

Music Therapy in the NICU and Pediatrics:  
A Program Proposal for Stony Brook Children's Hospital

By  
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### **Summary Statement**

I am proposing a music therapy program for the neonatal intensive care unit (NICU) and pediatric/adolescent medicine unit at the newly built children's hospital, Stony Brook Children's Hospital, which will soon be open to the public, located on the Stony Brook University Hospital campus. I have witnessed the impact of music therapy enhance the lives of the young patients and their families at Stony Brook University Hospital throughout my internship on the pediatric unit. Currently, there is one board-certified music therapist in the hospital who predominantly works in adult psychiatry. It would be beneficial to hire a music therapist or eventually, a team of music therapists, to work specifically in pediatrics and the NICU. Fortunately, during my internship, I was trained to work with hospitalized children through guidance of the child life specialists, as well as with the infants in the NICU. As it stands, in a 603 bed hospital it is impossible for one music therapist to provide care to all of the patients and their families who might benefit. With the addition of a pediatric hospital to the Stony Brook University Hospital campus, it is essential that a music therapist, or music therapists, are hired to work specifically with the pediatric population.

### **Statement of Need**

One of the many populations with which music therapists work are medically fragile patients, including pediatrics. About 14% of music therapists work in medical settings (AMTA, 2018, p. 15). Medically fragile hospital patients have been shown to respond to music therapy even when other treatment methods may not have been successful (AMTA, 2006b). Music therapy may be effective for medical patients of all ages, especially young children, because music is a medium that stimulates all the senses at once (AMTA, 2006a, 2006b). Hospital patients experience many physical symptoms and emotional responses to their illnesses. Music

and music therapy can both address both of these domains of need and alter the patient's perception and memory of the hospital experience (Shultis & Gallagher, 2015).

Stony Brook Medicine is adding a new building to their University Hospital campus. This building is called Stony Brook Children's Hospital and the patients currently in the pediatric unit of the University Hospital will be moved to this new building in the summer of 2019. Next to this new building is Stony Brook Medicine's state-of-the-art NICU consisting of 46 beds. I would like to propose a music therapy program for the pediatric patients, who will be residing in Stony Brook Children's Hospital in the near future, and for the patients currently in the NICU. In my internship, I have used music therapy techniques to benefit the children currently on the existing pediatric unit. Adding a board-certified music therapist to the team of professionals working in the new children's hospital and the existing NICU would allow for these patients to continue to receive this benefit and would set Stony Brook Children's Hospital apart from similar facilities.

### **What Is Music Therapy?**

The profession of music therapy was established in the 1950s (Metzger, 2004), but music has been used for healing in many cultures for thousands of years (Malchiodi & Crenshaw, 2015). According to the AMTA (2019a), "Music therapy is the clinical and evidence-based use of music interventions to accomplish individualized goals within a therapeutic relationship by a credentialed professional who has completed an approved music therapy program" (para. 1).

Music therapy is an evidence-based practice; there is much research to support the use of music as a treatment modality for a variety of clinical populations, and to address a variety of clinical needs. In order to maintain effective and ethical practice, music therapists are required to keep abreast of current and valid research in order to make clinical decisions (Baker, 2015).

Music therapists use a wide variety of music interventions which fall under four methods: compositional, receptive, re-creative, and improvisational (Bruscia, 2014). Music therapists work towards clinical goals with their patients, which may be musical or non-musical in nature and are often similar to the goals of other disciplines in healthcare.

The practice of music therapy requires completion of at least a bachelor's degree in music therapy, including a minimum of 1,200 hours of clinical music therapy training through internship and fieldwork experiences (AMTA, 2015). This allows for trained music therapists to take the board-certification examination through the Certification Board for Music Therapists (CBMT). In the state of New York, music therapists wishing to become state licensed are required to obtain a master's degree in music therapy and complete an additional 1,500 hours of direct supervision in order to obtain the LCAT (Licensed Creative Arts Therapist) credential (New York State Education Department, 2019).

The relationship between patient and therapist, coupled with the relationship with music, influence change and growth for the patient (Silverman, 2019). Thus, the consistent presence of a trained music therapist is important for any facility. Specifically, due to the acute and short-term nature of the hospital setting, the need for consistency and availability of the music therapy is paramount. Music has been shown to enhance the biological and psychological development of hospitalized newborns, children, and adolescents (Bower & Shoemark, 2009; Robb, 1996; Standley & Walworth, 2010). Music can help normalize the hospital experience, decrease anxiety in patients and their parents, and may actually shorten hospital stay (Caine, 1991). It is important however, for these experiences to be carefully monitored by a board-certified music therapist in order to support the patient's development and the family's emotional experiences.

The music therapist can be a vital part of the treatment team. Music therapists are trained to collaborate with other professionals in order to provide the most effective and meaningful treatment for each individual patient and family. Music therapists have the potential to provide a unique perspective of the patient's experience in the hospital, and have the potential to address both physiological and psychosocial needs (AMTA, 2006a). A fact sheet, providing answers to frequently asked questions about the music therapy profession, can be found in Appendix A.

