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AN INVESTIGATION OF THE IMPACT OF COVID-19 INFECTION CONTROL ON VISUAL ART INSTALLATIONS IN HOSPITALS WITH PEDIATRIC PATIENTS

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By

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Advertising Design and Computer Art

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ABSTRACT

This study investigated the impact of COVID-19 infection control on visual artwork in pediatric hospitals and hospitals caring for pediatric patients. The study involved five hospitals in three southern America states and addressed visual artwork and art installations. The researcher administered an internet-based survey to participants in job functions related to hospital administration, environmental services, and project management across the facilities and received participation from 18 respondents. Additionally, telephone interviews were conducted with three participants with the job titles project manager/analyst, child-life specialist, and environmental services director. Survey questions were designed to examine visual art programs in selected children's hospitals and identify artwork utilized, as well as the cleaning and maintenance practices of the artwork to limit the spread of infection. Data gathered revealed hospital staff participants' knowledge regarding the artwork design and materials, artwork purpose, cleaning standards, and effective cleaning practices for artwork to help better manage art programs for pediatric patients in a safe and effective manner.

DEDICATION

Dedicated to Dr. Hazim J. Safi who always supported me throughout my healthcare administration career, always encouraging the pursuit of continued education, and told me to “do what I love.” You have been my rock for so many years. Thank you for being you!

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I want to thank the incredibly hard-working healthcare professionals who participated in this study during one of the most trying times of a global health pandemic. Without your participation, this study would not be possible.

To my fiancé, my daughter, my family, friends, and my co-workers, thank you for standing by my side throughout this process. You made sure I did not give up and reassured me that this work was important. I am thankful that I can contribute to society and the future of artwork in pediatric settings.

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CHAPTER 1

Introduction

Visual art installations play an important role in pediatric hospital design, specifically the impact the artwork will have on the young patients' experience as well as other occupants of the facility. Visual art and art installations, including interactive art, contribute to the overall design of the built environment aesthetic in a consumer-driven healthcare market. They also provide a positive distraction for young patients that helps to hold their attention and distract them from anxious feelings (Pati & Nanda, 2011). Research on evidence-based design (EBD) in the healthcare environment suggests an important relationship between the built environment and health-related outcomes. Some of the benefits of EBD include reduced stress and anxiety for patients and an improved healing process (Alfonsi et al., 2014). Increased attention has been given not only to the built environment's impact on the patient experience in recent years but also to the ability to clean and sanitize the healthcare environment. In order to reduce infection susceptibility, specifically healthcare-associated infections (HAIs) in vulnerable patient populations, environmental cleaning is an important factor that contributes to reducing the spread of infection. Visual art installations, free-hanging installations, and interactive art pose a challenge in cleaning for hospital environmental services staff (EVS) (D. Orsatti, personal communication, July 15, 2020).

In the years 2020 and 2021, the world faced one of the most devastating world pandemics in the last century with the spread of the Coronavirus (COVID-19). It caused a sudden and radical shift in how people interacted in their environment and how hospital systems mitigated the spread of the infection, resulting in a heightened sense of concern regarding cleaning environmental surfaces (N. Hagerty, personal communication, September 16, 2020).

Statistics in Infection Prevention Related to Hospitals and Infectious Disease

The Centers for Disease Control (CDC) reported the following statistics:

- The U.S. Centers for Disease Control and Prevention (CDC) in October 2020 identified that nearly 1.7 million hospitalized patients annually acquire healthcare-associated infections (HCAIs) while being treated for other health issues, and that more than 98,000 patients (one in 17) died due to these HCAIs.
- According to the CDC as of December 2020, fewer cases of Coronavirus (COVID-19) in children (age 0-17 years) have been reported compared with adults. The number and rate of cases in children in the United States has been increasing since March 2020 although true incidence of the virus in children is unknown as testing prioritization has been given to adults. Hospitalization rates in children were lower than that of adults.

- In December 2020 the United States Food and Drug Administration issued the first emergency use authorization for a vaccine for the prevention of the coronavirus disease for individuals 16 years of age and older.
- According to the CDC as reported in 2020, environmental contamination was significantly associated with transmission of pathogens in major outbreaks of methicillin-resistant Staphylococcus aureus (MRSA), vancomycin-resistant enterococci (VRE), Clostridioides difficile (C.diff), and more recently in protracted outbreaks of Acinetobacter baumannii in a variety of healthcare settings.

Healthcare design is complex where special consideration must be taken in the design process to prevent the spread of infectious disease.

Statement of the Problem

Following the spread of COVID-19 in the United States, several hospital construction and design leaders of children's hospitals posed concerns with the display of visual art installations, indoor sculptures, and interactive art in pediatric hospital lobbies and corridors in reach of patients and visitors. Cleaning and infection control for visual art installations presented a challenge for environmental services staff due to the complexity of the design, the materials of which they are composed, or the difficulty in which they were maintained and disinfected (N. Hagerty, personal communication, September 16, 2020). Due to the infection control concern, removal of expensive art displays in major pediatric hospitals and/or restrictions in the type of art that could be

displayed occurred. The following hospital leaders voiced concerns and acted within 2020:

- Hospital A in Austin, TX – In the summer of 2020, hospital officials expressed concerns to their art consulting team at American Art Resources regarding the difficulty of cleaning a monumental art piece installed in previous years. The three-dimensional art in the shape of a butterfly had become a burden on staff, and concern for cleaning without damaging the piece had led the hospital to remove the piece of art (D. Orsatti, personal communication, July 15, 2020).
- Hospital B in Durham, NC – In the late spring of 2020, the interior designer for facility planning, design, and construction brought concerns to the hospital's art consulting firm American Art Resources regarding sculpture pieces and multi-piece wall installations proposed in the art package due to cleanability and protection from patient and visitor hands (K. Fitzgerald, personal communication, June 12, 2020).
- Hospital C in Philadelphia, PA – N. Hagerty (2020), VP of Construction and Design, stated at the Center for Health Design's Workshop on New Design Strategies and Solutions for Pediatric Settings on September 16, 2020, that a Pennsylvania children's hospital had removed all major interactive art and visual art that was in reach of patients and visitors due to the COVID-19

pandemic. She stated concerns for the health and safety of patients due to the potential spread of the virus through transmission by touch.

Due to the limited and emerging data on the Coronavirus coupled with the potential liability for contributing to the spread of the disease through person-to-person touch, hospitals took drastic steps to minimize exposure to patients and visitors, including removing art that helped to provide a positive environment and promoted well-being in children (Lambert et al., 2014). In addition, artists' approach to artwork for hospitals varied widely in materials, substrates, design structure, and shape. Hospital administrators typically were unfamiliar with appropriate art and artist design and relied on experts in art consulting and interior design to help direct them in appropriate art design for children in healthcare. Once the artwork was installed, the hospital environmental services staff assumed responsibility for cleaning the hospital environment. Training for cleaning art installations varied vastly, and limited literature existed for hospitals regarding cleaning standards for art installations. Environmental personnel worked for low pay, completed repetitive and mundane tasks, and lacked training regarding cleaning (Peters et al., 2018).

This researcher contended that since artists, healthcare administrators, and environmental services staff trained in very different fields of service, a gap existed in communication and education regarding appropriate pediatric hospital artwork program development and the maintenance required to ensure an acceptable level of safety and quality required by the Centers for Medicare and Medicaid Services (CMS) (2013)

specific to infection control. Furthermore, because manufacturers of the art typically were solo artists, no manuals existed on how to clean and sanitize the art installations. Although strict standards in medical equipment maintenance existed, there was little information on how to maintain unique artwork in a healthcare facility. The American Society for Healthcare Engineering's (ASHE) (2014) document for healthcare facility maintenance entitled *Maintenance Management for Health Care Facilities* was utilized as a manual by facilities and maintenance management for healthcare facilities. Further exploration into current standards of practice for proper maintenance of visual art installations and interactive art needed to be explored to maintain the level of quality and safety expected at pediatric hospitals in the COVID-19 pandemic.

Purpose of the Study

The purpose of this study was to examine visual art programs in selected children's hospitals, identify key concerns of hospital administrators, and determine what type of art can be provided in the pediatric hospital environment that limits the spread of infection and can be effectively cleaned and maintained by the hospital environmental services staff. Hospital art programs were approved by hospital administrators, hospital facility managers, and interior designers utilizing art consulting firms. This study focused on the type of art in pediatric hospitals, environmental services staff cleaning procedures, and infection prevention and control guidelines. Art solutions and cleaning standards discovered to be effective as a result of this study may help healthcare organizations

identify potential solutions that can be implemented in their facilities to provide safe and creative art solutions in pediatric hospital settings.

Research Objectives

The study addressed the following research objectives:

1. To identify the types of visual art, art installations, and interactive art that were installed in pediatric hospital environments prior to COVID-19.
2. To identify the types of visual art, art installations, and interactive art that were removed due to COVID-19.
3. To assess current methods utilized by Environmental Services Staff (EVS) in pediatric hospital environments to clean and sterilize surfaces, including any barriers such as installation mounting height, materials, and design to maintaining visual artwork surfaces.
4. To describe what types of visual artwork and materials are acceptable for installation in pediatric hospitals that limit or reduce the potential for the spread of infectious disease.

Delimitations

The study was delimited in the following areas:

1. The sample of respondents was not randomized but relied on convenience sampling via telephone interviews. Therefore, the results could not be generalized to the population of all hospital environmental services.

2. The sample was derived from hospital operations and environmental services staff across selected children's hospitals in Houston, Texas; Austin, Texas; Phoenix, Arizona; and Durham, North Carolina. These hospitals could not be considered representative of all children's hospitals.
3. EVS respondents' self-reported responses on perceived ability to do their job and clean properly in the hospital work environment was the perspective of a small sampling.

Data on the treatment and management of the COVID-19 pandemic that first presented on December 31, 2019, in Wuhan, China, was continually evolving as the research study progressed. The COVID-19 vaccine distribution in the United States included 63.5% of adults receiving at least one dose of the vaccine as of June 2021 with a total of 33,178,017 coronavirus cases in the U.S. and 594,381 deaths. Effects from the virus were still being studied. Further research, data collection, and data analysis on visual art installation materials and cleaning methods could provide further insight for healthcare administrators, facility managers, and artists on providing appropriate art and art programs for pediatric hospitals that would limit the spread of infection.

CHAPTER 2

Review of Literature

The topics of infection control and pediatric hospital evidence-based design have been researched individually, but sparse documentation was available on visual art installation related to environmental effects and infection control. This review assembled a range of topics and issues related to visual art, pediatric design, environmental services, and infection disease control in hospitals.

Visual Art

Visual art, including paintings, floor sculptures, hanging installations, and interactive art, played a significant role in contributing to the overall built environment and subsequently influenced the well-being of patients in hospitals (Ulrich, 1991). Research on visual art has shown important, positive effects for health, healing, and psychological well-being in patients. The budget allocated for new hospital construction art packages typically ranged from $250,000-$1,000,000 ($.75-$1.00 per square foot) depending on the square footage of the hospital according to healthcare art consultants at American Art Resources (C. Marcello, personal communication, September 23, 2020). Hospital art packages consisted of large-scale commissioned pieces of artwork and framed art for hospital corridors and patient rooms. Artwork in lobbies and high traffic areas included paintings, prints, floor sculptures (see Figure 1), wall sculptures, hanging

installations (see Figures 2-3), and interactive art as shown in the following images of a prominent pediatric hospital.

Figure 1

Floor Sculpture in Pediatric Hospital Elevator Corridor in Phoenix, AZ

Lankston et al. (2010) noted a Department of Health Working Group on Arts and Health report that the arts contributed to better health and well-being, along with improved experiences for patients and staff. The study also concluded that the public generally viewed art positively.

