.105]. Our modified intrinsic case study also adhered to the principles of a pilot study, with the testing of "research protocols, data collection instruments, sample recruitment strategies, and other research techniques in preparation for a larger study".[70,p.59] Our team's narrow focus responds to Chur-Hansen et al.'s[71] review of research in the AAI field. They concluded from a review of qualitative and quantitative studies of visiting therapy dogs and the elderly that the majority of studies lack sound scientific methodology.[p.136] In response, we have confined our study to a specific focus, incorporating both quantitative and qualitative data collection techniques.

The primary outcome of this study was how the patient felt after the therapy dog visit, measured in part with a five-face visual analog scale before and after the visit (see table 1). Other AAI studies, including within a healthcare context,[72] have similarly applied a one-item visual analog scale (VAS).[73,74,75] Binfet et al.[75] share that VASs "are commonly used in health research to capture participants' self-ratings of a construct, such as pain,[76] mood disorders[77] and stress[78] and require respondents to indicate on a scale, their perception of the construct in question".[p.3] It is also important to consider the context that the patient is completing the VAS in; for a 10 minute therapy dog visit it is not viable to request 10 minutes for data collection. A trained Research Assistant (RA) presented the visual analog scale to the patients and asked with the greatest consistency possible; "Can you tell me how you are feeling right now?".

Participants were also asked by the RA for words to describe how they were feeling before and then after visiting with the therapy dog. At the two points in time patients were asked: "What kinds of words describe how you are feeling right now?". Following the visit, participants were also asked by the RA to share their overall experience: "Is there anything you would like to share about your visit with the therapy dog?". A second RA was assigned to document unstructured qualitative observations of the interaction between the therapy dog and patient, including both perceived positive and negative engagement. Drawing on Creswell and Creswell,[67] these observations were in the most commonly applied open-ended format. The RA's role was to "observe the workings of the case". [69,p.8] The therapy dog handler was also asked by the RA following the visit for any key observations of the therapy dog and patient interaction. Our modified intrinsic case study design allowed multiple realities to be accounted for (patient, handler, researcher). Secondary data collection measures included whether the patient currently had a pet or had one in the past (and type), age, gender, reason for attending the ED, length of the therapy dog visit, wait time in the ED before visiting with the therapy dog, and if applicable, reason for declining a visit.

Table 1. Pre and post-visit participant visual analog scale

Pre-visit
Can you tell me how you are feeling right now? 
Post-visit
Can you tell me how you are feeling right now? 

Ethics exemption was issued by the University of Saskatchewan Human Research Ethics Board given the evaluative focus of the study. The U of S Animal Research Ethics Board (AREB) approved the study and operational approval was obtained from the Saskatoon Health Region. In most circumstances, oral consent was provided by the study participants, though several chose written consent. As well, the therapy dog handler completed the AREB Owner Consent Form.

Analysis

The five-face visual analog scale was converted to a quantitative numerical scale and analyzed for pre-post visit results. While there is some controversy in the treatment of Likert-type responses as an interval scale, there are those that do support this view.[79] The means of the one-item VAS scale were compared at pre and post measurement. Results were analyzed using inferential statistics, including a paired sample t-test. Repeated measures anova was conducted on age group ('54 years old and under' versus 'over 54 years'), pet ownership (yes or no) and gender. The qualitative data was analyzed through an inductive thematic analysis, seeking to identify recurrent patterns, or themes, in textual data. These themes were clustered based on similarity in meaning for patients and the observer/therapy dog handler separately and then compared.[80] All data were reviewed and interpreted by our multi-disciplinary team.

Results

Findings showed that patient affect on the five-point Happy Face visual analog scale improved 1.2 points between time 1 and time 2 ($M_1 = 2.90$, SD = 1.17; $M_2 = 4.09$, SD = 1.03) ($p<.001$, CI -1.384 to -1.003), which reflected statistically significant change and a clinically meaningful change over time (d = .25). Specifically, the proportion of patients choosing a face indicating positive feelings changed from 14.5% before the therapy dog visit to 71.8% afterward ($p<0.01$). There was no significant difference by participant age or pet ownership. While significant overall, females experienced a greater effect than their male counterparts from pre to post therapy dog visit, mean difference females = 1.41 versus males = 0.93; {Wilks Lambda = 0.95, F (1,121) = 6.44, p = .01, partial η^2 = 05}. Further, there was no association between the length of the therapy dog visit (r = -.08) or the amount of time in the ED prior to visiting with the therapy dog (r = -.07) and change on the visual analog scale.

