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Cover Page Footnote

The author is thankful for the Akron Children's Hospital Doggie Brigade therapy dog and handler teams for their ingenuity and ability to adapt to safely support patients and staff during the COVID-19 pandemic. A special thank-you to Vicki Parisi, MAOL, Volunteer and Visitor Services director, and the Child Life Specialist team from Akron Children's Hospital for providing programmatic support. Lastly, I would like to express gratitude to my advisor, Dr. Jeffrey Hallam, FRSPH, for the continuous support of my MPH practicum, and Dr. Pamela Schreiner for reviewing and providing feedback on a draft of this manuscript.

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From In-Person to Virtual: A Case Study of an Animal-Assisted Visiting Program in a Pediatric Setting

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Abstract This article focuses on the practical aspects of converting a successful in-person AAA program to a virtual program in a health care setting including human, canine, and physical resources; animal welfare considerations; training, infection control, and safety guidelines; and visit delivery procedures. In 1992, an interdisciplinary team at Akron Children's Hospital founded the Doggie Brigade, an animal-assisted activities (AAA) program where volunteer therapy dogs and their handlers visit pediatric patients. The program has become a cornerstone of the hospital's culture over its now 30-year tenure. In March 2020, the announcement of the COVID-19 pandemic forced health care organizations to suspend nonessential services, including volunteer-based patient activity programs, to reduce viral exposure risk for immunocompromised or otherwise medically vulnerable patients. Doggie Brigade volunteers proposed virtual visits as a temporary solution based on news media coverage of other virtual visitation programs. The author, henceforth known as the Doggie Brigade advisor (DBA), designed a program with two goals: (1) to provide alternative delivery of services abruptly suspended due to the COVID-19 pandemic, and (2) to reduce hospitalization-related anxiety through the experience of positive feelings associated with interacting with Doggie Brigade teams. From July 2020 to April 2021, the DBA provided nearly 300 one-on-one live video calls with Doggie Brigade volunteers and their dogs via iPad and Microsoft Teams.

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Introduction

Animal-assisted interventions (AAI) programs, commonly known as therapy animal programs, are "unstructured or goal-oriented activities that intentionally incorporate animals into human services, healthcare, education, and similar fields" (AAII, n.d.). While initially considered novelties, AAI programs have grown in size and scope due to pioneering research findings, public popularity, and media coverage (Fine et al., 2019). AAI programs traditionally involve live, in-person interaction with animals and have been incorporated into a variety of professions including but not limited to social work, mental health counseling, law enforcement, victim advocacy, and physical, occupational, recreational, and speech therapy.

Health care and hospitals are examples of the many settings that have seen an increase in the prevalence and popularity of AAI programs, particularly programs where volunteers bring their dogs to provide friendly visits to patients and staff. These types of programs are most commonly classified as animal-assisted activities (AAA) programs, where screened animal-handler teams are incorporated into activities focusing on "motivational, recreational, social, and general well-being" goals (AAII, n.d.). In pediatric hospitals, several studies have begun to show evidence of AAA benefits for patients such as reducing anxiety (Hinic et al., 2019; McCullough et al., 2018), distress, worry, fatigue, fear, sadness, and pain related to hospitalization (Chubak et al., 2017) or prior to stressful procedures such as magnetic-resonance imaging (MRI) (Perez et al., 2019). Despite the popularity and blossoming interest in research of AAA programs, the strength of available evidence is still limited due to differences in study designs and measurement instruments, the demographic complexity of both human and animal participants, and the complexity of the ways in which these factors interact (Rodriguez et al., 2021). These differences make systematic literature review and aggregation of comparable data necessary for evaluating the strength of evidence challenging, so few are available. Chur-Hansen et al. (2015) describe a lack of robust, relevant evidence due to the difficulty of conducting AAI research in clinical settings. Correale et al. (2022) echo these remarks, adding that despite limitations, the benefits of AAI for hospitalized children are "encouraging." Thus, these reviewers conclude that further research on risks and benefits of AAA is needed.