Figure 2

Hanging Art Installation in the Lobby of a Children's Hospital in Phoenix, AZ

Art offered other benefits. Visual artwork provided a healthy communication tool between nurses and patients as it created relevant and fruitful dialogue (Wikström, 2011). J. Dewey (1958) spoke of the aesthetic peak experiences in viewing art as moments of joy and temporary loss of time and self-awareness in his book *Art as Experience*.

Figure 3

Waiting Room of Children's Hospital in Phoenix, AZ (hanging art installation)

Wikström (2011) observed 20 participants' reactions and comments after viewing an art gallery in Sweden during one-hour sessions; he reported their experience as being happy, giving them inspiration, and being more mentally present overall. Study participants expressed a positive value for artwork and an importance of art in their lives, specifically stating that it makes them happy, energized, and inspired. Wikström noted that art provided a cognitive and emotional tool in the communication process.

A survey of 4,376 members of an online patient panel receiving care at the Cleveland Clinic evaluated their experience after exposure to an art collection of diverse subject matter, media, and imagery. The 5,300 works of artists included paintings, prints, works on paper, photography, and sculpture inclusive of "nature art" and "abstract art" (Karnik et al., 2014). The hospital curator sought to promote a restorative patient experience. Environmental descriptors used in the survey included *healing, inspiring, stark/bare, inviting/welcoming, and calming*. The researchers concluded that of the patients who visited for a single day, 50% of respondents who noticed the art stated that the environment was *inspiring* compared to the 31% who did not notice the artwork. Of the patients that stayed for two days or more, 60% of those who noticed the art described the environment as *inspiring.* Of the patients who visited for a single day, 71% of those who noticed the art described the environment as *inviting/welcoming* versus 60% of those who did not notice the artwork. If the patient stayed for two days or more, 77% of those who noticed the art described the environment as *inviting/welcoming.* Patients who visited for a single day and noticed the artwork found the hospital setting *calming* (57%)

versus 42% who did not notice the art. If the patient stayed for two days or more, 73% of those who noticed the art described the environment as *calming.* The majority (54%) of patients who visited for a single day and noticed the art versus 42% who did not notice the art described the surroundings of the hospital as *healing*. If the patient stayed for two days or more, 67% of those who noticed the art described the environment as *healing.* Of patients who visited for a single day, 21% of those who noticed the art described the environment as *stark/bare* as opposed to 20% who did not notice the art. Overall, of the 826 respondents who noticed the artwork, 78% reported the art collection had a positive impact on their overall impression of the institution.

Pediatric Hospital Design and Art

Little research existed on visual art in pediatric hospitals related to its effects on children and young people. Bishop's qualitative study (2008) of 24 young people 9-18 years of age at the Children's Hospital at Westmead in Sydney, Australia, included interviews with hospitalized young people and their perceptions, as well as Bishop's interpretation, of the impact of art on their emotional and physical well-being. In a later study, Bishop (2017, p. 18) noted that the art played a significant role in "providing a rich source of aesthetic variation, entertainment, distraction, engagement and identity," thereby allowing young people to maintain a positive mind frame, experience a rich source of color, and be in an environment that did not look or feel like a hospital. The young participants interviewed mentioned their love for the brightness of color, differentiation, variation, and uplifting nature which promoted a positive impact on their

mood and experience. Bishop's study showed consistency in the children and young people's value for the varied and eclectic nature of the artwork.

Healthcare designers commonly use the term *positive distraction*, specifically in pediatric hospital design. Roger S. Ulrich (1991) first introduced the term, and it continues to be used by architectural and interior design firms as key terminology in the design process for pediatrics. As defined by Jiang (2020), the idea of positive distraction focused on distracting an individual with positive feelings created by their surroundings and environment, thereby diverting the attention away from stress and anxiety that may be occurring. Healthcare providers designed environments for pediatric patients that provided a positive distraction using artwork, colors in design features, and elements of play to keep children's focus away from their illness.

Jiang (2020) conducted a thorough literature review of 27 peer-reviewed publications focused on positive distraction in pediatric healthcare environments. Six core and common themes were discovered from the study results: (1) art and environmental aesthetics, (2) spatial arrangement and atrium, (3) considerations of socialization patterns, (4) play and interactive technologies, (5) sound and lighting interventions, and (6) access to nature. In Jiang's review, he noted that according to Piaget's theory of child development, children think and process information from the physical environments differently than adults. Children are less developed, and unfamiliar spaces coupled with illness can create stress, anxiety, and fear for them (Singer & Revenson, 1997).

Jiang (2020) focused on positive distraction and play features in public places for pediatric patients. When examining the number one theme of art and environmental aesthetics, he found that many studies associated patients' perceived quality of care with the perceptions of their physical environment, and that the environment reduced stress and anxiety and improved the patient's overall experience. Jiang found that pediatric patients preferred a rich variety of color that leaned towards more blues and greens with artwork that was interesting and themed with variety so that the patients and visitors did not feel like they were in a hospital surrounded by reminders that they were sick. The importance of artwork in pediatric hospital settings played an essential role in the emotional wellbeing and healing process of children. Children depended on their sensory experience primarily to learn and understand, whereas adults depended on their cognitive ability as explained in Jean Piaget's Cognitive Development (Kazi & Galanaki, 2021). Healthcare providers and designers will need to continue to find ways to provide visual artwork and design in pediatric hospitals that also complies with cleaning and infection control standards.

Several factors drove the use of interactive art and virtual technology in healthcare settings for pediatric patients. As previously stated, art served as a distraction tool that allowed play and involvement of the young patients in the setting. This technique resulted in a positive impact on children's mood in a study observing 158 pediatric patients over the age of five in two pediatric clinic waiting areas (Pati & Nanda, 2011). Interactive art and visual displays appeared in the architecture and environment of

many pediatric hospitals around the United States to calm young patients, to complement the hospital's brand, and to attract patients to the facilities. In an ever-growing consumer-driven industry, the business of healthcare has been forced to evolve as patients had a choice in their care purchasing and behaviors (Vogenberg & Santilli, 2018). The reimbursement criteria from the Center for Medicare and Medicaid Services (CMS) held administrators of pediatric hospitals accountable for creating an environment that attracted patients, sustained a high quality with good outcomes, and maintained top patient satisfaction through the Hospital Consumer Assessment of Healthcare Provider and Systems (HCAHPS) survey (Center for Medicare and Medicaid Services, 2020). In an extensive literature review of research related to distraction techniques for children undergoing procedures, Koller and Goldman (2012) found multiple examples of clinically significant improvements to pain tolerance, decrease in distress, and reduction in anxiety for children exposed to interactive and passive virtual reality and other distraction techniques.

In a study at the Hospital for Sick Children (SickKids) in Toronto, Canada, researchers investigated an eight-story atrium style lobby that featured a hanging mobile sculpture of a tutu-clad pig on an overhead tightrope (see Figure 4). The desire to create an uplifting and therapeutic environment in which children and families would feel comfortable inspired the design.

Figure 4

Photograph featuring the hanging sculpture Barnyard Flyers by Jane Buckles at Hospital for Sick Children in Toronto, Canada. Courtesy Ricardo L. Castro (Adams, 2010).

Ten young people served as study respondents engaging in interviews, tours, and photo-elicitation to gather data. While the study focused on the architectural design of the atrium, the design of the surrounding patient rooms produced negative responses from children who believed the rooms lacked privacy due to their exposure to the main lobby and other rooms. The common, open spaces of the atrium lobby received positive feedback for promoting social interaction.

Behavioral reactions of young people and adolescents typically were magnified, and activities both physically and mentally outside of their normal routine disturbed them. Bennett et al (2015) reported that the rate of mental health disorders in children with chronic physical illness were four times that of the healthy population. The sense of displacement from their normal routine in tandem with coping with serious illness could cause a great deal of stress and anxiety on pediatric patients due to the threat of interference (Blumberg & Devlin, 2006). Children's response to strange and unfamiliar surroundings heightened in the healthcare setting, and their needs differed from those of the adult population. Children needed elements of fantasy, imagination, and play, not criteria emphasized in hospital designs for adults. In the study involving 100 junior high school students, 30% had been hospitalized overnight, 5% hospitalized for 1 to 2 weeks, and 1% hospitalized for 3 to 4 weeks. These adolescents rated and responded to two pictures of hospital hallways: an adult-oriented hallway and a child-oriented hallway. When discussing the color schemes of the two hallways, 40% of those who responded preferred the design focused on children rather than the design of the adult hallway, noting the bright colors in the children's hallway. Blumberg and Devlin deduced from the study that adolescents appreciated cheerful, colorful décor. The study stated an overwhelmingly similar experience of adolescents with and without overnight hospital stays.

Findings from a study of 55 children five to eight years of age across three pediatric hospitals in Ireland with an art-based approach suggested that the interior of

children's hospitals should reflect the developing needs and interests of young children with an unstructured, flexible, and contemporary environment featuring color ranges, shapes, patterns, and textures (Lambert et al, 2014). The study revealed that respondents preferred a bright, cheerful, warm, colorful, and comfortable environment that was spacious, creative, imaginative, and contemporary. Similarly, findings from a study at an Iranian children's hospital demonstrated that factors, including a colorful environment and a cheerful environmental design, could be effective in creating an appropriate environmental space for children based on 16 paintings and 24 interviews with children (Nasab et al., 2020). In a review of literature by Abbas and Ghazali (2010), artwork in children's hospitals provided a more cheerful environment and hence contributed towards the pediatric patients' healing process (Yusoff, 2012). The literature reviewed in all these studies posed a common and universal theme: children and adolescents have a unique need for the built environment to be specific to their demographic in their emotional development.

Infection Control and Prevention in Pediatric Hospitals

The healthcare environment has been a primary source of germs and pathogens that can cause infections or carry antibiotic resistance (Centers for Disease Control and Prevention, 2020). According to the CDC, about one in 31 hospital patients had at least one healthcare-associated infection (HAI). Surfaces in the healthcare environment contained a multitude of microorganisms. High touch surfaces such as bed rails, tray tables, and handles in hospitals were a direct source of transmission of disease from

patient to patient or healthcare personnel to patient. With the global Coronavirus disease (COVID-19) pandemic, an infectious disease caused by the newly discovered Coronavirus in 2019 which spread primarily through droplets of saliva or discharge from the nose or mouth when an infected person coughed or sneezed, precautions were developed to prevent infection and slow the transmission of COVID-19 (World Health Organization, 2020).

Due to the highly infectious nature of COVID-19 as well as the increased mortality rates, hospitals and healthcare providers had concerns regarding the transmission of the disease in the hospital environment. Because high touch surfaces were of great exposure for transmitting COVID-19, pediatric hospitals have been recognized as being especially vulnerable to the spread of the disease. The Coronavirus disease rarely caused severe disease in children although asymptomatic children could spread the disease; therefore, special precautions should be taken in pediatric hospitals to protect healthcare workers, as well as other patients and their caregivers (Devrim & Bayram, 2020). Recommendations including social distancing of a minimum of six feet, the use of personal protective equipment (PPE), frequent hand washing, and rigorous disinfecting of surfaces, in addition to many other precautions, were put into place within pediatric hospitals. According to Devrim and Bayram, if sufficient precautions were not taken, healthcare settings may have served as an additional source of transmission and spread of COVID-19 in the society. Hospital administrators in three pediatric hospitals removed some art installations that were in reach of young patients and visitors. Art

installations at a children's hospital in Philadelphia, including floor sculptures and interactive art installations, were removed and stored with the onset of COVID-19 according to N. Hagerty, Senior Director, Facilities & Design, Children's Hospital of Philadelphia (Hagerty, 2020). Hagerty discussed the burden on environmental staff services (EVS) to clean the installations as well as to have the resources on hand to clean the art installations effectively, frequently, and after every patient interaction. It could be deduced that the removal of art installations would leave a void in pediatric hospitals that could ultimately affect the experience of the patients, including their wellbeing.