### **Personal Statement**

As having been a premature infant and sick child myself, I am passionate about helping hospitalized children have the most pleasant hospital experience possible. I truly believe that music therapy is an essential tool in achieving the goal of normalizing and enhancing hospital experiences. When I first learned that hospitalized children and infants could benefit from music therapy, I knew this was something I wanted to do, and was meant to do. I plan to take a training course through Florida State University, in August of 2019, in order to receive a specific NICU music therapy certification. This extensive training course will provide me with the necessary tools needed to work with fragile premature infants. I also have had experience working with children in various settings such as a summer camp, a school for grade school aged children with autism as a practicum student, two different preschools for children with special needs (once as a music therapy fieldwork student and once as a teacher's assistant), and at Stony Brook University Hospital in the NICU and pediatric units. My resume is found in Appendix B.

### **Theoretical Orientation**

There are various approaches to music therapy that guide the music therapist in his or her work (Wheeler, 2015). In my personal practice, I find myself incorporating elements of developmental, humanistic, individualized and person centered perspectives into my work and

ways of thinking. It is essential to treat each patient as an individual, and through an integral approach. Each person is unique, has different strengths, and alternative treatment approaches benefit some patients more so than others. Seeing the patient's as unique individuals encourages the therapist to further individualize each person's therapeutic goals and objectives to meet their specific needs. I believe that working with people from a strengths-based mindset is absolutely necessary when approaching people who are in unfortunate life circumstances such as hospitalization. The nature of hospitalization can constantly remind people of what is currently "wrong" with them, rather than what is "right". A person-centered, humanistic, music therapist can be the one to remind the patient, and their loved ones, of his or her strengths despite the circumstances.

When working with infants, children, and adolescents, it is important to approach therapy from an informed developmental perspective (Briggs, 2015). Music therapists are trained to assess and respond to the developmental needs of a variety of clinical populations. For example, awareness of developmental levels is essential in the NICU to be able to assess the potential for harm in the application of music with infants at 24 weeks gestation or younger. Also, hospitalization can affect children differently depending on their age and developmental level, possibly experienced as trauma. Thus, when working with these constantly changing populations, an understanding of child development is extremely important. This author believes that her emphasis of developmentally appropriate, individualized, and strength-based treatment, coincides with the values of the Stony Brook Medicine healthcare system, specifically with Stony Brook Children's Hospital.

### Music Therapy and Stony Brook Medicine’s Mission Statement

The practice of music therapy connects to the mission statement, the vision, and the values of Stony Brook Medicine.

Stony Brook Medicine delivers world-class, compassionate care to our patients, advances our understanding of the origins of human health and disease, and educates the healthcare professionals and biomedical investigators of the future, so they can bring the fruits of scientific discovery to our patients (Stony Brook Medicine, 2019a, para 1).

The mission, vision, and values of Stony Brook Medicine, abbreviated ICARE, are almost exactly imbedded into the AMTA Code of Ethics (2019b). See Table 1 for an illustration of the overlap between these philosophical stances.

Table 1

#### *ICARE Versus AMTA Code of Ethics*

| <b>Stony Brook Hospital Values ICARE (Stony Brook Medicine, 2019)</b> | <b>Code of Ethics (AMTA, 2019b)</b>                |
|---|--|
| I- Integrity  | “Principle #4: Demonstrate integrity and veracity” |
| C- Compassion   | “Principle #2: Act with compassion”                |
| A- Accountability   | “Principle #3: Be accountable”                     |
| R- Respect  | Principle #1: Respect dignity and rights of all”   |
| E- Excellence   | “Principle #5: Strive for excellence”              |

Thus, music therapy and the ethical principles of practice of music therapy are perfectly aligned to the culture at Stony Brook Medicine.

### Review of the Literature

This review explores the extensive literature supporting the use of music therapy, with a board-certified music therapist, in neonatal intensive care units, and in pediatric and adolescent medical units of hospitals. The most relevant studies and sources used in this review will be further discussed in an annotated bibliography, located in Appendix C.

The specific units being discussed in this review include the NICU, the general pediatrics unit, the pediatric intensive care unit (PICU), the pediatric hematology and oncology unit and adolescent medical unit. All of these units, excluding the NICU, serve people ages 0-21. Music therapy is beneficial for people of all ages, but Whipple (2003) asserts that “children and adolescents display greater responses to music therapy in medical settings than do adults” (p. 77). Whipple came to this conclusion in response to Standley’s (2000) meta-analysis.

The literature in this review will be organized by the benefits experienced by pediatric patients through music therapy. Music therapy can benefit pediatric hospital settings financially and benefit both patients and family members physiologically and psychosocially. The benefits found in the literature and their corresponding scholarly sources are found in Table 2.