The Doggie Brigade program, sponsored by Milk-Bone, is an AAA program at Akron Children's Hospital at their Akron and Mahoning Valley campuses. Volunteers and their dogs ("teams") are screened by a hospital-approved therapy dog organization, such as Pet Partners, as well as completing a rigorous hospital volunteer onboarding and training process in order to provide friendly visits to pediatric patients (Akron Children's Hospital, n.d.). Typically, 50–70 teams visit patient rooms or lobby areas during visiting hours for 1–2 hours twice per month throughout the calendar year. Teams are permitted to visit nearly all departments of the hospital including Hematology and Oncology, Pediatric Intensive Care, Burn Center, Epilepsy Monitoring Units, Surgery Post-Op, Dialysis, and Emergency. In 2019, Doggie Brigade teams provided 3,182 hours of service. Averaging six visits per hour, it is estimated that teams visit between 17,000 and 20,000 pediatric patients annually. While the program's focus is patients, teams frequently visit staff to provide comfort and respite. Doggie Brigade teams also regularly participate in community events by invitation, with a focus on events that improve the health and well-being of children and families, including school presentations about therapy dogs and mental health, dog bite prevention education programs, or other similar events.

The Doggie Brigade was temporarily suspended in March 2020 when Akron Children's Hospital restricted public access to the hospital in response to the COVID-19 pandemic. Initially, the Volunteer Services department transitioned into a support role focused on supplementing hospital shortages and needs that arose due to the pandemic. Several weeks later, Doggie Brigade volunteers sent emails to the author, henceforth known as the Doggie Brigade advisor (DBA), sharing media articles about other therapy dog programs that transitioned to an

online format and inquiring if something similar could be implemented at Akron Children's. Around this time, Pet Partners, a national nonprofit organization that trains and registers therapy animal handler teams and a leader in the animal-assisted interventions field, published a white paper on animal-related engagement (ARE). ARE is defined by Dr. Taylor Chastain Griffin and Pet Partners (2020) as "any engagement opportunity that allows participants the benefits of the human-animal bond by encouraging the remembrance of feelings that are commonly associated with interaction with an animal." This white paper outlined supporting research that became the foundation for the program's justification. Further research into telemental health effectiveness (Hilty et al., 2013) and a concept known as "telepresence" (Lasky, 2019), discovered through collaboration with a Child Life intern researching a similar virtual presence program, provided background on virtual interventions in other contexts. Finally, the DBA considered the gap in normalization and stress reduction opportunities for patients created by strict infection prevention protocols required to reduce pandemic disease transmission, and how virtual programs could help to bridge that gap while delivering a similar experience through the safest means available (Biddiss et al., 2019; Cox et al., 2020). This paper describes how an in-person program was successfully converted into a virtual program in response to the COVID-19 pandemic restrictions.

Program Description

The Virtual Doggie Brigade program was implemented as a real-time, digital version of the in-person therapy dog visit program facilitated through iPad and Microsoft (MS) Teams video call software delivered to patients by the DBA. The hospital was also able to establish partnerships with a local equine-assisted therapy program and a local zoo to provide unique animal virtual visits.

The development of the Virtual Doggie Brigade was informed by a thorough literature review and benchmarking with similar organizations and programs. The Children's Hospital of Los Angeles (VanHoose, 2020) program aligned most closely with the goals of the proposed program, and their staff provided a wealth of information that helped determine that replication could be feasible at Akron Children's. With the support of stakeholders in Volunteer Services, Child Life, Information Services, Infection Control and Prevention, Legal, Compliance, and Nursing, the DBA drafted and submitted a Virtual Doggie Brigade proposal to the Akron Children's Hospital Incident Command System (HICs) team. HICs is an internal health care emergency management incident command structure that is implemented during disaster or crisis situations, including pandemics, and that assists with planning, response and recovery capabilities. HICs approved the proposal and the DBA was issued an iPad tablet preprogrammed by Information Services staff to comply with Health Insurance Portability and Accountability Act (HIPAA) privacy guidelines. Akron Children's Hospital presented an ideal opportunity to pilot this novel program. The hospital has been frequently recognized for using technology to improve patient care while adhering to the highest safety standards. Combined with a strong in-person animal-assisted activities program with a nearly 30-year tenure and a program advisor with strong technology skills and a 10-year background in health care volunteer and AAA program coordination, adapting the in-person program to a virtual format was a smooth transition.