In an interview, Luis Ostrosky-Zeichner, MD and Professor in the Department of Infectious Diseases at UT Health McGovern Medical School in Houston, Texas, (personal communication, October 12, 2020) noted that the main infectious diseases of concern fell under gastrointestinal bacteria (Methicillin-resistant staphylococcus aureus/MRSA, VRE/Vancomycin-resistant enterococcus, C. diff/difficile) and respiratory viruses (COVID-19, Influenza, Respiratory Syncytial Virus/RSV, Enterovirus, Rhinovirus, E. Coli, Salmonella). Dr. Ostrosky-Zeichner noted that the primary concern was viral or bacterial diseases transmitted by touch or that were airborne. The secondary concern was mold and dust particles that can affect patients with compromised immune systems and those with asthma and other airway diseases. In the conversation, he stated that any object within reach should be cleaned frequently and on a regular basis, ideally after any child or visitor has touched the surface. Dr. Ostrosky-Zeichner further stated that art and other objects in hospitals should not have a porous or textured surface and

should not be resistant to common disinfectants such as hydrogen peroxide. He stated that art installations near the ceiling or out of the reach of human contact were less of a concern for viral and bacterial spread; however, they were a concern for dust and mold contaminants.

Cleaning and disinfection of environmental surfaces in hospitals is fundamental to reduce the spread of healthcare-associated infections. In a study on the environmental services quality involving increasing education to the EVS staff, the cleaning compliance increased high-touch surface cleaning reliability from 37% to 90% from 2016 to 2018 in tandem with a 65% decrease in healthcare acquired infections at an independent health system serving children. This outcome resulted in an estimated cost avoidance of $500,000 for the organization (Craig et al, 2020).

Environmental services staff could be instrumental in reducing HAIs; they require education and training on how to properly clean surfaces within the healthcare environment. In a study at Cook Children's Medical Center, the percentage of cleaned surfaces improved incrementally between three trials with values of 20%, 49%, and 82% after repeated training to change staff behavior (Lilly, 2014). Most of the studies on EVS compliance related to HAIs focused on cleaning what the CDC (2020) has called *high-touch points/objects* (HTOs) including toilet seats, flush handles, bedpans, and handrails. Articles that discussed EVS staff knowledge and education on cleaning hospital lobby area art installations were virtually non-existent. There were also limited resources

available regarding standards for hospital art substrates and materials that are appropriate in the healthcare setting for ease of maintenance and cleaning to prevent HAIs.

Art installations in children's hospitals varied in size, substrate, structure, and design from hospital to hospital according to American Art Resources director of art consulting Clara Marcello (C. Marcello, personal communication, September 23, 2020). Artwork in pediatric hospitals ranged from framed wall art, murals, mosaics, wall sculpture, floor sculptures, and ceiling hanging art installations that were two-dimensional and three-dimensional. The art installations and interactive art in pediatric hospitals were created by various artists with the intent of creating positive distraction for young patients. There were no specific guidelines in existence for hospital art installations and interactive art. Hospital facilities management who generally manage EVS personnel were challenged with creating a safe healing environment within the hospital; according to one facilities manager at an Austin, Texas, based hospital of a national healthcare system, the art installations that were not contained in Plexiglas and were structurally intricate became a burden on the EVS staff to clean (D. Orsatti, personal communication, 2020). Young patients who touched the art installations and interactive art created a potential breeding ground for the spread of bacteria and virus which also included the highly infectious COVID-19.

Conclusion

The emergence of the Coronavirus Disease and pandemic in 2020 transformed the ways in which humans interacted and greatly expanded infection control and prevention

measures within hospitals and society. The highly infectious disease created new challenges for hospital administrators, facilities managers, and environmental services staff in maintaining a safe environment for patients. Pediatric hospitals and healthcare settings had protocols and processes in place to mitigate the spread of infection. Additional precautions following the onset of COVID-19 resulted in the removal of visual art installations considered high-touch surfaces in some pediatric hospitals. While the greater impact and long-term effect of COVID-19 continued to evolve, the world adapted to the new normal as a result of this disease. Consequently, the need emerged for pediatric hospitals to develop new solutions for displaying visual art installations that limited the spread of infection, for artists to develop substrates that were durable and cleanable with appropriate cleaning solutions, and for environmental services staff to be properly trained in how to keep artwork clean and safe to patients.

Missing from the literature were design solutions specific to visual art installation standards in pediatric hospitals that meet infection prevention and control standards and environmental services cleaning instructions for this type of art. This topic should be further explored as the removal of these expensive art pieces could cause a financial loss for the pediatric hospitals and provide a disservice to their young patients' wellbeing.

CHAPTER 3

Methodology

The study investigated the impact of COVID-19 infection control on visual art installations in pediatric hospitals. The mixed qualitative and quantitative research method was exploratory and grounded in theory from participants interacting with the visual art installations. The study focused on the effect of the art's design and materials' effect on the environment and consequent challenges posed for hospital staff in cleaning the art for infection control.

The placement of large, complex art installations in pediatric hospitals posed a major problem in consistent and effective cleaning. These pieces often appeared in main lobbies and corridors of frequently traveled spaces in view and sometimes in reach of visitors and patients. Out of concern, some hospital administrators simply removed expensive pieces of art. Such actions highlighted the need for new solutions to infection control targeting COVID-19 and other infectious diseases.

Sample

The researcher solicited volunteer respondents from hospital administrators, hospital facilities managers, project managers, environmental services staff, artists, and art program consultants. Data collection methods included interviews and a survey to determine themes in experiences.

The study was conducted with 18 employees of five hospitals that treated pediatric patients as well as 10 professional artists and three art consultants providing visual art installations for pediatric hospitals. Hospital administrators and staff participated in the study and provided consent for the staff to participate.

The data collection process involved two methods. First, respondents were shown a visual example of a children's hospital hanging art installation. Secondly, respondents provided feedback via interviews and a survey requesting feedback about the challenges these pediatric hospital professionals experienced in cleaning the art due to the art's design and materials.

The results could be utilized to help educate hospital professionals on what type of design features should be implemented in an art program to prevent the spread of infectious disease. The findings could help administrators and facilities managers better understand appropriate art and cleaning methods to be able to continue providing positive distraction for ill children in a cost-effective manner.

Pilot Study

Eight volunteers with job functions unrelated to the study's sample participated in a pilot of the electronic survey to assess its readability and clarity. The volunteers found no problem with the structure of the survey questions or the navigation of the Qualtrics software. The pilot process, however, led the researcher to add open-ended questions to the survey to glean all possible information from respondents.

Materials

Data collection methods included the following:

a) A survey distributed via email to participants. Refer to Appendix A for the survey tool used in this study.

b) Virtual interviews with the researcher following a script and asking respondents questions one-on-one in an open dialogue.

Survey Administration

The researcher requested permission from hospital leaders to distribute the study to select hospital employees. The surveys were distributed by email between the researcher and hospital staff which included hospital administrators, facilities managers, project managers, and environmental services leaders. Survey respondents completed the survey in 15 minutes or less. Respondents were given approximately one month to complete the survey with a reminder sent each week. In addition, interview conversations of one hour or less were conducted and recorded over a period of two months.

Data Collection and Oversight

The researcher applied for permission to use human subjects to the Institutional Review Board (IRB) at Stephen F. Austin State University; the IRB approved the application (see Appendix B). The researcher electronically filed signed consent forms from the respondents and hospital administrators.

The researcher saved and stored the data on a password protected computer. Data collected via interviews was recorded and transcribed by the researcher to examine

patterns or repeated ideas that emerged. Surveys were kept anonymous. The responses were tagged with codes in a spreadsheet entered by the researcher in a statistical database software (SPSS). Data was analyzed by categories relating to the study specific to artwork, cleaning patterns, behaviors, and perceptions. Recurring themes were linked into a cohesive, overarching theme.

Data Collected

The survey collected respondent demographic information and similar opinions through open-ended items. The data collected consisted of demographic information and respondent perceptions and opinions related to hospital artwork types, artwork materials, and cleaning standards.

Demographic Information

The survey collected self-reported respondent information on demographics. The demographics included respondent gender, tenure at organization (years), position/title, employment status, and duties related to artwork.

Respondent Opinion

The survey collected self-reported respondent opinions on the following topics which the researcher recorded:

- identification of key situations in which staff struggled to clean the art or administrators had infection control concerns
- identification of environmental cleaning methods utilized to manage the art

- identification of visual art installations and interactive art designs and materials that were utilized to reduce the spread of infectious disease in pediatric hospitals
- identification of the overall perception of the safety of visual and interactive art in pediatric hospitals due to the nature of the patient demographics

Variables of Study

Several independent variables were investigated in the study. The variables, outlined below, were analyzed to gauge staff perception of effective solutions for managing the cleaning of visual art installations and interactive art.

- career tenure
- education provided to environmental services staff for cleaning art
- education provided to artists for providing art materials that could be cleaned without damage to the art
- presence and type of design solutions for art in pediatric hospitals
- types of cleaning agents utilized
- frequency of cleaning
- location and height of art
- patient access to art

Research Questions

Based on the study's research objectives, the researcher posed the following research questions.

1. What types of visual art, art installations, and interactive art were installed in pediatric hospital environments prior to COVID-19?
2. What types of visual art, art installations, and interactive art were removed due to COVID-19?
3. What current methods did environmental services staff (EVS) utilize in pediatric hospital environments to clean and sterilize surfaces?
4. What barriers, such as the installation mounting height, materials utilized, and design features, existed that challenged the maintenance of visual artwork surfaces?
5. What types of visual artwork and materials were acceptable for installation in pediatric hospitals that limited or reduced the potential for the spread of infectious disease?

Conclusion

Visual art installations in pediatric hospitals are part of the aesthetic design of the hospital environment and provide positive effects on patients, staff, and visitors through evidence-based design. This study was intended to be informative and to provide education to hospital leaders, hospital staff, artists, and art consultants about providing art programs for pediatric hospitals. Study findings could also assist in reducing the spread of infectious disease and help hospital administrators, facilities managers, and hospital environmental staff better understand appropriate art and cleaning methods to continue to provide positive distraction for ill children in a cost-effective manner.

CHAPTER 4

Results

This study examined visual art programs in selected children's hospitals in Texas, Arizona, and North Carolina to identify key art concerns of hospital administrators and to determine what type of art can be provided in the pediatric hospital environment that would limit the spread of infection while being effectively cleaned and maintained by the hospital environmental services staff. The study focused on the types of art in hospitals caring for pediatric patients, environmental services staff cleaning procedures, and infection prevention and control guidelines. Participants completed an internet-based survey to communicate their opinions related to types of artwork in hospitals, cleaning methods, infection control guidelines, and challenges related to cleaning the artwork pre-COVID-19 and post-COVID-19. The researcher coded responses to numerical values to enhance descriptive statistic measures. The results in this chapter have been organized by research question, with analysis on the quantitative and qualitative data where appropriate. A secondary internet-based survey was distributed to professional artists and art consultants who provided services for hospitals with pediatric patients. In addition, the researcher conducted telephone interviews with the Director of Environmental Services at one of the participating hospitals in addition to the Director of Child Life Specialty by using a series of structured questions to provide further qualitative analysis.

Demographic Information

The researcher distributed internet-based surveys through Qualtrics at five hospital systems in Texas, Arizona, and North Carolina (Hospital A, Hospital B, Hospital C, Hospital D, Hospital E) that treated pediatric patients. The survey was distributed to three main job titles (hospital executives, directors of environmental services, and facilities project managers) who oversee hospital artwork directly and indirectly. The sample size totaled 18 hospital employees and contract employees.

Table 1 summarizes the demographic data of hospital survey respondents utilizing several categories. More than half of the respondents were male (56%), and nearly half were female (44%). Of the 18 respondents, 14 (77%) reported over five years of work experience in their related field in healthcare, and six respondents reported over 15 years of experience. It is worth noting that the four environmental services directors were primarily contract employees (75%), and one of the five facilities project managers was a contract employee. Hospital executives' oversight related to artwork was split between direct and indirect supervision while hospital environmental services directors primarily had indirect duties related to artwork (75%). Facilities project managers reported 100% direct duties related to the hospital artwork.