Thematic analysis of how participants felt before the therapy dog visit most commonly included in pain (23 of 124; 19%), anxious (24 of 124; 19%), sad (22 of 124; 18%), fine/doing OK (22 of 124; 18%), tired of waiting (16%) and tired (15%). Select representative comments from the therapy dog visit observations include: "She looked lovingly at the dog. As time passed, began asking questions and being active contributor to the conversation. Looked really content while snuggling the dog", "Seemed upset at first, was crying, but after was smiling and appeared happy", "Pet the dog throughout the visit", "The dog was cuddled up beside her. She was stroking him. Was quiet throughout visit, but seemed to enjoy the dog visiting. A nurse was checking vitals and the participant had the dog stay during that time", "Very excited to see the dog", "Body language very open and positioned around the dog. Moved to pet the dog. Seemed content throughout visit" and "Very enthusiastic to see the dog when asked to participate. Immediately started talking about his own dog – his name, age, travels with the dog. The therapy dog cuddled right up to him, put head between arms on chest. He was baby talking to him, giving the dog a massage. He moved over to make more room for the dog. Said 'All I care about is that the therapy dog is here', never stopped petting him with both hands, was so happy, wanted a picture. Kissed him twice on the head, and with tears in his eyes at the end". After the therapy dog visit the most common patient themes were feeling happy (48 of 124; 39%), calm (27 of 124; 22%), fine/doing OK (20 of 124; 16%), better (19 of 124; 15%) and loved (13 of 124; 10%).

During therapy dog visits, participants were most commonly observed by a research assistant to be expressing happiness (99 visits; 80%), engaging in touch (82 visits; 66%), sharing stories (81 visits; 65%), showing interest in the therapy dog and the St. John Ambulance Therapy Dog program (50 visits; 40%), positively changing their demeanor (49 visits; 40%), and paying concentrated attention to the therapy dog (33 visits; 27%). Although not a focus, the therapy dog's display of intuition, that is seeming to know just what to do when interacting with a patient, was noted for 23% of the visits.

The top three reasons patients declined a visit with a therapy dog were that they were not feeling up to it (e.g., tired, uncomfortable) (39%), not a dog person (16%) and did not think it would be helpful (12%). A common theme among patients who did not visit, was that individuals with a pet at home recognized its positive impact on their health and did not want to 'take up the dog's time' and offered their visiting time so other patients could benefit.

Discussion

There has been emerging attention to the patient experience in healthcare research in Canada, the United States and elsewhere over the past decade or so.[21,31,81] For example, in 2011 the Canadian Institutes of Health Research, a major health research funding body, developed a national strategy for patient-oriented research, including the goal of "enhancing patients' health care experience".[82,p.iii] The Beryl Institute defines the patient experience as "the sum of all interactions, shaped by an organization's culture, that influence patient perceptions,

across the continuum of care". [83,para.1] Currently, however, there is no common accepted definition of the patient experience in healthcare and it remains woefully under researched.[21] The limited health care research that does acknowledge the patient experience generally addresses a single individualized measure—patient satisfaction.

That said, some of the patient experience literature expressly considers patients' emotions and feelings. Referring to a consultation report reviewing the healthcare patient experience, Wolf et al.[21] cite the patient experience as including the "emotional experience" and "the intuitive perception (i.e., gut feelings)" of patients. As shared, an emotion is experienced as a physical biochemical reaction and a feeling is the subjective meaning humans attach to it, for example, based on a memory or experience.[41] A specific review of qualitative studies by Gordon et al.[24] of factors influencing patient experience of the ED determined that it included the emotional impact, as well as waiting and the ED environment. The findings of the preliminary case study that is the topic of this paper suggests that visiting with a therapy dog in the ED appears to improve patients' feelings, and specifically their perceived comfort and distress. The therapy dog visit is also identified as a welcome distraction from a stressful ED environment. The patient wait experience with therapy dogs in an ED has been an undocumented area.

(i) Improving patients' feelings of comfort

Pain is the primary reason individuals attend an ED[43] including the RUH.[66] Long wait times can negatively impact peoples' pain, or perceived pain. Pain reduction is influenced by the activation of endogenous pain modulation mechanisms such as the release of anti-nociceptive hormones and neurochemicals (e.g., oxytocin, prolactin, dopamine) when petting an animal.[84,85] For example, research specific to oxytocin indicates that levels of this feel good hormone, often referred to as the love hormone, increase after interacting with a dog.[86] Coakley and Mahoney[3] and others[65,87,88] suggest in their work that a therapy dog's presence can change people's perceptions of pain and its intensity. Pain severity is highly influenced by contextual factors, including emotional state, and so is not solely determined by the extent of tissue damage.[89]