Ethical review and approval were waived for this project because the program was approved as a patient activity, no form of intervention was performed on human subjects, and protected health information (PHI) was not collected. For the initial pilot launch of the program, an anonymous three-question satisfaction survey was given to parents at the conclusion of a virtual visit for the purpose of program evaluation. Parents were informed that the survey was optional and anonymous, and that survey completion and results would not influence their ability to participate in or decline services. Thirteen parents completed and submitted the survey to the DBA.

Implementation

For the purposes of explaining general program procedures and because Doggie Brigade visits made up the majority of program visits, the following will focus on Doggie Brigade team visits. Each visit consisted of six steps.

Step 1: Coordinate Volunteer Schedules

The DBA scheduled Doggie Brigade team visits in advance based on volunteer availability. SignUp Genius, a free Web-based software for coordinating event signups, was utilized to communicate available visitation slots to volunteers who could then sign up for visits in advance. Slots were created by the DBA based on personal availability and hospital-specific considerations, such as physician rounding, physical therapy treatment blocks, or mealtimes.

Step 2: Obtain Patient Referrals

On the days when volunteers were scheduled to provide virtual visits, the DBA contacted each floor's child life specialist or nursing staff to inquire if they had any recommendations to visit or not to visit. Staff would provide a list of patient names and room numbers. It was more practical to inquire day-of rather than several days or weeks in advance as patient care needs change rapidly. Patients can be admitted and discharged on an hourly or daily basis.

Step 3: Assemble Needed Supplies and Test Call Connection Strength

Necessary supplies were determined in advance through consultation with Infection Control and Prevention and Information Services. The DBA ordered supplies from the Materials Management department through the hospital's requisition system, which were kept on hand in the Volunteer Services office.

The DBA was required to utilize a surgical face mask and safety eyewear personal protective equipment (PPE) while facilitating virtual visits with patients. OXIVIR TB wipes were utilized to wipe down nontechnology items, and PDI screen wipes were used to wipe down the iPad screen to sanitize while also preventing residue.

Supplies were transported to and from patient care areas using a three-shelf cart that could be parked outside rooms during a visit. The Patient Experience and Language Access Services departments suggested a wheeled tablet stand that could be taken into patient rooms so patients could more easily utilize tablets without requiring staff support, but one was not available at the time. Tablet stands typically have a basket attachment where cleaning or other supplies can be stored. However, the tablet stand would need to be cleaned in between each patient room to prevent cross-contamination. The three-shelf cart could be left in the hallway outside a patient's room so it only needed to be cleaned on arrival to patient care floors and before departing patient care floors.

iPad hardware was used to facilitate virtual visits because it had a larger screen so it would be easier for patients to view the therapy dogs. The device was password-protected. All apps other than the video call software, Microsoft (MS) Teams, were disabled. MS Teams was selected because it was deemed more secure than other video conferencing software and to reduce server load on medical telehealth software. Child Life staff recommended the Cooper Dynamo Rugged Kids Play Case because they are soft, nontoxic, and come in bright colors that are more child-friendly and can help make lost iPads easier to find.

In order to mimic the experience of an in-person Doggie Brigade visit as much as possible, the DBA brought Doggie Brigade trading cards and gave them away to each patient after a visit concluded. Trading cards are a common practice in pediatric therapy dog programs because they can serve as an icebreaker and provide a memento of a positive experience for patients to take home with them. The DBA also brought a mixed-breed stuffed dog named Barkers, designed especially for Akron Children's Hospital by Ty Inc., a complimentary gift for each new patient up to age 16. Barkers wears a blue scarf similar to the Doggie Brigade dogs. Barkers is provided for patients at no cost through grants from the Women's Board of Akron Children's Hospital, the

Friends of Akron Children's Hospital, the Holiday Tree Festival, and individual donations.

Once supplies were assembled on the cart, the video call with the volunteer was initiated to test the connection prior to leaving the Volunteer Services office. If problems were identified, it was easier and less intrusive to patient care to coordinate a resolution with the Information Services department. The video and microphone were then turned off while traveling the hallways of the hospital and only turned on when facilitating a virtual visit with a patient who had expressed willingness to participate in a virtual Doggie Brigade visit.