Table 1

Demographic Characteristics of Hospital Participants

Characteristics		Hospital executive	Director of EVS	Facilities project manager	Total
Gender					
Male	Count	5	4	1	10
	%	55.6%	100.0%	20.0%	55.6%
Female	Count	4	0	4	8
	%	44.4%	0.0%	80.0%	44.4%
Years with current					
1-5 years	Count	3	1	0	4
	%	33.3%	25.0%	0.0%	22.2%
6-14 years	Count	2	2	4	8
	%	22.2%	50.0%	80.0%	44.4%
15 or more years	Count	4	1	1	6
	%	44.4%	25.0%	20.0%	33.3%
Employment status					
Hospital employee	Count	9	1	4	14
	%	100.0%	25.0%	80.0%	77.8%
Contract employee	Count	0	3	1	4
	%	0.0%	75.0%	20.0%	22.2%
Duties related to					
Directly	Count	5	1	5	11
	%	55.6%	25.0%	100.0%	61.1%
Indirectly	Count	4	3	0	7
	%	44.4%	75.0%	0.0%	38.9%
Total	Count	9	4	5	18
	%	100.0%	100.0%	100.0%	100.0%

The researcher distributed a second internet-based survey to professional artists and art consultants providing art commissioning and procurement services to hospitals and the healthcare sector. The ten professional artists included in the survey had previous experience providing artwork for hospitals that treated pediatric patients. The three professional art consultants completing the survey also had experience managing projects in hospitals treating pediatric patients which included the hospitals in the survey. Table 2 summarizes the demographic data of the art professionals survey respondents utilizing several categories. Half of the professional artist respondents were male (n=5), and half were female (n=5). All art consultant respondents were female (n=3). Of the 13 respondents, 11 (85%) reported over 10 years of work experience in their related field, and six respondents reported over 21 or more years of experience.

Table 2

Demographic Characteristics of Artists and Art Consultants

Characteristics		Professional artists	Professional art consultants	Total
Gender				
Male	Count	5	0	5
	%	50.0%	0.0%	38.%
Female	Count	5	3	8
	%	50.0%	100.0%	61.5%
Total	Count	10	3	13
	%	100.0%	100.0%	100.0%

Table 2 Continued

Characteristics		Professional artists	Professional art consultants	Total
Years in Profession				
1-10 years	Count	1	1	2
	%	10.0%	33.3%	15.4%
10-20 years	Count	4	1	5
	%	40.0%	33.3%	38.5%
21 or more years	Count	5	1	6
	%	50.0%	33.3%	46.2%
Total	Count	10	3	13
	%	100.0%	100.0%	100.0%

Response Data from Hospitals

The researcher analyzed responses received to artwork types, artwork materials, frequency of cleaning artwork, and barriers to cleaning artwork related to infection control prevention and limiting the spread of infectious diseases, specifically the COVID-19 virus, within the hospital environment. To establish hospital respondents' understanding of the role and value that artwork plays within hospitals caring for pediatric patients, respondents answered in a qualitative, open-ended format as listed in Table 3. Common themes in qualitative responses related to the role of artwork in hospitals included 75% of respondents stating a perceived value to providing a calming and healing environment to patients. Respondent comments indicated a value and need for artwork in pediatric hospital settings that contributes to the healing process for pediatric patients.

Overall, responses in the data showed several gaps of knowledge and perception related to cleaning of artwork and standards within the hospital by job title and function from hospital administrators, facilities project managers, and environmental services directors. Gaps of knowledge and perception included cleaning frequency, cleaning agents utilized on artwork, and barriers to cleaning artwork.

Table 3

Understanding of the Role /Value of Artwork in Hospital with Pediatrics

Job title	Qualitative results from respondents' open-ended comments
EVS directors	Aesthetic value to create a calming healing environment.
	Images should create a calming environment, sometimes offering an escape through imagery and imagination.
	Provides a welcoming/safe environment to the patients and parents.
	Provide a warm, inviting atmosphere.
Executives	To help with the healing process. To add aesthetic appeal.
	To create a pleasant and healing environment that is pleasing to the eye.
	Provides atmosphere and distraction to children receiving care.
	Moderate.
	Has multiple purposes including stimulation, calming, distraction.
	I haven't done one yet, but I would imagine it is important to select/install artwork that fits the area and eases patient anxiety.
Project managers	Helps with emotions.
	Reflect a calm, positive, familiar environment; reduce anxiety, scared feelings of unknown; provide visual and interactive diversions from sterile waiting, exam, and procedure rooms.

Types and Materials of Artwork in Hospitals

When asked to identify types of artwork and materials utilized to display artwork required by hospitals caring for pediatric patients correlated with job titles of respondents working within hospitals, responses varied. There were 38 responses from 18 respondents to the multiple response question whereby respondents could select answers by art type. Of the 18 participants completing the survey, only 16 participants responded to this question. The researcher assumed that participants were unfamiliar with art types in the hospitals in which they were employed. Types of artwork in hospitals primarily consisted of framed artwork (n=15), hanging installations (n=10), and floor sculptures (n=9) as noted in Table 4. Four of the respondents listed other types of artwork (n=4); open-ended text responses for other types of artwork consisted of floor designs, ceiling tile designs, projector images on floors, interactive video, and awards behind glass. Framed art had the highest number of responses at 39.5% of the total responses.

Similarly, the materials utilized on the artwork in the hospital surveyed consisted of a multiple response question where only 11 of the 18 respondents answered yielding a total of 22 responses. Materials required by hospitals to display artwork consisted of Plexiglas (n=11), wood (n=4), and canvas (n=3) as noted in Table 5. Four of the respondents listed glass as another material to display artwork (n=4). Plexiglass accounted for 50% of the overall responses. One facilities project manager stated that additional coverings were being studied since the onset of the COVID-19 pandemic.

Table 4

Types of Art in Surveyed Hospitals

Art types	Responses		
	N	Percent	Percent of Cases
Framed art	15	39.5%	93.8%
Floor sculpture	9	23.7%	56.3%
Hanging installation	10	26.3%	62.5%
Other	4	10.5%	25.0%
Total	38	100.0%	237.5%

Table 5

Types of Materials Utilized in Surveyed Hospitals

Material types	Responses		
	N	Percent	Percent of cases
Plexi	11	50.0%	100.0%
Wood	4	18.2%	36.4%
Canvas	3	13.6%	27.3%
Other	4	18.2%	36.4%
Total	22	100.0%	200.0%

Hospital Cleaning Frequencies and Barriers to Cleaning Artwork

Study participants responded to questions relating to the cleaning of artwork in their respective hospitals that cared for pediatric patients. Responses varied regarding hospital cleaning standards, cleaning agents utilized for cleaning artwork, cleaning frequency for artwork, and barriers to cleaning artwork by job type. As noted in Table 6, less than half of all the respondents from hospitals stated that they had cleaning standards specific to artwork within the hospital (44.4%), although most environmental services staff stated they did have standards for cleaning hospital artwork (75%).

Table 6

Hospital Artwork Cleaning Standards by Job Title

Artwork cleaning standards		Job title			Total
		Executive	Director EVS	Facilities project manager	
No	Count	5	1	4	10
	%	55.6%	25.0%	80.0%	55.6%
Yes	Count	4	3	1	8
	%	44.4%	75.0%	20.0%	44.4%
Total	Count	9	4	5	18
	%	100.0%	100.0%	100.0%	100.0%

Hospitals implemented best practices in environmental cleaning standards regarding cleaning policies and procedures. Participants responded to their experience or

knowledge on specific cleaning standards for artwork within the hospital environment. As shown in Table 7, 55.6% of the total respondents stated that they did not have specific cleaning agents for artwork whereas 33.3% of the respondents stated that they did not know if there were specific cleaning agents for artwork. All the 18 respondents completing the survey answered the question related to cleaning standards for artwork. One of the respondents stated the hospital utilized Virex 256 for cleaning artwork. Limited responses specified a hospital cleaning agent specifically for artwork. The assumption may be made that hospital cleaning agents are not solely provided for artwork and are for general purpose cleaning on multiple surfaces within the hospital environment. Respondents may have interpreted the question related to specific cleaning agents for artwork to have the meaning that the cleaning agent was only utilized for artwork and no other surfaces within the hospital. The cleaning standards and agents used to clean artwork responses may have been impacted based on job title due to the education provided regarding cleaning agents based on job title duties and responsibilities. Executives and facilities project managers do not typically have direct responsibility for cleaning the facilities and may not be trained on the cleaning agents utilized. Further clarification on the context of the question could limit or eliminate confusion among respondents with varying job titles and job duties.

Table 7

Specific Cleaning Agents for Artwork by Job Title

Specific cleaning agents for artwork		Job title			Total
		Executive	Director EVS	Facilities project manager	
Don't know	Count	5	0	1	6
	%	55.6%	0.0%	20.0%	33.3%
No	Count	3	3	4	10
	%	33.3%	75.0%	80.0%	55.6%
Yes	Count	1	1	0	2
	%	11.1%	25.0%	0.0%	11.1%
Total	Count	9	4	5	18
	%	100.0%	100.0%	100.0%	100.0%

A third of the hospital respondents indicated a cleaning frequency for artwork of two to three times a week (33.3% of the total respondents) with the next highest response of weekly (27.8%) as shown in Table 8. Over half of the respondents stated there were not specific cleaning standards for artwork within the hospital. Two respondents were unclear of the frequency for cleaning artwork. Three respondents stated they had special training protocols for environmental staff related to artwork, and one facilities project

manager stated that environmental services staff “are not responsible for artwork and installations.”

Table 8

Cleaning Frequency of Artwork by Job Title

Cleaning frequency		Job title			Total
		Executive	Director EVS	Facilities project manager	
Daily	Count	1	0	1	2
	%	11.1%	0.0%	20.0%	11.1%
2-3 times a week	Count	2	1	3	6
	%	22.2%	25.0%	60.0%	33.3%
4-6 times a week	Count	2	0	0	2
	%	22.2%	0.0%	0.0%	11.1%
Weekly	Count	3	2	0	5
	%	33.3%	50.0%	0.0%	27.8%
Other	Count	1	1	1	3
	%	11.1%	25.0%	20.0%	16.7%
Total	Count	9	4	5	18
	%	100.0%	100.0%%	100.0%%	100.0%

Survey participants were asked if they perceived any barriers to cleaning and maintaining visual art in pediatric hospital settings. Barriers to cleaning artwork categories included height of the artwork, materials utilized on the artwork, and artwork design. The multiple response question included responses from 17 of the 18 respondents yielding a total of 44 responses with an average of 2.6 responses. The materials utilized on the artwork provided the biggest barrier to cleaning per 36.4% of the barrier types followed by height and artwork design with both receiving 31.8% of responses (see Table 9). Analysis indicated a minimal difference regarding barriers to cleaning artwork when correlated with gender (see Table 10) or job classification. Barriers to cleaning included 17 of the 18 participants' responses (n=17). Materials emerged as the greatest difference with females (100%) more likely than males (87.5%) to say materials were a barrier to cleaning (see Table 10). The Cramer's V association value for height as a barrier for females and males was .209.