Table 2

#### *Benefits of Music Therapy with Children in Medical Settings*

| <b>Benefit</b>  | <b>Sources</b>   |
|---|--|
| Decreases heart rate, respiration rate and blood pressure | Metzger, 2004<br>Yurkovich, Burns, & Harrison, 2018<br>Loewy, Stewart, Dassler, Telsey & Homel, 2013 |
| Increases immunity  | Lane, 1996<br>Kuhn, 2002   |
| Improves respiratory muscle function                      | Yoon Irons, Petocz, Kenny, & Chang, 2016   |

(continued)

Table 2. Benefits of Music Therapy with Children in Medical Settings (continued)

| Benefit   | Sources   |
|---|---|
| Improves neurological development in children                   | Bower & Shoemark, 2009  |
| Improves neurological development in infants                    | Marley, 1984<br>Shoemark & Hanson-Abromeit, 2015<br>Shoemark, Hanson-Abromeit, & Stewart, 2015<br>Walworth, Standley, Robertson, Smith, Swedberg, & Jarred Peyton, 2012<br>Whipple, 2005<br>Loewy, et al., 2013 |
| Increases non-nutritive sucking (NNS) behaviors in NICU infants | Cevasco & Grant, 2005<br>Whipple, 2008<br>Loewy, et al., 2013   |
| Increases bonding and attachment with infants and caregivers    | de l'Etoile, 2006<br>de l'Etoile, 2015<br>Hillmer, Swedberg, & Standley, 2012<br>Malloch, Shoemark, Crnec, Newnham, Campbell, Prior, Coward, & Burnham, 2012<br>O'Gorman, 2007<br>Loewy, et al., 2013           |
| Contributes to a positive environment                           | Bradley Palmer, Lane, & Mayo, 2017<br>Duda, 2013<br>Robb, 2000<br>Viega, 2018   |
| Provides procedural support                                     | Batson Malone, 1996<br>Millett & Gooding, 2017<br>Swedberg Yinger, 2016<br>Whipple, 2003  |
| Decreases stress and anxiety                                    | Daveson, 2001<br>Edwards & Kennelly, 2012<br>Gooding, Swedberg Yinger, & Iocono, 2016<br>Karakul & Bahire Bolışık, 2018<br>Millett & Gooding, 2017<br>Robb, Nichols, Rutan, Bishop, & Parker, 1995              |
| Decreases pain perception                                       | Noguchi, 2006<br>Mitchell & MacDonald, 2006<br>Whitehead-Pleaux, Zebrowski, Baryza, & Sheridan, 2007  |

(continued)

Table 2. Benefits of Music Therapy (continued)

| Benefit   | Sources  |
|---|--|
| Stabilizes mood and behavior                    | Barrera, Rykov & Doyle, 2002<br>Hendon & Bohon, 2008<br>Keith, Russell, & Weaver, 2009   |
| Helps family members                            | Fiore, 2016<br>Lindenfelser, Grocke, & McFerran, 2008<br>Wolfe & Woolsey, 2003   |
| Provides emotional support                      | Kennelly, 2001<br>Mondanaro, 2008<br>Robb, 2003  |
| Provides an atmosphere for safe self-expression | Barry, O'Callaghan, Wheeler, & Grocke, 2010<br>Froehlich, 1984<br>Robb, 1996   |
| Improves quality of life                        | AMTA, 2006b<br>Colwell, Davis & Schroeder, 2005<br>Hillard, 2003<br>O'Callaghan, McDermott, Reid, Michael, Hudson, Zalberg, & Edwards., 2016 |

### Physiological Benefits of Music and Music Therapy

Music therapy has been shown to decrease blood pressure, heart rate, and respiration rate, increase immunity, improve respiratory muscle function and increase neurological development in children. Though the results were not consistent in Metzger's (2004) literature analysis, she concluded that specific music can affect heart rate and blood pressure variably. Most of the studies in her review indicated at least a slight decrease in heart rate, suggesting that music therapy can have beneficial effects on heart health. The variation in results also support the need for a trained music therapist in order to design effective interventions and respond in a clinically appropriate manner. Yurkovich, Burns, and Harrison (2018) examined the effect of music therapy entrainment on five infants in a cardiac intensive care unit. Entrainment is a phenomenon in which bodily rhythms become more in sync with the rhythms of surrounding music, resulting

in steady heartbeat, respiration rate, among other bodily systems (Shaller, Gerweck, & Tan, 2010). Results supported the use of music therapy entrainment to decrease heart rate and respiratory rate. Though the sample size is small, the study showed an 80% success rate.

Active music-making has been shown to improve the health of hospitalized patients (Lane, 1996; Yoon Irons et al., 2016) and healthy college students (Kuhn, 2002) by increasing immunity and improving respiratory muscle function. Lane (1996) compared the effects of music therapy on the immunity of 40 cancer patients ages 6-12. The music therapy group consisted of 20 patients. The remaining 20 participants were in the control group, and engaged in activities such as watching television, reading, playing video games, or talking on the phone. Lane found greater improvements in the immunity of the experimental (music therapy) group in comparison to the control group. Kuhn (2002) compared the Salivary Immunoglobulin A (SIgA) of 33 college students participating in either active music-making or passive music listening. She found a more significant increase in SIgA in the active music-making group than the music listening group, which suggests active music-making benefits the immune system greater than just listening to music. The music listening group showed greater increases in SIgA than the control group (no music). Singing, which is a type of active music-making, has been shown to help people with cystic fibrosis improve respiratory muscle function, specifically by increasing maximal expiratory pressure (Yoon Irons et al., 2016).