Step 4: Check-in on Patient Care Floor and Identify Interested Patients

Each visit began by checking in at the nurse's station to confirm that the list of patients to visit or not visit was still correct at the time of arrival to the floor. If the list was obtained in the morning and the visit took place in the afternoon, it could have changed. It also helped to establish rapport with staff and educate them on the availability and purpose of the virtual visit program.

Prior to entering any patient's room, the DBA would check each patient's door for signs indicating exclusion events such as contact precautions, isolation, or "no visitors" instructions. The procedure to identify interested patients for virtual visits was to knock on their door, explain the purpose of the program, and ask if the patient wanted a visit. This procedure is identical to the procedure used to identify interested patients for in-person dog visits. Hand sanitizer was used prior to entering and upon exiting each patient's room for each visit. The tablet was also sanitized in between each visit.

Step 5: Facilitate Virtual Therapy Dog Visit

The DBA turned on the tablet video and microphone and confirmed call quality. Closed captioning was turned on to make visits more accessible for patients who are deaf or hard of hearing. Patients then had the option to hold the tablet themselves or participate in the video call by having the DBA hold the tablet for them. The therapy dog handler was primarily responsible for initiating and maintaining conversation with the patient with occasional support from the DBA. Activities with the dog, such as feeding a treat or demonstrating tricks, helped as icebreakers or ways to connect when a patient struggled to vocalize.

Step 6: Conclude Visits and Store Supplies for Later Use

Visits were immediately wrapped up if medical providers walked into the room. If an emergency had ever arisen during a visit, the DBA would have pressed the nurse's call button to request assistance. The therapy dog handler would communicate with staff if they observed stress signals in their dog and staff would communicate with the therapy dog handler if they observed stress signals or disinterest in the patient, and each would work together to conclude the visit. Visits concluded with a predetermined phrase such as "Thank you so much for letting us visit."

In-person Doggie Brigade visits at the hospital could last anywhere from 30 minutes to 2 hours depending on the stamina and experience of the dog-handler team. The Doggie Brigade program followed Pet Partners guidelines that facility visits per dog-handler team be no longer than 2 hours per day to protect the animal's safety and welfare, in addition to liability reasons (Pet Partners, 2017). Virtual visit experiences typically lasted no longer than 1 hour per dog-handler team. Even though the typical stressors of a facility visit were not present because the dogs were at home, dog handlers frequently reported that their dogs appeared to lose interest and it became difficult to keep them engaged with or near their electronic device. The virtual program could typically see three patients per hour per day while the in-person program could typically see six patients per hour for up to 2 hours per day. Both in-person and virtual visits tended to last no longer than 5 to 10 minutes per patient.

Two to six patients could be seen individually during that hour. Each individual visit with a patient typically lasted 2 to 10 minutes, similar to the in-person visitation program.

When the last patient had been seen for a given day or when the handler indicated that the dog was stressed or disengaged, the DBA would notify the nurse's station of their departure. The DBA then checked in with the handler to obtain or provide feedback, and then ended the video call. All supplies were returned to the Volunteer Services office, sanitized, and then stored until the next visit experience was scheduled.

Volunteer Training and Support

To assess volunteer training and support needs, the DBA developed a four-question survey on SurveyMonkey and deployed it to all Doggie Brigade volunteers. Based on the responses to the questions, the DBA scheduled one-on-one training with 24 Doggie Brigade volunteers who expressed interest in participating in the program. During the initial training, a test call was conducted to make sure the video and audio quality was acceptable. Fewer than five volunteers experienced difficulty operating MS Teams. In those cases, volunteers were instructed to contact the hospital's IS Help Desk service for technology troubleshooting. Volunteers who operated Apple/Macintosh (Mac) devices experienced a greater degree of difficulty with MS Teams than those who operated PC/Windows devices.