Underlying the therapy dog literature is a general understanding of the role of the therapy dog as providing comfort, with some crisis therapy dog programs referring to the canines as comfort dogs (e.g., LCC K9 Comfort Dog Ministry).[90] Clinical guidelines from the National Institute for Health and Care Excellence identify comfort as an outcome of a good patient experience.[91] Dell et al.[56,57] found that feelings of love and comfort were increased among a sample of patients with a substance use disorder while visiting with a therapy dog. The impact of therapy dogs on feelings of comfort and love has also been demonstrated outside of healthcare settings, including among children testifying in court and in prison and school settings.[75,92,93,94]

(ii) Decreasing patients' feelings of distress

It is widely accepted in the companion animal literature that interacting with animals can have positive effects on human health, including distress.[95,96] There is growing evidence that AAIs can also be beneficial to human health in numerous ways, such as reduced anxiety, heart rate and blood pressure, and increased dopamine production, which reduces the stress hormone cortisol.[97,98,99,100,101,102] A study of young children concluded that procedure-induced behavioral distress was reduced in a health-care setting when a therapy dog was present.[103] Although not scientifically documented, there are also many examples of therapy dogs offering comfort to victims in distress, including for the recent large-scale bus crash in Humboldt, Saskatchewan and the school shooting in Parkland, Florida.

Therapy dogs visit campuses across North America primarily to assist with reducing student stress.[104,105] A study by Dell et al.[17] found that de-stressing and relaxing with therapy dogs was a key reason for student visits to a campus therapy dog program. The study also concluded that as a result of the therapy dog visit, 80% of students identified feeling in control of their emotions (that is, balanced and in the moment) after the visit.[17] Another study by Barker and Dawson[106] found that "[a]nimal-assisted therapy was associated with reduced state anxiety levels for hospitalized patients with a variety of psychiatric diagnoses".[p.797] Likewise, a recent controlled clinical trial by Kline et al. in the United States found that therapy dog exposure significantly reduced anxiety in ED patients.[107] The work of Arkow[101] refers to therapy dogs as "a form of stress reducing or stress-buffering social support".[p.2]

(iii) Welcome distraction from a stressful ED environment

A study by Harper et al.[108] found that involving therapy dogs in patients' care plans immediately following joint replacement surgery improved their pain scores because the visits assisted with distraction from their pain. A qualitative study with children who underwent surgery found that a visiting therapy dog "distracts children from pain-related cognition and possibly activates comforting thoughts regarding companionship or home".[65,p.51] Related research refers to therapy dogs as enabling people to be 'in the moment'. For example, Arkow[101] shares that animals have an ability to attract and hold our attention. Dog trainers, including for service animals, often refer to a dog's ability to live in the moment, and that this canine trait can assist humans with being present (B. Doan, personal; communication, November 14, 2014; Chris Lohnes, personal communication, December, 2017). Harris shares that "by expressing their pure joy at seeing us, our pets teach us that living in the moment is… a

healthy thing to do".[109,p.33] Additional research exploring the utility of therapy dogs as a distraction is warranted.

Implications for Research, Theory & Practice

This preliminary study, examining if and how a unique therapy dog initiative impacted patient feelings during their ED wait, is timely. Not only is patient ED wait time a growing concern for healthcare, so too is the need to acknowledge and understand the patient experience. Therapy dogs are not a remedy to the needed system change to address long ED wait times, but they may be beneficial for their impact on the patient wait experience. This is applicable whether the wait time is long or not. That said, although the findings of our modified intrinsic case study are promising, they are limited by the narrow scope of the research and the emerging state of current evidence. Nonetheless, the findings support further research, theoretical and practice-based attention.

It is reasonable to conclude that our study's ***research*** question of whether the therapy dog initiative impacted patients' feelings during their ED wait time was answered – it did and it did so positively. However, only preliminary insight was gained into how this occurred. An important next step is to undertake a comprehensively designed, scaled-up study of the RUH ED therapy dog initiative to compare patients who visit with a therapy dog to those who do not (e.g., are patients who visit with a therapy dog more likely to wait in the ED until seen?; are patient health care outcomes different between the two groups?). There is a specific need to address selection bias (e.g., do individuals who like dogs self-select to visit) and further explore the 40% of patients who chose not to visit with a therapy dog. Both qualitative and quantitative approaches are needed in these and additional areas, including the impact of potential stress on the therapy dog, and the unexamined role of the therapy dog handler.