In a case study by Bower and Shoemark (2009), music therapy was shown to increase the neurologic development of a child with an acquired brain injury. Bower and Shoemark (2009) found that through the elements of music, this child was able to engage with others, when he was unable to engage without musical stimuli. This may be because “music listening, performing and

composing engage regions throughout the brain, bilaterally, and in the cortex, neocortex, paleo-, and neurocerebellum” (Levitin & Tirovolas, 2009, p. 214).

### **Music Therapy and Infant Development**

Music therapy has been shown to enhance the development of premature infants (Loewy et al., 2013; Standley & Walworth, 2010) and full-term infants (Marley, 1984). Music is a complex stimulus and can be potentially harmful for infants who are underdeveloped and younger than 24 weeks gestation. Because interventions with this fragile population need to be carefully implemented, it is essential that interventions are provided by a NICU-trained, board-certified music therapist (Shoemark & Hanson-Abromeit, 2015).

**Full-term infants.** Marley (1984) examined the effects of music on the stress behaviors of 27 hospitalized infants and toddlers, ages ranging from five weeks to 36 months. Interventions included music and relaxation, experimental music games, music and movement interventions, and the use of simple songs. The participants experienced enhancement in their motor, social, and verbal skills, while increasing relaxation and decreasing stress responses such as crying, throwing objects, and tensing the body.

**Premature infants.** Music therapy can enhance the sensory environment in the NICU. Shoemark, Hanson-Abromeit, and Stewart (2015), in a single case study, found that a premature infant’s sleep patterns, breathing rate, and neurodevelopment improved in response to music therapy interventions and careful auditory stimulation techniques. The sensory environment of the NICU, and this patient’s room placement (right next to the nursing station) was overstimulating for this infant. A change in room location and coupled with a 20-minute playlist of developmentally appropriate soundscapes and lullabies played daily resulted in a return normal sleep schedule within 48 hours. Marley (1984) also used music therapy interventions to

address sleep issues. Music therapists can assist in creating an environment in the NICU that enhances development, rather than overstimulate the infant.

Music therapy has been shown to enhance neurologic development in children (Bower & Shoemark, 2009) and in infants in the NICU (Shoemark & Hanson-Abromeit, 2015; Loewy et al., 2013). Loewy and colleagues solely used live music therapy interventions to enhance the development of 272 infants from 11 different NICU's. Results indicated that live music therapy significantly lowered heart rate, improved sleeping patterns and increased feeding behaviors (2013). Whipple (2005) described the use of music and multimodal stimulation in NICU settings, its adaptations, and benefits. Music and Multimodal Stimulation (MMS) was developed by Jayne Standley (1998). Multimodal stimulation, also known as multi-sensory stimulation, is a technique used to stimulate a premature infant sequentially so that he or she does not become overstimulated. Multimodal stimulation usually includes auditory, tactile, visual, and vestibular stimuli. (Standley & Walworth, 2010). The sequence in MMS begins with 30 seconds of quiet humming or lullaby singing (auditory stimulation), then adds light rocking (vestibular stimulation). After the infant appears stable when combining these two stimuli, the parent or music therapist will move onto the stroking or light massage (tactile stimulation). Lastly, visual stimulation is added by giving the infant cues to maintain eye contact (Standley & Walworth, 2010). In a study with over 100 premature infants, Walworth et al. (2012) found that music paired with multimodal stimulation increased neurodevelopment more so than infants receiving standard care from the NICU.

**Non-nutritive sucking behavior.** Music therapy helps infants engage in more frequent non-nutritive sucking behaviors (NNS). Sucking behaviors usually begin during the third trimester of fetal development, but infants outside of the womb at this early stage may not

engage in this behavior as naturally as he or she would inside of the womb (Standley & Walworth, 2010). A device used to help infants with practicing sucking behaviors is the pacifier activated lullaby (PAL). The PAL device is a pacifier that plays music based upon the frequency and strength of the infant's suck. This musical reinforcement encourages the infant to continue the NNS behaviors (Standley & Walworth, 2010). Cevasco and Grant (2005) found that the PAL increases NNS behaviors, which then reinforce the behaviors needed in order to eat. Infants in the study who used this PAL system, immediately before feeding, gained the most weight. Whipple (2008) found that using the PAL system also helped decrease stress levels prior to heelstick procedures that are common in the NICU.

**Infant bonding and attachment.** Music therapists can help infants and their parents have essential bonding experiences, which are necessary for the infant's development. Parents of NICU infants can feel strain, stress, separation, depression, hopelessness, disappointment, and ambivalence (Shoemark & Hanson-Abromeit, 2015) due to the acute care environment. These various emotions can put parent-infant pairs at risk for insecure attachment (de l'Etoile, 2006) and disturb the relationship between mother and infant (O'Gorman, 2007). For these reasons, it is essential to work with a family-centered model of care and take the family's needs into account as much as the patient's (Hillmer, Swedberg, & Standley, 2012). Infants and adults bond through communicative musicality, meaning that the pair engages in emotional connectedness, when they match one another in musical qualities such as rhythm, shape, duration, and intensity. These interactions are essential for the infant's social, cognitive and emotional development. Infants who engage in music therapy have been shown to have greater ability maintain self-regulation when being handled by adults (Malloch et al., 2012).