Once technological comfort was established, the DBA explained to handlers that virtual conversation would be similar to in-person conversation during a visit to offer them a starter template. Volunteers were instructed to introduce themselves, their role, their dog's name, and fun facts about their dog. Volunteers were also given examples of conversation starting questions such as asking about the patient's favorite sports, activities, subject in school, if they had pets at home or if they wanted pets, what pets and why? A one-page "virtual visit conversation guide" was adapted from Fraser Health's (2017) conversation tool for physicians, which outlined conversation flow steps and dialogue ideas specific to a virtual therapy dog visit, then sent to volunteers so they could have it handy during a virtual visit as a reminder of concepts discussed during in-person training. Over time, several volunteers came up with creative ideas to engage patients digitally, so the DBA researched educator activity sheet templates, adding a modification for animal welfare considerations, and used those to write up each idea as a one-page activity sheet. The DBA then combined those sheets into one PDF document that was sent out to all volunteers so they could all share each other's ideas.

Animal Welfare and Stress Management

Animal welfare policies and procedures are the foundation of an AAI program's ability to generate a positive therapeutic relationship for participants, including volunteer handlers and their therapy dog partners. These considerations are equally important for a virtual AAI program adaptation, though the context differs based on service delivery method (Dell et al., 2021). Each dog's experience was carefully managed at each visit through a collaborative relationship between therapy dog handlers and the DBA. An effort was made to cultivate a positive conditioned emotional response to electronic devices through the use of toys, games, and treats. Handlers were encouraged to allow their dog to move or play naturally rather than ask their dog to remain still and/or stare at the electronic device for any duration. This allowed for a more organic and comfortable interaction between the patient and the therapy dog handler team.

Whenever the handler or the DBA identified stress signals in the dog, they would communicate to the other and decide if the dog needed to take a break or end the visit. Stress signals were determined by observing the dog's ears, eyes, mouth, body posture, tail position, and behavior. Some signals, such as whether the dog carried its tail high or low, were easily observable by the DBA on the screen. Other more subtle signals required the handler to be observant and check in with their dog frequently.

The majority of handlers reported that their dog appeared unconcerned by the presence of their

electronic device. Some handlers reported that their dog became excited whenever they brought out their electronic device, similar to how their dog might be excited were they to bring out their dog's leash. A few handlers reported that the virtual visits were confusing for their dog, who appeared distressed and attempted to seek out the source of unfamiliar voices. After providing several virtual visits, the DBA and several therapy dog handlers came to the consensus that virtual visits should be no longer than 60 minutes based on the prevalence of stress signals observed and that dogs should be given as much freedom to perform normal behaviors as possible.

Financial Overview

The in-person Doggie Brigade program operating budget covers program uniforms, trading cards, treats, insurance, and Pet Partners registration fees. Akron Children's Hospital established a Pet Fund to cover these expenses that is supported by grants from the Women's Board of Akron Children's Hospital and Milk-Bone, a product of the JM Smucker company, as well as individual gifts. The Volunteer Services director oversees the financial and logistical operations of the Doggie Brigade. Day-to-day administrative tasks including onboarding and training are carried out by the Volunteer Services staff. Traditionally, one of those staff who has specialized knowledge of therapy animal programs is designated as the Doggie Brigade advisor. This author's official job title was Volunteer Office coordinator, with the role of Doggie Brigade advisor falling under one of several responsibilities.

The startup costs for the virtual Doggie Brigade were either sourced from hospital resources already on hand (iPad and accessories, MS Teams account) or covered by the Volunteer Services Department operating budget. The salary of the DBA was covered by the Volunteer Services Department payroll. Time the DBA would have spent coordinating the in-person program pivoted to facilitating the virtual program instead, for an average of 5 hours per week but usually not more than 10 hours per week. PDI screen wipes and OXIVIR TB wipes were already on hand for sanitization needs of other department services. The quantity of sanitizer wipe products required for the virtual Doggie Brigade visits and the cost per product was so low that additional funding was not needed. Table 1 outlines the approximate startup costs for starting a program, assuming that all supplies would need to be purchased, while Table 2 outlines the maintenance costs over time. The most significant expenses are the staff salary and the startup cost of the iPad tablet.