It will also be important to account for the influence of moderators, including gender, cultural background, history of pet ownership, length of ED wait, and reason for ED attendance. For example, both sensory and affective experiences of pain as well as disability from pain have been identified as more severe in females than males.[89] The hospital ED patient wait experience, like all social phenomena, is gendered. We know that women generally experience longer ED waits. A 2018 study found that, because male patients were often more demanding than female patients, they were attended to more quickly in the ED.[110] The therapy dog literature, for the most part, has not considered the impact of gender. And as found in this study, females experienced a greater effect than their male counterparts from pre to post therapy dog visit.

This preliminary study exploring the impact of a therapy dog during the ED wait experience accounts for the interrelated animal-human-environment components in a One Health framework. While One Health has traditionally focused on zoonosis (disease transmission from animals to humans), a 2011 paper by Hodgson and Darling articulated the flip side through the concept of zooeyia, that is, "the positive benefits to human health from interacting with animals". [96,p. 189] Some non-Western worldviews do the same, such as Indigenous understandings. Accounting for the natural environment can expand how the ED patient experience is conceptualized.[111] For example, an Indigenous perspective of wellness is "a whole and healthy person expressed through a sense of balance of spirit, emotion, mind and body. Central to wellness is belief in one's connection to language, land, beings of creation, and ancestry, supported by a caring family and environment".[112] Western literature refers to the concept of biophilia.[113,114,115] Wilson introduced the concept to medicine in 1984, defining it as "the urge to affiliate with other forms of life".[113,p.85] It can be ***theorized*** within a One Health framework that incorporating a therapy dog into the ED introduces the natural environment into the stressful ED social environment. This highlights, in part, what is widely accepted in the companion animal literature but infrequently by healthcare. Specifically, interacting with animals can benefit human bio-psycho-social-spiritual health.[13,97,98,99,116,117]

Based on the RUH's experience with the therapy dog initiative over the 10-month period of this preliminary case study, it has since implemented six therapy dogs teams visiting the ED six days a week and one team is in training. Our team also informally documented the advantages and challenges of implementing the therapy dog initiative. A key advantage was the positive ***practice-based*** stories shared by staff. For example, the head of the RUH ED told the following: *I remember a man in his 80's, a Saskatchewan farmer, who was admitted to the ED. He had been boarded there for at least 24 hours. During this time he was continuously trying to crawl off his stretcher and so our ED team was planning to sedate him for his own safety. Before this happened though, his family consented to a therapy dog visit. After the patient talked to the dog for several minutes, petting him and giving a run-down of the dogs he used to own, he looked visibly relaxed and agreed to remain calm and stay in the ED. The family was very moved and thankful.* These shared stories and experiences may beneficially impact the ED environment in varying ways. These include the therapy dog as a medium for patient engagement, relationship building with staff[3,59,60] and stress reduction among ED clinicians. A survey conducted in a stressful US hospital environment identified that "93% of patients and 95% of staff agreed that therapy dogs should visit EDs".[118, p.363]

A key challenge to implementing the therapy dog initiative is infectious disease system barriers, and most specifically a perceived risk of zoonotic disease transmission.[119]

Methicillin resistant *Staphylococcus aureus* (MRSA) is a particular concern, and a number of investigations have identified indistinguishable strains in dogs and people who are in contact with each other, suggesting transmission.[120] However, the direction of transmission has been inadequately investigated. In the case of MRSA the literature suggests that, while dogs may serve as mechanical vectors for this organism, it is typically a reverse-zoonosis (acquired by dogs from people).[120,121] *Staphylococcus pseudintermedius* is a canine associated bacterial species closely related to *S. aureus* and has also been identified from human infections, although a recent population-based study from Alberta, Canada found that human infections with this organism are exceedingly rare compared to those caused by *S. aureus*.[122] Previous investigations have suggested that simple hygiene-based protocols and procedures, such as hand washing, substantially reduce the risk of zoonotic transmission.[120] The American Veterinary Medical Association has published therapy dog visiting guidelines, indicating a growing awareness of how therapy dog handlers can mitigate zoonotic concerns and educate regarding hygiene-based protocols.

The empirical evidence on time and process-focused initiatives such as the Lean transformation in Saskatchewan has not resulted in substantially decreased patient wait times. In the short and long term, improving actual patient wait time involves a complex continuum of system change, whereas improvement in patient perception and experiences of care are more straightforward. Creative, cost-effective and evidence-based responses are needed to improve the patient wait experience, irrespective of current ED wait time concerns. As Wolf[22] suggests, researchers and practitioners need to "push the boundaries" in patient experience research. Our team of clinicians, researchers, therapy dog handlers and patient advocates suggest that therapy dogs may be one such pathway. The findings of this preliminary case study support a unique approach to improving the ED patient wait experience, acknowledging both the patient experience and recognizing the potential benefit of non-human animals in human healthcare.

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