Singing to infants, also known as Infant-Directed Singing, is a universal caregiving behavior that occurs in every human culture (de l'Etoile, 2006). De l'Etoile (2015) found that infants with and without Down syndrome maintain better eye contact, self-regulation, and attention when being sung to by adults. Infant-Directed Singing helps infants maintain more secure attachments with their caregivers and their environments (O'Gorman, 2007). Singing parent preferred lullabies can also increase bonding between the infant and caregiver (Loewy et al., 2013).

### **Music Therapy Contributes to a Positive Environment**

Music therapy fosters a positive environment in hospital settings. Hospital environments are chaotic, inconsistent, unpredictable, and unfamiliar and music therapy can alter the patient's perception and memory of the hospital experience into something more positive (Shultis & Gallagher, 2015). Children succeed in environments containing structure and predictability. Music is naturally structured in a way that provides an environment of predictability and safety in an otherwise, seemingly unsafe and scary place for children (Robb, 2000).

Robb (2000) studied the benefit of music therapy interventions on ten pediatric patients, ages 4-11 years old. The participants were on isolation precautions, which cause various environmental stressors and can be harmful to the psychological needs of children (Robb, 2003). Results support the benefit of music therapy interventions to positively alter the hospital environment for children in medical isolation. Viega (2018) explored the use of hip hop and digital technology in the music therapy context to positively alter the hospital environment for adolescents. Specifically, the use of patient preferred music has the capacity to create a soundscape more familiar and comfortable to adolescents than what is typically experienced in a hospital. Duda (2013) describes the various ways music therapy interventions have changed the

environment in a pediatric palliative care. Specifically, the interventions are designed to create a safe environment in order to promote success, self-expression, and ability.

Bradley Palmer, Lane, and Mayo (2017) examined the effects of providing music therapy in the operating room, as people were undergoing surgery. The responses from patients, staff, and family members indicated that music therapy enhanced the environment. Staff stated that music therapy engendered an environment that facilitated greater competence in the medical staff. A surgeon involved in the study stated, “The right music therapist can change the whole tone in the OR, allowing everyone to have a voice and improving surgical safety” (Bradley Palmer, Lane, & Mayo, 2017, p. 33).

### **Music Therapy and Procedural Support**

Medical procedures can be distressing for all people, especially children. Music therapy as procedural support has been shown to benefit pediatric patients and their families before, during, and following painful medical procedures (Swedberg Yinger, 2016; Whipple, 2003; Batson Malone, 1996). Music therapy as procedural support is defined as “the use of music and aspects of the therapeutic relationship to promote healthy coping and decrease distress in individuals undergoing medical procedures” (Ghetti, 2012, p. 6). Swedberg Yinger (2016) conducted a randomized controlled trial involving 58 children aged 4-6 years old receiving immunization shots, their parents, and the nurses administering the immunizations. Half of the children received music therapy directly before, during, and directly following the immunization and half did not. The children involved in music therapy displayed fewer distressing behaviors such as yelling and crying. The parents also reported that their children’s distress levels were much lower when they had music therapy as part of the procedure.

Whipple developed a program called “Surgery Buddies” that emphasizes music therapy as procedural support. An assigned music therapist is considered the child’s “Buddy” when he or she has to go through a painful procedure or surgery. Whipple has received much positive feedback from her program by the pediatric patients involved, their parents, and the hospital staff (2003).

Batson Malone (1996) assessed the use of live music therapy procedural support decreased on the distress levels of 20 children up to age seven who were undergoing needle insertion procedures such as intravenous starts, venipunctures, injections, and infant heel-sticks. She found statistically significant evidence ( $F = 9.6, p < .05$ ) supporting the use of music therapy as procedural support over “distraction” techniques. Millett and Gooding (2017) explored active and passive distraction-based music therapy interventions and their effectiveness in decreasing preoperative anxiety in pediatric patients. They found that pediatric patients and their families who received music therapy interventions had much less anxiety than families receiving no music therapy. However, there were no significant differences between the preoperative anxiety levels of the participants who engaged in either active (musical alternate engagement) or passive (music assisted relaxation) music therapy interventions.

### **Music Therapy to Decrease Stress and Anxiety**

A commonly documented finding in medical music therapy research is that music therapy decreases stress and anxiety in medical patients in pediatrics (AMTA, 2006a; Bradley Palmer, Lane, & Mayo, 2017; Millett & Gooding, 2017; Robb et al., 1995; Whitehead-Pleaux et al., 2007) and can help young children manage stressful situations (AMTA, 2006b). Anxiety can lead to negative health outcomes for hospitalized children (Gooding, Swedberg Yinger, & Iocono, 2016). It is essential for a music therapist working with children in the hospital to

understand theories of stress, coping and adjustment, and transactional models of stress (Edwards & Kennelly, 2012). Research has shown that music therapy decreases anxiety for pediatric burn patients (Edwards & Kennelly, 2012; Robb, 2003), general pediatric patients (Millett & Gooding, 2017), oncology patients (Daverson, 2001), and pediatric ambulatory surgery patients (Gooding et al., 2016). In fact, just simply listening to music has been shown to decrease anxiety children and adolescents who had just gotten out of surgery (Karakul & Bahire Bolışık, 2018).