Table 9

Barriers to Cleaning Artwork in Surveyed Hospitals

Barriers to cleaning	Responses		
	N	Percent	Percent of Cases
Height	14	31.8%	82.4%
Materials	16	36.4%	94.1%
Design	14	31.8%	82.4%
Total	44	100.0%	258.8%

Table 10

Barriers to Cleaning by Gender

Barriers to cleaning		Gender		Total
		Male	Female	
Height	Count	7	7	14
	%	87.5%	77.8%	82.4%
Materials	Count	7	9	16
	%	87.5%	100.0%	94.1%
Design	Count	6	8	14
	%	75.0%	88.9%	82.4%
Total	Count	8	9	17
	%	100.0%	100.0%	100.0%

When barriers to cleaning the artwork was cross tabulated with the type of art in hospitals caring for pediatric patients, materials emerged as the biggest barrier to cleaning for all art types (n=35) as seen in Table 11. Interestingly, height was the lowest barrier to cleaning for hanging installations. Hanging art installations typically hang from the ceiling, and the assumption could be made that artwork located at a height beyond reach would be difficult to clean and require additional equipment such as a ladder or long cleaning tool. The design of the artwork received the second highest total of responses by art type (n=32). The most peculiar response correlated height as a barrier to cleaning floor sculptures in 31.8% of the responses.

Table 11

Barriers to Cleaning by Type of Art

Barriers to cleaning artwork		Art type				Total
		Framed art	Floor sculpture	Hanging installations	Other	
Height	Count	12	7	8	3	30
	%	30.8%	31.8%	30.8%	30.0%	
Materials	Count	14	8	9	4	35
	%	35.9%	36.4%	34.6%	40.0%	
Design	Count	13	7	9	3	32
	%	33.3%	31.8%	34.6%	30.0%	
Total	Count	39	22	26	10	97
	%	100.0%	100.0%	100.0%	100.0%	

Of the 18 respondents at hospitals, five stated that their employer had taken actions to improve the COVID-19-related infection control threat of the hospital's artwork and art installations. One respondent stated that they used minimal canvas artwork in patient areas, and another stated that new artwork was created and installed with enhanced infection prevention features. Two respondents stated that some artwork had been removed after the onset of COVID-19. Nine of the 18 respondents were aware of the United States Environmental Protection Agency's (EPA, 2021) List N

Disinfectants for COVID-19. Respondents' lessons learned regarding cleaning artwork appear in Table 12 as open-ended responses. Commonalities include setting more specific protocols around appropriate cleaning agents and cleaning techniques.

Table 12

Lessons Learned Cleaning Artwork

Job title	Qualitative results from respondents' open-ended comments
EVS directors	Learned to be very careful and to have an experienced tech do the actual work. Many times, management will have to do the cleaning.
	Mostly we dust the artwork and damp wipe the frame.
Executives	Accessibility, horizontal surfaces, and unusual contours must be diligently monitored, or they can build up dirt.
	Some do leave residue.
	COVID-19 has increased awareness of high-level disinfectant to areas often overlooked.
	Art selection that can be cleaned. We acquired a hospital that has artwork that isn't ablet to be cleaned outside of dusting.
Project managers	Large canvas pieces have been damaged by environmental worker spraying disinfect directly on canvas and wiping; small/intricate dimensional sculptures broken by brisk cleaning.
	Issues of safety around strict fire codes can be inconsistent or can be helpful in cleaning protocols.

Hospital Interview Responses

The researcher conducted telephone interviews with a project manager of a pediatric hospital, an environmental services director of a hospital that treats pediatric patients, and a child life specialties director of a pediatric hospital. Two of the participants indicated they were employed or contracted with the same healthcare system in Houston, Texas (Hospital A), and the project manager was employed with a healthcare system in Austin, Texas (Hospital B). Communication during the interviews provided detailed information regarding the selection of artwork, materials selected for artwork, cleaning processes, education, and training within hospitals caring for pediatric patients.

Program Manager of Facilities Communication. According to the telephone interview responses of a participant with the job title of Program Manager of Facilities Management who had worked in the role for over 15 years, the art selection process and art committee composition evolved and changed through the years (D. Orsati, personal communication, May 14, 2021). During the onset of Orsati's career, the art committee was comprised of an executive, the hospital priest, the project manager, and the art consultant while it currently consisted of the chief operating officer, the child life specialist, the project managers, the end users (clinical leaders within the hospital units), and the art consultant. Frontline nursing leaders became a new addition to the art committee. Orsati stated that the primary focus of the art committee members was to assist in selecting appropriate art for the patient population that supports the healing

process. The hospital system created standards for materials to encase artwork, including the type of wood framing and non-glare Plexiglas covering.

Figure 5

Photograph Featuring Glass Sculpture Encased in Plexiglas in the Waiting Area of a Children's Specialty Pavilion in Austin, Texas, Provided by American Art Resources.

When asked about the purpose of artwork in the pediatric hospital prior to the pandemic, the project manager stated that pre-COVID the hospital administration and child life specialist believed that the artwork should be very hands on for the kids, encouraging the pediatric patients to play with and touch the artwork. During post-COVID, the consensus of the art committee members was to limit touching the art and to enhance the ability to clean the artwork. The project managers of the facilities expressed concerns about the materials utilized on the artwork, their cleanability to keep the artwork free of germs, and their ability to prevent the spread of infection. The art committee

expected protective encasing around artwork that was structural or sculptural in nature. Orsati (personal communication, May 14, 2021) stated that she felt there should be communication between the art consultant and the environmental services staff with education on the type of cleaning agents that were safe to use on the artwork materials to keep the pieces clean, free of germs, and well maintained for a long lifecycle.

Environmental Services Director Communication. During a telephone interview, a participant with the job title of Director of Environmental Services stated that environmental service staff (EVS) members receive an initial series of training videos focused on cleaning materials, techniques, and safety protocols for their job function (D. Olvera, personal communication, April 7, 2021). Olvera holds a bachelor's degree in hotel and restaurant management (hospitality) with 16 years of training in healthcare environmental services. He stated that his current employer has a 10-step process (see Appendix I) and a duty list for cleaning (see Appendix J) in addition to a damp wipe protocol utilizing quaternary (water-based) disinfectants. These disinfectants appeared on the EPA's list of COVID-19 approved cleaning agents that require a dwell time of 10 minutes and meet hospital grade cleaning standards (EPA, 2021). Quaternary disinfectants are not very corrosive or harsh on materials such as wood and metal. Staff used bleach products when exposure to C-Diff bacteria occurred or was suspected to have occurred within locations of the hospital. The respondent stated that the daily basic cleaning material for most surfaces is microfiber cloth, the gold standard in cleaning and catching virus and organic matter. Staff used a microfiber high duster with a flexible

wand to clean difficult to reach surfaces. Olvera stated that he had not seen a significant deterioration of furnishings or artwork due to cleaning disinfectants based on his experience during his 16-year tenure.

When asked about new equipment or technology to make EVS job duties easier, Olvera (personal communication, April 7, 2021) stated that he continued to review best practices and latest technology on an effective, time-based system. He stated that new technology now placed into practice included UVC technology in the operating rooms required powerful UV rays that had power to clean areas in healthcare settings; however, this technology was not safe for human exposure due to the high UV output. The UVC technology implemented by his employer in Houston, Texas, required sensors that monitored motion and were set to a shut-off mode when motion was detected which eliminated the possibility of human exposure to the powerful and harmful rays. Olvera noted that small UVC wands lacked sufficient power to provide adequate cleaning in healthcare areas and could potentially expose humans to the harmful UV rays; therefore, wands were not utilized.

The researcher asked the respondent to identify the biggest challenges EVS staff faced in accomplishing tasks of cleaning furnishings and artwork. The director of environmental services responded that "the EVS department traditionally is an undesirable position with high turnover and low pay so capable and effective manpower is the biggest challenge" (D. Olvera, personal communication, April 7, 2021).

Child Life Specialist Director Communication. According to the telephone interview responses of a participant with the job title of Director of Child Life Specialist, staff members faced significant changes in their interaction with pediatric patients post-COVID-19 due to heightened safety measures (A. Luksa, personal communication, April 8, 2021). Before-COVID, Luksa stated that her team of child life specialists would go into the two playrooms, game rooms, and outside areas. Post-COVID, the patients remained in their patient rooms where they were visited by child life specialists. They could go one at a time for a one-on-one session with the child life specialist in the playroom. The playroom had to be cleaned by the child life specialist by wiping down toys and areas touched or utilized.

When asked about artwork within the play spaces, the child life specialist (A. Luksa, personal communication, April 8, 2021) identified sculptures and wall installations. She stated that there was a life-size tree sculpture in the playroom (see Figure 5) with an indoor park that was inviting to the children; they tended to touch the tree sculpture and hold onto it. The tree sculpture was cleaned by wiping it with a water-based cleaner and cloth. Also, Luksa stated that staff removed a multiple-piece canvas wall art installation painted by the children at the hospital due to concern that it had a porous surface and could potentially transmit COVID-19 to patients and visitors. The interviewee stated that her staff was responsible for cleaning toys and areas that patients touched; however, environmental services staff cleaned all other areas of the walls and floors daily. Before COVID, infection control staff at the children's hospital in Houston,

Texas, audited the playroom randomly every month with spot checks to find any growing bacteria. Because the playroom presently was not utilized due to COVID, the audits had been discontinued but would resume when the patients could return to play. Luksa further stated that the biggest challenge had been the pediatric patients' confinement to their rooms; in her opinion, isolation does not promote their mental health and the recovery process.

Figure 6

Tree Sculpture in the Playroom of a Children's Hospital In Houston, Texas, Provided by the Director of Child Life Specialty (A. Luksa, personal communication, April 8, 2021).

The interviewed participants provided insight into daily functions, real-life situations, and experiences within a hospital caring for pediatric patients during the pandemic. Their experiences relayed cleaning protocols and concerns with infection control and prevention in wall and sculptural artwork within reach of pediatric patients.

Artists and Art Consultants Response Data

The researcher analyzed responses received on artwork types and artwork materials from professional artists and art consultants for healthcare. These responses established respondent understanding of infection control in limiting the spread of infectious diseases, specifically the COVID-19 virus, within the hospital environment. For the purposes of this study, professional artists and art consultants who provided artwork services for hospitals will be referred to as artwork professionals. A total of 13 artwork professionals responded to an online survey administered by electronic mail, 10 of which were professional artists, and three were healthcare art consultants.

Artwork Professionals Type and Material of Artwork for Hospitals

The researcher asked artwork professionals to identify types of pediatric artwork they had supplied to hospitals and the materials utilized to display them. Responses were correlated with respondent job titles and whether the installation was completed pre-COVID-19 or post-COVID-19. Professional artists' artwork mediums consisted of paintings, hanging installations, wall sculptures, floor sculptures, mosaic artwork, and other artwork types. Types of artwork provided in hospitals pre-COVID-19 by artwork professionals primarily consisted of hanging installations (n=9), paintings (n=8), mosaics

(n=5), and floor sculptures (n=2) as noted in Table 13. Of the 13 respondents, multiple responses were selected by art type (27/13=2.08 responses per respondent).

Table 13

Pre-COVID Artwork Type

Pre-COVID artwork type	Responses		Percent of cases
	N	Percent	
Hanging installation	9	33.3%	69.2%
Paintings	8	29.6%	61.5%
Mosaic	5	18.5%	38.5%
Other	3	11.1%	23.1%
Floor sculpture	2	7.4%	15.4%
Total	27	100.0%	207.7%

Table 14 reveals that paper, canvas, and paint emerged most frequently as artwork materials in hospitals caring for pediatric patients. Multiple responses were selected by materials utilized on the artwork pre-COVID (50/13=3.85 responses per respondent). Profession type of professional artists and art consultants were not significant factors contributing to artwork type and materials; rather, artists' responses depended on their artwork medium of choice and training.

Artwork professionals mostly considered the use of a special coating to protect artwork in the hospital setting. Seventy percent of the artists utilized a special coating to

protect the art, and 33.3% of the art consultants used a special coating to protect art with 66.7% of them using it sometimes as seen in Table 15.