Outcomes

The Virtual Doggie Brigade program output between June 8, 2020, and October 27, 2020, produced 72.25 volunteer hours and 146 live video calls with a Doggie Brigade, Victory Gallop, or Akron Zoo animal handler. Virtual visits continued until April 2021, when in-person visits were approved to resume. Patients experienced virtual visits with dogs, horses, an Indian star tortoise, an eastern screech wwl, and a Chilean rose-hair tarantula. The Public Relations department produced three Facebook posts and two Instagram posts featuring virtual visits that received a total of 1,583 likes, 25 comments, and 83 shares.

Patient Experience Observations of Doggie Brigade Advisor (DBA)

The DBA kept a journal of the number of patients visited, floor(s) visited, observed patient behaviors in response to the virtual visit, and lessons learned from each visit to refine program processes. While facilitating virtual visits, the DBA observed the following behaviors from patients: high arousal/excitement, low arousal/calm, smiling, laughing, stroking the image of the animal on the tablet, distracted by the virtual visit tablet during a minor procedure, disengagement/distraction from the virtual visit tablet, conversation directed at the animal's handler, conversation directed at the animal, hugging the tablet, waving to the animal handler/animal, showing a stuffed animal to the animal handler/

Table 1 Sample Startup Budget

EXPENSES	Unit Cost	Quantity	Total
A. Personnel			
Facility Liaison (1 person) (training and coordinating virtual visits)	~$20.00/h	5h/week	$400.00 (1 month)
B. Technology and Equipment			
Video Call Service Subscription (Cost varies based on package)	$0–15/mo	Monthly	$0–15 (1 month)
iPad Tablet	$332.00/ea	1	$332.00
Cooper Dynamo Rugged Kids Play Case for Apple iPad (foam)	$17.95/ea	1	$17.95
iPad USB-C Cable	$35.00/ea	1	$35.00
iPad 30W Power Adapter	$49.00/ea	1	$49.00
C. Expendable Supplies			
PDI Screen Wipes (70 wipes/tub, 12 tubs/case)	$2.43/ea ($29.16/cs)	1	$2.43
OXIVIR TB Wipes (160 wipes/tub, 12 tubs/case)	$4.53/ea ($54.36/cs)	1	$4.53
			Subtotal
			$840.91–$855.91

Table 2 Sample Maintenance Budget

EXPENSES	Unit Cost	Quantity	Total
A. Personnel			
Facility Liaison (1 person) (training and coordinating virtual visits)	~$20.00/h	5h/week	$400.00 (1 month)
B. Technology and Equipment			
Video Call Service Subscription (Cost varies based on package)	$0–15/mo	Monthly per User	$0–15 (1 month)
C. Expendable Supplies			
PDI Screen Wipes (70 wipes/tub, 12 tubs/case)	$2.43/ea ($29.16/cs)	1	$2.43
OXIVIR TB Wipes (160 wipes/tub, 12 tubs/case)	$4.53/ea ($54.36/cs)	1	$4.53
			Subtotal
			$406.97–$421.96

animal (holding the stuffed animal in front of the camera intentionally), narrated animal's observed actions, sketched the animal, asked parent/medical provider to look at the animal on the virtual visit tablet, and engaged parent/medical provider in conversation about virtual visit after visit concluded. The frequency of these observed behaviors was not documented.

Perceptions of Parents

A small pilot model of the program and an evaluation was conducted from July to August 2020 to test and evaluate program technology, volunteer training, virtual visit content, canine engagement, and canine welfare protection strategies. An anonymous three-question satisfaction survey was given to parents at the conclusion of a virtual visit to request feedback regarding their satisfaction with video and audio quality, their child's enjoyment of the virtual visit service, and suggestions for improvements to the service. A total of 13 parents completed the survey. The first section of the survey asked respondents to rate their satisfaction with video quality, audio quality, connection quality, interactivity, child's enjoyment, benefit to child's well-being, and overall satisfaction. Response options were very satisfied, satisfied, neutral, unsatisfied, and very unsatisfied. The majority of respondents reported feeling very satisfied (85–92%) with service quality. Few respondents (8–15%) reported feeling satisfied while even fewer respondents (8%) reported feeling unsatisfied with service quality.