Daverson (2001) identified four phases of treatment that some pediatric oncology patients with lymphoblastic leukemia and acute myeloid leukemia may experience. During each phase, an essential goal of music therapy is to decrease anxiety and promote relaxation. Reducing anxiety is relevant and important for pediatric patients with cancer due to “the number of invasive procedures completed and the treatment regimens that they must follow” (Daverson, 2001, p. 116).

Gooding et al. (2016) concluded that music therapy decreased the anxiety levels of children and their parents prior to surgery. Edwards and Kennelly (2012) concluded that the therapeutic relationship between an eight-year-old burn patient and his music therapist helped this child to adjust to the hospital setting and decrease his stress and anxiety. In fact, nursing staff noted that the patient was more relaxed during debridement treatments when the music therapist was present. Robb et al. (1995) measured the effects of music-assisted relaxation (MAR) on 20 pediatric burn patients aged 8-20. Patients in the group receiving MAR sessions showed decreases in anxiety levels, whereas patients in the control group did not.

### **Music Therapy to Decrease Pain Perception**

Music therapy has been proven to decrease pain perception in pediatric patients. According to the AMTA (2010), music therapy can focus on pain management for physical

rehabilitation, cardiology, medical and surgical procedures, obstetrics, oncology, and burn debridement, along with many others. Music therapy is effective for pain management because it can provide music that is familiar, predictable, enjoyable, and can be structured as a safe form of sensory stimulation. Patient preferred music is most effective for alleviating pain (Mitchell & MacDonald, 2006).

Two theories explaining the effectiveness of music therapy for pain management are the gate control theory of pain and the effect of music on the amygdala. In gate control theory, stimulation from sensory neurons can close the “neural gate” that allows neurological responses to pain to go up the spinal cord and reach the brain (Melzack & Wall, 1965). Therefore, when a person hears music or engages in musical activity, these pain responses are blocked by a closed gate, due to the sensory neurons arising from our human responses to music (Whitehead-Pleaux et al., 2007). Current brain research has found that activity in the amygdala, part of the emotional-affective component of the brain, decreases when people have pleasurable responses to music (Whitehead-Pleaux et al., 2007). The amygdala is a part of the limbic system that is the main component in our brain’s fight-or-flight system. When activity in the amygdala is decreased, people are less responsive to potential dangers, such as perceived pain (Tomaino, 2015).

Music therapy has been shown to reduce pain in pediatric burn patients, and pediatric patients receiving injections. Qualitative and quantitative data by Whitehead-Pleaux, Zebrowski, Baryza, and Sheridan (2007) showed that music therapy significantly decreased pain and increased relaxation. Noguchi (2006) conducted a study using 64 participants, ages 4-6, who were receiving painful injections from immunizations. Participants were either read a “musical story”, a spoken story, or received standard care. A musical story is a story that is sung rather

than spoken. The musical story in this study had a musical recording for the reader to follow along with and consisted of the same content as the spoken story. The children who were read the musical story had the least amount of reported pain. Noguchi also found that children who received more injections on a regular basis benefitted the most from the music condition.

### **Music Therapy Stabilizes Mood and Behavior**

Music therapy has been proven to stabilize mood and behavioral responses in pediatric patients. Music therapy techniques used to improve mood and stabilize behavior in the studies presented in this literature review include interactive music therapy and live music listening.

Hendon and Bohon (2008) compared the mood differences in pediatric patients engaging in either music therapy or play therapy by examining the frequency and duration of their smiling behaviors. The children engaged in music therapy sessions smiled more often than the children in play therapy, indicating higher levels of happiness in the music group.

Developmentally appropriate music therapy sessions have been shown to reduce the duration and frequency of crying episodes in premature, critically ill infants (Keith, Russell, & Weaver, 2009). The researchers emphasize the importance of using live music in session, and conclude that substituting live music with a recording is ineffective.

While live, passive music listening has been shown to be more effective in improving mood than having no music at all, patients who interact with the music therapist and actively engage in the musical process show greater improvements in mood. Barrera, Rykov, and Doyle (2002) examined the mood changes of pediatric oncology patients before and after music therapy sessions. Participants included toddlers, children and adolescents. Not only did the actively engaged patients have greater changes in mood, but the parents of the actively engaged patients

had more positive comments about the sessions, and music therapy as a whole, than parents of children who were passively engaged.

### **Music Therapy Helps Family Members**

Music therapy not only benefits patients, but can positively impact their caregivers, families, and parents. Wolfe and Woolsey (2003) state, “Having a child admitted to a pediatric medical care facility is perhaps one of the most stressful events that parents may experience” (p. 41). Children look to their caregivers for emotional support during stressful life events so it is essential to take a family centered approach to treatment (Robb, 2003). A parent’s negative or positive behaviors and responses to their children receiving medical treatment have a direct impact on the amount of distressing behaviors their children display (Walworth, 2005). Parents and caregivers of ill infants and children can experience lack of sleep and anxiety (Wolfe & Woolsey, 2003), feel helpless and guilty (Lindenfelser, Grocke, & McFerran, 2008) and even experience trauma and “hospital phobia” (Standley & Walworth, 2010). In the NICU, “the care must address the infant in the context of the family to ensure healthy development in the future” (Shoemark & Hanson-Abromeit, 2015, p. 415). When the parents experience minimal amounts of stress, they can more adequately care for their children (Wolfe & Woolsey, 2003).