Table 14

Pre-COVID Materials

Pre-COVID materials	Responses		Percent of cases
	N	Percent	
Paper	10	20.0%	76.9%
Canvas	10	20.0%	76.9%
Paint	10	20.0%	76.9%
Glass	6	12.0%	46.2%
Wood	6	12.0%	46.2%
Metal	4	8.0%	30.8%
Other	4	8.0%	30.8%
Total	50	100.0%	207.7%

Table 15

Utilized Special Coating Protecting Art by Job Title

Utilized special coating protecting art		Job title		Total
		Art consultant	Artist	
No	Count	0	2	2
	%	0.0%	20.0%	15.4%
Yes	Count	1	7	8
	%	33.3%	70.0%	61.5%
Sometimes	Count	2	1	3
	%	66.7%	10.0%	23.1%
Total	Count	3	10	13
	%	100.0%	100.0%	100.0%

Post-COVID-19, five of the 13 artists and art consultants responded to making changes to art, either in type of artwork or materials used to make artwork. Artwork material changes provided the highest count with four of the six total responses. However, all three of the surveyed art consultants changed materials utilized to create or cover art in comparison to only one of the 10 artists surveyed (see Table 16).

Table 16

Post COVID Changed Art Type or Materials by Job Title

Changes to art post-COVID		Job title		Total
		Art consultant	Artist	
Art type changed	Count	1	1	2
	%	25.0%	50.0%	
Art materials changed	Count	3	1	4
	%	75.0%	50.0%	
Total	Count	4	2	6
	%	100.0%	100.0%	

Of the 13 professional artists and art consultants surveyed, 76.9% indicated familiarity with infection control prevention standards within hospitals (n=10). Only 30.8% received instruction on infection control standards related to the artwork they provided for hospitals caring for pediatric patients (n=4) as shown in Table 17.

Table 17

Infection Control Prevention Knowledge by Job Title

Infection control prevention knowledge		Job title		Total
		Art consultant	Artist	
Familiar w/infection control	Count	3	7	10
	%	100.0%	70.0%	76.9%
Provided instructions on infection control	Count	2	2	4
	%	66.7%	20.0%	30.8%
Utilized special coating protecting art	Count	1	7	8
	%	33.3%	70.0%	61.5%
Total responses	Count	6	16	22
	%	100.0%	100.0%	100.0%

When the researcher asked the artwork professionals for additional recommendations related to the study on artwork cleanability and durability within hospitals, they recommended utilizing non-porous surfaces to encase or coat the art such as covering art with Plexiglas or coating the art with a solid finish. Respondents' comments included a recurring theme of using warm, soapy water to clean artwork surfaces. Comments on cleaning products varied greatly from those of hospital environmental services staff who used EPA-approved cleaning products that incorporated water-based quaternary disinfectants.

Conclusion

When evaluating visual artwork programs in selected children's hospitals and hospitals treating pediatric patients, respondents across all facilities and job titles responded in a varied manner. Respondents were familiar with the types of art provided and materials utilized prior to the COVID-19 pandemic. Due to concerns related to COVID-19 and infection control, only two hospitals caring for pediatric patients had removed artwork. One pediatric hospital had removed artwork based on an interview with a child life specialist.

Methods utilized by Environmental Services Staff (EVS) to clean and sterilize surfaces, including any barriers to maintaining artwork such as artwork height, materials, and design, varied by hospital respondent job title. A clear disconnect existed between hospital respondents that were not trained to clean and yet fell under the EVS job function, and those who were EVS staff. When artists utilized typical materials found in hospital furnishings, standard water-based cleaning agents proved adequate for cleaning and infection control of artwork.

Looking ahead to the desired future state of artwork, standardizing protocols and education for cleaning artwork would be beneficial to pediatric hospitals and the artists who provide artwork for them.

CHAPTER 5

Discussion

The COVID-19 pandemic created a worldwide shift in everyday life, causing many psychological and physical changes such as work and school closures, social distancing guidelines, mask coverings, virtual workspaces, and limited connections with family and loved ones, among others. The pandemic placed a great strain on the healthcare system due to the number of severe illnesses caused by this highly contagious respiratory infection that spread at a rapid rate. Hospital staff took special precautions throughout hospitals to limit the number of visitors, reduce physical contact of patients and staff, and remove furniture and other physical items (such as artwork) to reduce infections.

The COVID-19 pandemic was not the first pandemic that the world had experienced, and it likely will not be the last; therefore, the healthcare system needs long-term solutions. In fact, the efficacy of the COVID-19 vaccine is still unknown, and an outbreak may reoccur since the vaccine does not provide full immunity against infection. Although children 12 years of age and older may now take the vaccine (U.S. Centers for Disease Control and Prevention, 2021), some individuals do not meet requirements to get vaccinated, and the vaccine may be less effective against other possible variants (Murray & Piot, 2021).

The purpose of this study was to examine visual art programs in selected children's hospitals and other hospitals caring for pediatric patients, identify key concerns of hospital administrators, and determine what type of art can be provided in the pediatric hospital environment that will limit the spread of infection and can be effectively cleaned and maintained by the hospital environmental services staff. This study focused on perceptions and experiences pre- and post-COVID regarding the type of art in pediatric hospitals, environmental services staff cleaning procedures, and infection prevention and control guidelines. From data collected via an online survey, 18 responses were received from hospital staff across all surveyed sites, and 13 responses were received from artists and art consultants who provided services for hospitals caring for pediatric patients. Survey respondents completed the survey which contained simple demographic questions, several Likert-scale items, and open-ended questions. The researcher conducted telephone interviews with three hospital staff members and documented responses. The items in the survey and telephone discussions requested staff opinions on the types of hospital artwork in hospital facilities and the respondents' experience or knowledge on the cleanability of the artwork to help limit the spread of infectious disease, specifically the COVID-19 virus.

Limitations

The goal of the study was to identify existing gaps in communication and education in pediatric hospitals and other hospitals that cared for pediatric patients regarding artwork program development and the maintenance required to ensure an

acceptable level of safety and infection control. All hospital respondents who completed the survey and interviews were full-time staff. Art consultant respondents who completed the survey worked full-time, and artist respondents were independent contractors. Due to the COVID-19 social distancing safety precautions in place at hospitals, the researcher conducted all communications via electronic mail, telephone conversations, and video conferencing. In addition, because the survey listed questions that did not pertain to all job functions and job titles, respondents expressed concerns regarding their inability to effectively answer some of the questions. There was a chance that the survey data collected may have been skewed in certain areas because environmental services leaders, project managers, and facilities managers had the most direct contact with the artwork within the participating hospitals.

Importance of Art

The threat of hospital staff removing art from the pediatric healthcare environment instead of pursuing effective methods of cleaning and maintaining it spawned the inception of this research study. Removing artwork from walls, floors, and ceilings is *not* the best answer. Art contributes too much value to a healing environment (Adamaitis, 2020) to be treated with such disregard. Art serves a multitude of design benefits such as establishing a spatial focal point, adding textural interest, conveying character and mood, anchoring a color scheme, and introducing pattern. In healthcare, art can suggest the hospital's brand and philosophy as well as salute the local community, its cultural diversity, and geographic region (Curtis, 2018). Most of all, for patients and

guests, art presents a positive distraction by relieving one's mind of the seriousness of an illness or impending treatment (Huelat, 2015). Art possesses the power to fascinate, engage, and soothe. It can make technology, uniforms, treatments, and medications more palatable, especially for the young child.

Key Research Findings

The study yielded a relatively small sample size of 18 participants across five hospitals in the southern United States. The following discussion relates to the findings for each research question and gives insight into visual art installation function, challenges, and cleanability in pediatric hospital environments.

Types of Visual Art, Art Installations, and Interactive Art Installed in Pediatric Hospitals Prior to COVID-19

Visual art in pediatric hospitals varied from hospital to hospital in size, type, and structure. Art as a positive distraction for patients and families in a potentially stressful and frightening environment provided a healing atmosphere for ill patients and supported their wellbeing (Adamaitis, 2020). The types of artworks displayed in hospital lobbies and corridors included in this study varied from framed artwork, floor sculpture, and hanging art installations. The most prevalent artwork based on feedback from respondents was framed artwork with 39% of respondents, followed by hanging installations at 26.8%. Hospital participants also noted interactive video, projector images on floors, and ceiling tile designs in their pediatric settings in per their open-ended comments. The preferred material utilized on artwork was Plexiglas or acrylic according

to the hospital respondents. Two respondents listed glass as a material utilized on the artwork, and one individual stated that additional coverings were being studied since the onset of the COVID pandemic.

Only 60% of the hospital respondents reported duties related to direct contact with the visual artwork in the hospital. The researcher speculated that the respondents' understanding varied on the definition of direct duties related to artwork as it pertained to their job function. Job functions ranged from executives, environmental services directors, and facilities project managers with various levels of responsibilities related to the artwork. Job titles and related duties were somewhat different across multiple hospitals and healthcare organizations based on their employer's structure. Individual responses related to direct duties included overseeing hospital renovation and construction activities, purchasing, approving the art, and dusting the artwork. Likewise, an individual respondent stating an indirect role related to artwork commented that their responsibility was to make sure the art was maintained.

Types of Visual Art, Art Installations, and Interactive Art Removed Due to COVID-19

Two of the 18 hospital respondents indicated that artwork had been removed due to COVID-19 at their respective locations, and 33.3% of the respondents stated their hospital employer took action to improve the COVID-19 related infection control threat to the hospital's artwork and art installations. Forty-six percent of respondents selected hanging art installations as presenting the most challenge for cleaning and infection control and ranked it the highest in this category out of all the art types. One of the

respondents noted that anything porous would be hard to clean, and another respondent noted that surfaces encouraging touch, play, and interaction would be challenging to clean. Three of the participants listed specifics related to actions to improve the COVID-19 infection control threat of the hospital artwork: minimizing canvas in patient areas, cleaning routinely, and including enhanced infection prevention features for all new art installations.

Current Methods Environmental Services Staff Utilized in Pediatric Hospital Environments to Clean and Sterilize Surfaces

Methods of cleaning in pediatric hospital environments were inconsistent according to both the web-based survey in this study and direct telephone interviews with hospital employees. Although cleaning methods for standard surfaces within hospitals were similar with approved cleaning agents, the methods for cleaning artwork were not well defined, or not defined at all, and were complex in nature based on design, materials, and location of the artwork. Across all facilities and job functions, 83.3% of respondents selected “no” when asked if there were special cleaning agents used to clean artwork displays. The researcher speculated that the respondents selecting “no” was not a reflection on the lack of cleaning agents for artwork, but rather, it signified that the same cleaning agents were used on artwork displays as were used on other surfaces within the hospital. Of all respondents, almost half (44.4%) listed cleaning standards specific to the artwork, although three of the four environmental services directors stated that artwork cleaning standards existed within their facilities. One of the respondents noted the use of

the cleaning disinfectant Virex 256, a one-step, quaternary-based disinfectant cleaner concentrate providing broad spectrum disinfection at 1:256 dilution. An environmental services director interviewed also mentioned the use of quaternary disinfectants on most surfaces in the hospital setting. Only one participant explored other cleaning protocols for cleaning artwork in the last year. Half of the participants indicated familiarity with the U.S. Environmental Protection Agency (EPA, 2021) List N disinfectants for COVID-19. Special training protocols for environmental services staff specific to cleaning the artwork existed according to 33.3% of the participants.

Frequency of cleaning differed across facilities and by job function. The most common cleaning frequency in the study was two to three times a week followed by weekly cleaning. Widespread perception and experience of respondents ranged from daily cleaning to weekly cleaning with one environmental services director selecting "other" as a selection. It can be inferred that the cleaning frequency of the hospital did not fit well in any of the selected ranges. One of the environmental services directors interviewed explained that artwork in main lobby areas or that was encased may only be cleaned once a month.

Three participants offered additional recommendations related to the study on artwork in hospitals and ease of cleanability. One of the comments focused on the life of any particles on art mediums, and another participant commented that "simplified cleaning and maintenance considerations need to be priority when designing/ recommending pieces, especially if decisions are being made by architects and design

consultants unfamiliar with infection control measures and maintenance requirements; art installers/designers should provide specific recommendations on cleaning solutions and purchasing of parts needed."