The respondents who felt unsatisfied experienced connection turbulence that hindered the audio and video quality, and were thus unable to participate in a visit. The second section of the survey was an open-ended question asking parents for suggestions about improving the service. Most of the respondents indicated they did not have any changes to improve the program. One response indicated the connection during their visit was choppy. The third and final section of the survey asked if respondents considered virtual therapy animal visits were worthwhile until in-person visits could resume. A majority of the respondents responded yes (92%) and one respondent did not respond to the question (8%).

Reflections and Observations of Volunteers

An eight-question volunteer feedback survey was sent to volunteers to collect information regarding their experience and suggestions to improve the program for patients and other volunteers. The first five questions asked the name of the person who completed the form, the date and time of their visit, the floor(s) or departments visited, the number of patient visits, and the number of staff visits. The DBA later determined that it was more efficient to enter this data into the volunteer tracking software, VSys One, after each visit and pull reports later rather than rely on volunteers completing the survey each time they participated in a visit. The number of staff visits was combined with the number of patient visits to track the total number of virtual visits.

The sixth question asked respondents what they liked best about their visit and instructed them not to include any patient names or identifying information. Volunteers responded that they liked seeing kids smile, how engaged children were, having their dog do tricks for the kids, being able to see the kids, and the short, quick format being easy to manage time. One volunteer reported they enjoyed having two dogs participating in one virtual visit and that it kept the visit livelier and more interactive. Another volunteer shared that the use of the dog's trading card during the virtual visit "gave the visit a more real feel."

The seventh question asked respondents what would make the virtual visit process better or to share lessons learned. Volunteers responded that test runs were helpful for first timers, having treats and toys readily available helped facilitate virtual visits, and saving the video call link on their calendar helped them find it more quickly when it was their time to visit. One volunteer with a small dog shared that placing their dog on a countertop helped keep them keep the dog in visual range of the screen. Another shared that having the DBA repeat what

patients or parents said helped make it easier to understand what was said since it could sometimes be hard to hear them.

The eighth and final question asked respondents what advice they would give to other Doggie Brigade volunteers to make visits better. Volunteers responded to just have fun with their "fur baby," engage the child and ask them questions, use the brightest screen setting on their device when outdoors, have a few things prepared in advance such as a trick or gimmick, food puzzles, toys and treats, and carefully time the introduction of treats or play to manage their dog's attention during visits. One volunteer said: "Make sure to check your location and camera angle in advance. Look for best way to show yourself and dog. Check for lighting and make sure the background is free of any distracting items." Another volunteer suggested having a short script handy and that "it's OK to repeat the 'script' for each patient."

Reflections and Observations of the Staff

Lastly, the DBA conducted an informal survey in October 2020 by emailing Child Life and nursing staff on inpatient floors where virtual visits took place. Staff were invited to share their unstructured personal opinions, experiences, or testimonials regarding the virtual visit program. The following responses were received:

> I think the virtual Doggie Brigade has been so helpful in lifting the spirts [*sic*] of the children as well as parents on my unit. Working on a unit where many of my patients are here for extended amount of time, my patients look forward to different activities such as dog visits. When I have patients come back that have been to the hospital several times before they ask we often if a dog can come and because of all the changes in the hospital right now I hate having to tell them no. So when Volunteer Services told us about the virtual visits I knew it would be a huge hit with my floor. One patient in particular had asked me a few times so she was ecstatic when she got a visit from Willie Nelson (pony) and a Dog. She was shy at first watching on the iPad but that afternoon that's all she could talk about to staff and her family when they visited. I think that visit alone showed me how important it is to have some sort of normalization for these kids. Thank you for doing what you do!" (Child Life specialist)

> I am so grateful that these virtual visits have been made possible and so are our families. Many of our patients look forward to the normal pre-COVID Doggie Brigade visits as a part of their hospital stay or have lengthened stays that do not allow them to partake in physical visits to the Akron Zoo or Victory Gallop Farm. What this program provides brings this experience right to our patient rooms. We have completed several visits so far and I find that families are asking when the next one will be! We have one patient who has been struggling this admission and would not engage with staff or family. During a Doggie Brigade visit, this patient was more interactive, happy, and excited than she has been in a couple of weeks. I am hopeful that these services continue as I have seen first-hand the wonderful benefits it can have on my patients and how it can help them to cope with being here. (Child Life specialist)

> I am a longtime child life specialist who has seen firsthand for years how therapeutic the doggie brigade visits can be. I have witnessed these beautiful dogs help children cope with pain, grief, and missing their own pets at home. I have had many children tell me that the dog visits were their favorite part of being hospitalized. Because of this, it has been so hard not being able to have the visits in this time of COVID19.