Music listening can help parents of pediatric patients feel more relaxed. Wolfe and Woolsey (2003) developed a music listening/relaxation program solely for the family members and parents of the pediatric patients. The music therapists and students involved in this study developed CDs containing music meant to relax the listener and mask the unwanted sounds of the hospital. The majority of participants in the study reported increased relaxation while listening to this music.

Family members of pediatric patients who are terminally ill or who have passed away deal with grief in different ways. Siblings of pediatric patients may respond to and understand hospitalization or death of their ill siblings differently based upon their age and developmental levels. It is important for grieving children to be provided with the support they need in order to lessen the intensity of the loss and maximize their social, emotional, and physical functioning (Fiore, 2016). Parents of children who had recently passed away in palliative care settings report that music therapy was an integral part of the care and well-being of both their children and the family as a whole. Parents reported a belief that music therapy altered their views of having a terminally ill child, helped them cope, provided the family with songs to remember their child by, gave the parents pleasure and a “time out” and provided an opportunity for the parents to see their children “thrive” even during the last days of their life (Lindenfelser, Grocke, & McFerran, 2008, pp. 337-338). Lastly, music has the ability to illuminate potential for a child with serious illnesses, and bridge the gap between the pre-illness and current life for the family (Lindenfelser, Grocke, & McFerran, 2008).

### **Music Therapy Provides Emotional Support**

Music therapy can help provide emotional support for pediatric patients. Hospitalization is unfamiliar and frightening for pediatric patients, and adequate emotional support is essential for their development. When emotional support is absent or inconsistent, children can develop high levels of anxiety. A primary role of music therapists is to provide emotional support to clients (Robb, 2003). Music therapy is effective for providing emotional support because music itself is a “form of emotional communication” (Levitin & Tirovolas, 2009).

In order to provide appropriate emotional support, the therapist must be aware of a patient’s developmental level (Robb, 2003) and culture (Loewy, 2015). Children at different

stages of development possess different strengths and needs. Developmentally appropriate music therapy sessions can provide hospitalized children with the support needed to develop independence and mastery. Playing music from, and taking the time to learn about a person's unique culture, can provide patients and families with a sense of being supported by the music therapist. Culturally relevant music provides people with feelings of familiarity and safety (Mondonaro, 2016).

Providing emotional support is an important goal for children and adolescents with cancer. Kennelly (2001) described a case study of her work with an adolescent male receiving a bone marrow transplant. Music therapy was able to provide this patient with the emotional support needed to open up to the music therapist. In fact, staff commented that this patient “seemed to find it easier to talk to the music therapist than other members of the staff and his family” (Kennelly, 2001, p. 106).

### **Music Therapy Provides an Atmosphere for Safe Self-Expression**

Music therapy can provide a safe atmosphere where patients can express themselves freely. This has been noted in various music therapy methods including receptive methods, recreative methods, and compositional methods (Barry et al., 2010; Froehlich, 1984; Robb, 1996). Hospitalized children can use music to express the feelings of anxiety that arise from being separated from their family, undergoing immunizations and radiation treatments requiring immobilization (Barry et al., 2010). Music therapy can also act as a useful tool for processing the changes in the child's daily routine (Froehlich, 1984). Adolescents can use music therapy to process their experiences of restricted independence and self-image development (Robb, 1996).

Hospitalized pediatric patients have been shown to express themselves more freely when undergoing music therapy sessions, in comparison to children not receiving music therapy (Barry

et al, 2010; Froehlich, 1984). Children who listened to a personally composed and remixed music therapy CD while undergoing radiation treatments, did not use social isolation as a coping mechanism, unlike the 67% of children in the control group (Barry et al., 2010). Children who participate in active music therapy tend to engage in more meaningful, involved, and expressive verbalizations about their hospital experience in comparison to the children who engage in play therapy (Froehlich, 1984).

Following a traumatic injury, adolescents can use songwriting as a means of coping effectively (Robb, 1996). If an adolescent does not have opportunities to express their feelings and needs, they can feel like they're losing control over their lives, feel helpless and depressed, and even mentally regress. Robb (1996) asserts that songwriting interventions can help adolescents increase self-esteem, increase self-expression, facilitate adjustment to hospitalization, improve interpersonal communication, and recover repressed material in the unconscious mind.

### **Music Therapy Improves Quality of Life**

Quality of life (QOL) is increasingly becoming a significant concept in healthcare. People continue to prioritize the *quality* of their lives rather than the quantity, or length of life (Waller et al., 2018). Music therapy enhances the QOL of the many populations served (AMTA, 2006b) because “music enriches human lives in a unique and necessary way” (Aigen, 2005, p. 93).