Perceived Barriers that Challenged the Maintenance of Visual Artwork Surfaces

Barriers to cleaning artwork in hospital lobbies and corridors varied based on artwork type, job title, gender, and additional barriers to cleaning such as height, materials, and design. Materials of artwork had the highest response with 88.9% of respondents, followed by height and design features (77.8%). Individual comments included: non-porous surfaces are best, canvas cannot be sprayed with disinfectant, glass is very hard to clean considering the delicate nature of some artwork, and environmental staff are not educated and provided appropriate cleaning tools and solutions for artwork that will not scratch, fade, or damage pieces. Comments by respondents on design features' shape and structure barriers to cleaning the artwork included statements that shapes are difficult to clean, small grooves exist in the artwork, uneven surfaces collect dust and debris, and interactive pieces require special light bulbs. There were no differences in cleaning barriers by the number of respondents by gender based on height. Individual open-ended comments related to height listed the need to supply ladders and appropriate cleaning tools for artwork at higher levels that might trap dust particles. Differences in experience and opinion varied by job title with facilities project managers responding that height, materials, and design were barriers to cleaning 100% of the time. Hospital executives had the lowest counts for height, materials, and design being barriers

to cleaning artwork out of all three job titles. It was inferred that hospital executives did not have direct contact with the artwork daily and were further removed from daily maintenance of artwork due to their job function. Hospital-specific requirements regarding encasing coverings used for artwork was present with 88 % of the participants. The artwork encasing material most used to cover artwork was Plexiglas with the highest rate of response (44 %).

Types of Visual Artwork and Materials Acceptable for Installation in Hospitals That Care for Pediatric Patients Limiting the Potential for the Spread of Infectious Disease

The study survey results and interview responses regarding acceptable materials for artwork in hospital settings with pediatric patients was inconclusive as no recommendations were given on materials appropriate to use for artwork in hospital settings. The study sample did not have enough knowledge on the subject, and current data on the COVID-19 spread on surfaces continues to evolve. According to the CDC (2020), the relative risk of environmental transmission of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was considered low compared with direct contact, droplet transmission, or airborne transmission; the data on infections acquired through surfaces transmission was unclear at the time of the study.

The researcher acknowledged the survey participants' comments and inferred that smooth, cleanable surfaces made of durable materials fit the profile for providing ease of cleaning. Plexiglas surfaces were utilized the most in hospital settings as the surface was

durable, shatter-proof, and cleanable. More definitive standards should be explored to define appropriate materials to use on artwork in pediatric hospital settings.

Implications

Based on the feedback gathered, there were several items identified that organizations could implement to provide artwork as a part of the aesthetic design. These features have been shown to provide positive effects on pediatric patients while also being easy to effectively maintain infection prevention. Establishing standards for artwork materials and design features would allow environmental services to clean easily with current cleaning tools and disinfectants without concern for damage to the artwork.

Design solutions suggested by employees to help better maintain artwork posed potential implementation challenges for hospital leadership unless further knowledge emerges on materials that can withstand standard cleaning solutions used in hospitals. In addition to establishing protocols and standards for artwork types, training should be provided to artists, art consultants, and hospital facilities leaders on the type of materials that can be utilized in a hospital art program. Education and training should be provided to environmental services staff specific to cleaning agents and frequency for cleaning artwork. The researcher recommends that hospital leaders consider establishing an artwork committee that includes executives, facilities project managers, environmental services leaders, and art consultants to establish an artwork that is easily maintained to assist in preventing infectious disease spread within the hospital environment.

Recommendations for Further Study

While this study provided insight into the opinions and perceptions of hospital employees, artists, and art consultants on their existing art program and cleaning specific to artwork, the proposed solutions are still unclear but indicate several benefits and challenges for their respective organization to implement. The study was limited to five healthcare organizations caring for pediatric patients with survey participation from 18 employees or contract employees across three job functions. The researcher recommends further studies be performed across multiple hospitals with a higher participation rate among those with direct contact with the artwork. Hospital leaders may gain knowledge from more experienced hospitals which have maintained artwork programs over a more extensive period.

The study could be enhanced with additional changes to the questionnaire through lessons learned. As the hospital respondent pool for the study was limited to executives, environmental services directors, and project facilities managers, the researcher recommends enlisting environmental services staff and additional environmental services leaders to participate. Additional recommendations include expanding the questions on the survey to include experience with artwork that has been damaged due to cleaning methods and cleaning disinfectants. Further explanation regarding the definition of direct versus indirect job functions related to artwork should be provided.

Respondents offered additional information when given the option to provide written responses to open-ended questions regarding barriers to cleaning, types of

artwork, and materials of artwork. The researcher recommends conducting a focus group with multiple employees with the same job function to gain further clarification on their experiences. Limited research existed specific to infectious disease presence on artwork and was generalized to typical hospital surfaces. The researcher recommends a study related to infectious disease presence on different artwork types in shape, design features, and materials. Evolving data regarding COVID-19 viral count on surfaces will need to be reviewed as new research studies emerge. For example, in an early 2020 research study, some surfaces of a hospital room of COVID-19 patients tested positive, such as the toilet bowl and sink; these less-porous surfaces of plastic and steel had the highest viral load because they absorbed droplets less easily, preserving the active virus (Fiorillo et al., 2020). Appropriate cleaning agents on artwork materials should be explored that minimize damage to the artwork. Further research on cleaning agents specific to materials such as Plexiglas and wood materials utilized on the artwork would be beneficial to hospital leaders and environmental service staff.

Artwork in pediatric hospitals plays a vital role in the healing process and as a positive distraction for pediatric patients. Studies have shown how artwork can assist with reducing anxiety, stress, and perception of wait times (Bishop, 2017; Jiang, 2020). Hospital leaders working in tandem with hospital designers will need to find creative solutions to display calming and aesthetically pleasing artwork while limiting the spread of infectious disease.

The researcher intends to share the results of the study with the leadership of the participating hospitals. Study findings should heighten awareness and open the lines of communication regarding appropriate art programs and artwork cleanability in hospitals caring for pediatric patients.

Conclusion

This research on the impact of COVID-19 infection control on visual art installations in hospitals caring for pediatric patients focused on the effect of the art's design and materials on the environment and consequent challenges posed for hospital staff in cleaning the art for infection control. Due to challenges in accessing hospital staff who have direct involvement with art programs and in defining job functions within hospitals where duties are not clearly defined for the maintenance of artwork, the data in this study were limited. Hospital employees participating in this study noted that it is important to select appropriate types of artwork, materials, and cleaning agents for hospital art programs. Education and training for hospital staff that select artwork and environmental services staff that clean and maintain artwork will need to be established and communicated to reduce the need to remove or replace expensive artwork. While this study involved relatively large healthcare systems and hospitals in urban and heavily populated communities, the results of the study related to expanding education and training for hospital administrators and environmental staff regarding cleaning standards for artwork could benefit hospitals of any size in both urban and rural areas.

Due to the limited research that existed on the artwork design and maintenance of artwork in hospitals, the researcher was not surprised by the overall results of the data gathered. Hospital artwork has not been primary in the design process, and firms that have expertise in evidence-based design specific to artwork consulting for healthcare have been limited. The most surprising result to the researcher was the disconnect between hospital executives and facilities project managers in barriers to cleaning artwork when compared with the responses of environmental services directors. Hospital administrators' perceptions of the artwork and challenges with maintenance were slightly out-of-touch from that of the environmental services leaders with direct experience. The researcher expected a clearer response on types of cleaning agents suitable for typical artwork materials used in hospitals.

Artwork was present in every hospital surveyed as a standard part of the hospital design and construction. With the onset of COVID-19 and a mass global pandemic, hospitals caring for pediatric patients expressed a heightened concern for the spread of the disease on high-touch surfaces, including artwork displays for pediatric patients. Infection control prevention has always been a concern in hospital environments, and the spread of infectious diseases will continue to be an issue on all hospital surfaces, including artwork. Based on the outcomes of this survey and hospital employee interviews, if provided an opportunity to improve artwork design standards and artwork cleaning method standards, healthcare leaders of hospitals caring for pediatric patients

will benefit by providing an art program that conveys hospital quality and financial responsibility as they endeavor to promote a healing environment for children.

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APPENDICES

APPENDIX A

Definition of Terms

Visual Art. Art, also called (to distinguish it from other art forms) visual art, a visual object or experience consciously created through an expression of skill or imagination. The term *art* encompasses diverse media such as painting, sculpture, printmaking, drawing, decorative arts, photography, and installation (Britannica, 2020).

Installation and Performance Art. Incorporates a variety of different materials and artistic forms, such as sculpture, videos, and music, all with the purpose of transforming a given space (Britannica, 2020).

Interactive Art. A form of art that involves the spectator in a way that allows the art to achieve its purpose. Works of this kind of art frequently feature computers, interfaces and sometimes sensors to respond to motion, heat, meteorological changes or other types of input their makers programmed them to respond to (Wikipedia, 2020).

Positive Distraction. A positive distraction has been defined as "an environmental feature that elicits positive feelings and holds attention without taxing or stressing the individual, thereby blocking worrisome thoughts." The term distraction itself refers to "the direction of attention to a nontoxic event or stimulus in the immediate environment" (Pati, 2011).

APPENDIX B

Institutional Review Board Approval

STEPHEN F. AUSTIN STATE UNIVERSITY

Institutional Review Board for the Protection of Human Subjects in Research
P.O. Box 13019, SFA Station • Nacogdoches, Texas 75962-3046
Phone (936) 468-1153 • Fax (936) 468-1573

Principal Investigator: Mitzi Perritt
Human Services
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Co-investigators: Shannon Kimich

RE: An Investigation of the Impact of COVID-19 Infection Control on Visual Art Installations in Pediatric Hospitals
Case Number: **AY 2021-2095**

TYPE OF RESEARCH: Faculty Research

FROM: Emmerentie Oliphant, Chair , IRB-H

DATE: March 1, 2021

I would like to thank you for submitting your project entitled "**An Investigation of the Impact of COVID-19 Infection Control on Visual Art Installations in Pediatric Hospitals**" to the IRB for review. It has been reviewed and has been **approved** based on the following criteria:

Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

Your project has approval through **February 27, 2022.** Should you need additional time to complete the study you will need to apply for an extension prior to that date. The IRB should be notified of any planned changes in the procedures during the approval period, as additional review will be required by the IRB, prior to implementing any changes, except when changes are necessary to eliminate immediate hazards to the research participants. The researcher is also responsible for promptly notifying the IRB of any unanticipated or adverse events involving risk or harm to participants or others as a result of the research.

All future correspondence regarding this project should include the case number **AY 2021-2095.**

AY2021-2095 Exempt

APPENDIX C

Survey Questions for Artists and Art Consulting Firms Regarding Lobby and Corridor Visual Art Installations

1. Before the COVID-19 pandemic, what types of art would you design for visual or interactive art installations for a pediatric hospital?
2. Before the COVID-19 pandemic, what materials and/or media would you select if designing an art piece for a pediatric hospital lobby and corridors? (metal, glass, plastic, paper, etc.)
3. During the present COVID-19 pandemic, what types of art would you design for visual or interactive art installations for a pediatric hospital?
4. During the present COVID-19 pandemic, what materials and/or media would you select if designing an art piece for a pediatric hospital lobby and corridors? (metal, glass, plastic, paper, etc.)
5. Are you familiar with infection control standards for the hospital environment?
6. Are you provided with instructions for providing art that meets infection control standards in hospitals when being commissioned for a hospital art piece?