> I have to admit I was dubious that virtual visits would be very fun for the patients. I expected the experience to be nowhere near as therapeutic as the actual ones. I am happy to report that that they actually get pretty close! The kids get excited when asked if they would like to participate, and when I follow up to see if they would like to do it

> again, I have been met with a resounding yes! The kids and families truly seem to enjoy it, and find it a calming, pleasant distraction as always. It may even have more impact than in usual times, since so much is unavailable. Thank you so much to [the DBA] and all the volunteers continuing to provide this in these difficult times. (Child Life specialist)

Limitations

There were several limitations to this evaluation. First, the virtual Doggie Brigade was intended as a rapid response to a sudden cease in patient activities due to pandemic-related safety measures. The evaluation was designed ad hoc to troubleshoot problems and assess basic outcomes, not as research to develop or advance knowledge in a field of study. As such, formal qualitative or quantitative research methodologies and analysis were limited.

Additionally, the sample size was small, homogenous, selected based on convenience, and geographically restricted, which will limit the ability to generalize data to other demographics and populations. Patients were mostly white and ages 5 to 18; other demographic factors are not known. There is also a possibility of self-selection bias affecting survey results as participants providing feedback chose whether or not to participate. In addition, the pandemic caused nearly all patient recreational and social activities in the hospital to cease. Thus, as is the case with many animal-assisted interventions studies, a halo effect and pandemic-related shortages may cause outcomes to appear more beneficial than they actually are.

Implications for Future Research and Programs

Further studies are needed to document and quantify the benefits and risks of virtual animal-related engagement (ARE) interventions. Directions for future research include evaluating the cost-effectiveness of in-person programming compared to virtual programming, expanding the sample size, and replicating this project's methodology across multiple pediatric hospitals nationally or internationally. Other types of settings such as schools or workplaces could also be explored.

Applying formal research best practices, including collecting detailed participant demographics such as protected health information (PHI), implementing an intervention and control group, and statistical analysis would improve understanding of the power and effect size of measured outcomes. For example, the DBA felt surprised by the frequency of the behavior of showing a stuffed animal to the live animal during a video call. It would also have been interesting to learn more about unexpected interactions, such as a patient hugging a tablet.

In particular, qualitative research could help to crystallize ideas, experiences, and themes related to interacting with live animals via video call as well as how this experience relates to other similar experiences under the umbrella of animal-related engagement. While studies have begun to ask questions about the impact of interacting with a live animal in person compared to interacting with a robot animal in person (Krause-Parello et al., 2019; Logan et al., 2019) or animal-related media such as videos (Myrick, 2015), this evaluation appears to be among the first few (Dell et al., 2021; Mabe, 2021) that have begun to investigate the impact of interacting with live animals through video conferencing software.

Conclusion

The pandemic forced many organizations to adapt extraordinary circumstances and fledgling technologies into essential staples of day-to-day interactions. While the virtual program outcomes could not match the quantity of visits that the in-person program achieved, this experience demonstrated how virtual and ARE experiences could potentially supplement traditional AAA when in-person visits are not safe or for populations that might otherwise be excluded from certain services, such as patients restricted by isolation precautions, immunocompromised status,

or allergies. Additionally, opportunities to partner with organizations that would normally be prohibited from visiting due to zoonotic disease transmission prevention protocols or geographic distance were discovered such as zoos and animal sanctuaries. The virtual Doggie Brigade and other similar programs have opened new doors to respond to service gaps that existed pre-pandemic and alleviate public health areas of concern such as hospitalization-related distress, social isolation, and loneliness.

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Institutional Review Board Statement

Ethical review and approval were waived for this project because the program was approved as an in-person patient activity, no form of intervention was performed on human subjects, and protected health information (PHI) was not collected.

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