APPENDIX D

Survey Questions for Hospital Administrators, Hospital Facility Managers, and Hospital Environmental Services Managers regarding Lobby and Corridor Visual Art Installations

1. What is your understanding of the role/value of visual art installations in pediatric hospital settings?
2. What types of pediatric visual art installations are incorporated in your hospital lobbies and corridors?
3. Which types of pediatric visual art installations present the most challenge for cleaning and infection control?
4. What actions have you taken to improve the Covid-19-related infection control threat of your hospital interactive art installations?
    - What cleaning standards are required?
    - What cleaning agents are used?
    - How involved is the cleaning?
    - How often do you clean these installations?
    - Do you train the ES staff?
    - Are there other cleaning protocols that you might explore or purchase?
    - What recommendations would you give artists creating pieces of art for hospital installations in main lobbies and corridors?

APPENDIX E

STEPHEN F. AUSTIN STATE UNIVERSITY
CONSENT TO PARTICIPATE IN A RESEARCH STUDY
AN INVESTIGATION OF THE IMPACT OF COVID-19 INFECTION CONTROL ON VISUAL ART INSTALLATIONS IN PEDIATRIC HOSPITALS
Artists and Art Consulting Firms

The following information describes the research study in which you are being asked to participate. Please read the information carefully. At the end, you will be asked to sign if you agree to participate.

PURPOSE OF STUDY:
You are being asked to participate in a research study. The purpose of this study is to look at cleaning management of visual art installations, including floor sculptures, 3-dimensional art installations, hanging art installations and other art pieces within pediatric hospitals with the onset of the COVID-19 virus and related precautions. You are being asked to be in the study because you have direct engagement in visual art installations within hospitals.

PROCEDURES:
If you decide to participate this is a basic outline of what will happen over the course of your participation in the research study. The study will take you a maximum of 40 minutes to provide feedback with one or more of the following data collection methods:

- A survey distributed to you via email (5-10 minutes)
- A virtual interview with the researcher in an open dialogue (20-30 minutes)

Surveys and Interview Questions
Examples and questions and open dialogue in the study will: be related to the types of art or art programs you would design for pediatric hospitals; the materials and media used to design art for hospitals; and instructions for cleaning visual art and art installations for infection prevention pre- and post-COVID-19.

The length of time you are expected to participate in the study
The study will take place from December 14, 2020 to February 26, 2021 in scheduled times working with your schedule. Notes and audio recording may be used during the interview. Audio recordings will only be used to properly document your experiences and perspectives correctly and will be erased following the completion of the study on

May 31, 2021.

RISKS AND/OR DISCOMFORTS:

We do not anticipate you will experience any personal risk or discomfort from taking part in this study. You should report any problems to the researcher and audio taping is optional. You may skip any questions you do not wish to answer in the survey or interview.

BENEFITS:

It is possible that you will benefit from this study by educating you in your job function related to visual art installation planning, maintaining, and cleaning.
The study is expected to benefit:

- The results will be utilized to help educate hospital professionals on what type of design features should be implemented in an art program to prevent the spread of infectious disease
- The findings will help administrators and facility managers better understand appropriate art and cleaning methods to be able to continue providing positive distraction for ill children in a cost-effective manner

CONFIDENTIALITY:

The following steps will be taken to keep information about you confidential, and to protect it from unauthorized disclosure, tampering, or damage: research data files will be kept on a secure external drive that is password protected and in a locked cabinet with access only to the researcher. Data will be aggregated; no identifying direct quote will be used by research participants.

By signing this consent, you authorize the Investigators(s) and his/her/their staff to access your responses as may be necessary for purposes of this study. This information will also be shared with the Sponsor of this study, and persons working with the sponsor to oversee the study (Thesis Committee Members of SFASU). The investigators and their assistants will consider your records confidential to the extent permitted by law. The U.S Department of Health and Human Services (DHHS) may request to review and obtain copies of your records. Your records may also be reviewed for audit purposes by authorized University or other agents who will be bound by the same provisions of confidentiality. You are advised that you must agree not to reveal anything you learn from group discussions or other activities.

COSTS:

There are no costs associated with your participation in this study.

COMPENSATION:

There is no compensation for this study.

RIGHT TO DECLINE OR WITHDRAW:
Your participation in this study is voluntary. You are free to refuse to participate in the study or withdraw your consent at any time during the study.

CONTACT INFORMATION:
The Principal Investigator, Shannon Kimich at 281-639-9943, will gladly answer any questions you may have concerning the purpose, procedures, and outcome of this project. If you have questions about your rights as a research subject, you may contact Office of Research and Sponsored Programs (ORSP) 936-468-6606 or the SFASU IRB at irb@sfasu.edu

PARTICIPANT AGREEMENT:
I have read the information in this consent form and agree to participate in this study. I have had the chance to ask any questions I have about this study, and they have been answered for me. I am entitled to a copy of this form after it has been read and signed.

_____	_____
Signature of Participant	**Date**
_____	_____
Signature of Person Obtaining Consent	**Date**

APPENDIX F

STEPHEN F. AUSTIN STATE UNIVERSITY
CONSENT TO PARTICIPATE IN A RESEARCH STUDY
AN INVESTIGATION OF THE IMPACT OF COVID-19 INFECTION CONTROL ON VISUAL ART INSTALLATIONS IN PEDIATRIC HOSPITALS
Hospital Administrators, Facility Managers, and Environmental Services Managers

The following information describes the research study in which you are being asked to participate. Please read the information carefully. At the end, you will be asked to sign if you agree to participate.

PURPOSE OF STUDY:
You are being asked to participate in a research study. The purpose of this study is to look at cleaning management of visual art installations, including floor sculptures, 3-dimensional art installations, hanging art installations and other art pieces within pediatric hospitals with the onset of the COVID-19 virus and related precautions. You are being asked to be in the study because you have direct engagement in visual art installations within hospitals.

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If you decide to participate this is a basic outline of what will happen over the course of your participation in the research study. The study will take you a maximum of 40 minutes to provide feedback with one or more of the following data collection methods:

- A survey distributed to you via email (5-10 minutes)
- A virtual interview with the researcher in an open dialogue (20-30 minutes)

Surveys and Interview Questions
Examples and questions and open dialogue in the study will: the types of visual art installations in your facility; challenges for cleaning art installations; infection control for visual art installations; and instructions for cleaning visual art and art installations for infection prevention pre- and post-COVID-19.

The Length of Time You Are Expected to Participate in the Study
The study will take place from December 14, 2020 to February 26, 2021 in scheduled times working with your schedule. Notes and audio recording may be used during the interview. Audio recordings will only be used to properly document your experiences and perspectives correctly and will be erased following the completion of the study on

May 31, 2021.

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The following steps will be taken to keep information about you confidential, and to protect it from unauthorized disclosure, tampering, or damage: research data files will be kept on a secure external drive that is password protected and in a locked cabinet with access only to the researcher. Data will be aggregated; no identifying direct quote will be used by research participants.

By signing this consent, you authorize the Investigators(s) and his/her/their staff to access your responses as may be necessary for purposes of this study. This information will also be shared with the Sponsor of this study, and persons working with the sponsor to oversee the study (Thesis Committee Members of SFASU). The investigators and their assistants will consider your records confidential to the extent permitted by law. The U.S Department of Health and Human Services (DHHS) may request to review and obtain copies of your records. Your records may also be reviewed for audit purposes by authorized University or other agents who will be bound by the same provisions of confidentiality. You are advised that you must agree not to reveal anything you learn from group discussions or other activities.

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PARTICIPANT AGREEMENT:
I have read the information in this consent form and agree to participate in this study. I have had the chance to ask any questions I have about this study, and they have been answered for me. I am entitled to a copy of this form after it has been read and signed.

_____	_____
Signature of Participant	**Date**
_____	_____
Signature of Person Obtaining Consent	**Date**

APPENDIX G

10 Step Cleaning Process

1. **Interact with Patient**

   Look for isolation room precautions & Place “Wet Floor” sign. Use hand hygiene.

2. **Remove Waste and Soiled Linen**

3. **High Dust**

   Check walls and vents

4. **Disinfect Horizontal and High Touch Surfaces**

   Focus on bed rails, bed frame, and underneath bed for blood etc.

5. **Disinfect Vertical Surfaces**

   Spot clean visible soil, door handles, light switches

6. **Disinfect Restrooms**

   Clean mirrors, toilet bowl, seat, handle, and walls. Sink, shower. Restock all supplies and V-tip Toilet Paper. Blue Water and toilet strip

7. **Dust Mop the Floors**

   Begin with corners and edges in the far side of the room. Dust under beds and move furniture if necessary.

8. **Inspect your work**

   Check windows for prints

9. **Damp Mop the Floor**

   Use “Wet Floor” sign. Wipe out all corners and edges.

10. **Interact with the Patient**

    Ask if there is anything they need. Let them know the EVS number 4177. Wash Hands.

APPENDIX H

Sample Duty List

Name:_____ **Score:** _____

Date: _____ **Goal:** _____

EVS AM Cleaning Tech Unit 1-A
DAYS: Sunday to Saturday
HOURS: 6 AM to 2:30 PM
BREAK TIMES: 8:00 AM Break, 11 AM Lunch

Areas of Responsibility Following the 8 Step Process:

Time ✓	S	S	M	T	W	T	F	Area/Duty
6:00 AM								Clock in for Shift, Huddle, Pick up Pagers
6:15 AM								Report to area, Gather Supplies
6:25 AM								S1 021 Restroom
6:30 AM								S1 022 Restroom
6:35 AM								S1 023 Breakroom
6:45 AM								EVS Closet
6:47 AM								Partners Off Stage Area
7:00 AM								IV Therapy
7:15 AM								Wheelchair Storage
7:17 AM								Staff RR
7:22 AM								Nurses Station
7:35 AM								S1 031 Office
7:37 AM								S1 031 Office
7:39 AM								Soiled Utility Room
7:42 AM								Medication Room
7:47 AM								Clean Utility Room
7:50 AM								Nourishment/Pantry
7:55 AM								Clinical Dietian Office
8:00 AM								AM Break
8:30 AM								Patient Rooms 134, 135, 136, 137, 138
9:30 AM								Patient Rooms 139, 140, 141, 142, 143
10:30 AM								Patient Room 144
10:46 AM								Clean Linen Room
10:48 AM								Patient Room 145
11:00 AM								Lunch Break
11:40 AM								Patient Rooms 146, 147, 148, 149, 150
12:40 PM								Patient Rooms 151, 152, 153, 154, 155
1:40 PM								Patient Room 156, 157, 158, 159
2:20 PM								Clean and Store Cart
2:30 PM								Return Keys and Pagers. Clock out for Shift

REPORT ANY MAINTENANCE ISSUES TO THE MAINTENANCE DEPARTMENT

Duty list should be followed unless otherwise directed by your supervisor.
Breaks and lunch may require flexibilty to meet hospital cleaning requirements
Check with supervisor before changing schedule or leaving work area
Discharges are a priority and will be completed as soon as possible.

10 STEP CLEANING PROCESS
1) Interact with the Patient/Guests
2) Empty Trash
3) High Dust
4) Damp Wipe all Horizontal Surfaces
5) Spot clean all Vertical Surfaces
6) Clean/Disinfect Restroom
7) Dust Mop the Floor
8) Inspect your Work
9) Damp Mop the Floor
10) Interact with Patient/Guests

DETAIL CLEAN
1) Use Putty Knife on Corners and edges of the floor/baseboard

CUES OF CLEAN
Tent Card - Signed
Crew - Blue Toilet Water
Creative Towel Fold
Bed Linens Displayed
Toilet Strip

VITA

In May of 2000, Shannon Kimich graduated from Stephen F. Austin State University with a Bachelor of Fine Arts in Advertising Design and Computer Art. During the following 19 years, she was employed with a large healthcare system in Houston, Texas with 8 years in healthcare business development and service line administration. In November of 2019 she pursued an opportunity as the president and CEO of a national art consulting firm for healthcare. In July 2017, she entered the Graduate School of Stephen F. Austin State University and will receive the degree of Master of Science in August of 2021.

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This thesis was typed by Shannon Kimich