Music therapy can improve QOL for patients who have been diagnosed with cancer. Hilliard (2003) found that cancer patients identified as having six months or less to live who received consistent music therapy sessions experienced an increased QOL over time, whereas the control group showed a decrease QOL over time. O’Callaghan and colleagues (2016) found

through a meta-ethnography that music therapy can increase the QOL in cancer patients because “music can be a lifeline, support biopsychosocial and spiritual well-being . . . extends self-awareness and social connections, prompts play, memories, imageries, and legacies” (p. 399).

Along with QOL, Colwell, Davis, and Schroeder (2005) found that hospitalized children who participated in a compositional music therapy session experienced increases in self-concept. This is significant because, in mentally healthy people, self-concept is consistent to thoughts and behaviors, thus it is likely to contribute to a healthier QOL.

### **Proposed Music Therapy Program**

Due to the size of the facility and number of patients, ideally a team of music therapists would be employed to provide the fullest services for Stony Brook University Hospital. However, as a new program, this proposal will focus on the addition of a single music therapist to deliver treatment across the hospital units. As such, the proposed program will reflect the music therapist splitting her time between the NICU and pediatric units. Specifically, services will be presented as being delivered on the NICU two days a week and the pediatrics unit three days a week. Table 3 shows a proposed weekly schedule for one music therapist beginning to provide services for the NICU and pediatrics units of Stony Brook Children’s Hospital.

Table 3

*Proposed Weekly Schedule*

| <b>Monday<br/>(Pediatrics)</b>              | <b>Tuesday<br/>(NICU)</b>  | <b>Wednesday<br/>(Pediatrics)</b>           | <b>Thursday<br/>(NICU)</b>   | <b>Friday<br/>(Pediatrics)</b>                   |
|---|--|---|--|--|
| 8:00-9:00<br>morning meeting                | 8:00-9:00<br>morning meeting   | 8:00-9:00<br>morning meeting                | 8:00-9:00<br>morning meeting   | 8:00-9:00<br>morning meeting                     |
| 9:00-10:00<br>Individuals<br>Hem/Onc        | 9:00-10:00<br>Individuals Pod<br>A & B                                   | 9:00-10:00<br>Individuals<br>PICU           | 9:00-10:00<br>Individuals Pod<br>A & B                                   | 9:00-10:00<br>Individuals<br>Adolescent Unit     |
| 10:00-10:30<br>Document                     | 10:00-10:30<br>Document  | 10:00-10:30<br>Document                     | 10:00-10:30<br>Document  | 10:00-10:30<br>Document                          |
| 10:30-11:30<br>Children's<br>Group          | 10:30-11:30<br>Individuals Pod<br>C & D                                  | 10:30-11:30<br>Adolescent<br>Group          | 10:30-11:30<br>Individuals Pod<br>C & D                                  | 10:30-11:30<br>Individuals<br>Hem/Onc            |
| 11:30-12:00<br>Document                     | 11:30-12:00<br>Document  | 11:30-12:00<br>Document                     | 11:30-12:00<br>Document  | 11:30-12:00<br>Document                          |
| 12:00-1:00<br>Lunch                         | 12:00-1:00<br>Lunch  | 12:00-1:00<br>Lunch                         | 12:00-1:00<br>Lunch  | 12:00-1:00<br>Lunch                              |
| 1:00-2:00<br>Individuals<br>Adolescent Unit | 1:00-2:00<br>Individuals Pod<br>E & F                                    | 1:00-2:00<br>Individuals<br>Hem/Onc         | 1:00-2:00<br>Individuals Pod<br>E & F                                    | 1:00-2:00<br>Individuals<br>PICU                 |
| 2:00-2:30<br>Document                       | 2:00-2:30<br>Document  | 2:00-2:30<br>Document                       | 2:00-2:30<br>Document  | 2:00-2:30<br>Document                            |
| 2:30-3:30<br>Individuals<br>PICU            | 2:30-3:30<br>Individuals Pod<br>G and others<br>missed<br>throughout day | 2:30-3:30<br>Individuals<br>Adolescent Unit | 2:30-3:30<br>Individuals Pod<br>G and others<br>missed<br>throughout day | 2:30-3:30<br>Children and<br>Adolescent<br>group |
| 3:30-4:00<br>Document                       | 3:30-4:00<br>Document  | 3:30-4:00<br>Document                       | 3:30-4:00<br>Document  | 3:30-4:00<br>Document                            |

An important part of the music therapy program will be group interventions. Music therapy groups will be provided at least weekly for children, another for adolescents, and a group for all patients (excluding those on isolation precautions). Parents and family members are welcome to join most of the music therapy groups on the unit. Depending on the population and census on the pediatric and adolescent units, there may be more groups scheduled on either or both units to meet the clinical needs of the patients. In addition to groups, individual sessions will be implemented and will be scheduled according to need, interest, and the individual schedules of the patients. Individual sessions with patients and families will be the treatment context on the NICU. Table 4 describes the population each intervention will target, as well as if the intervention can be done in a group setting, an individual setting or both.

Table 4

*Interventions and Populations*

| <b>Intervention</b>        | <b>NICU</b> | <b>Pediatric</b> | <b>Adolescent</b> | <b>Individual</b> | <b>Group</b> |
|----------------------------|-------------|------------------|-------------------|-------------------|--------------|
| Re-creative Music Therapy  |             | X                | X                 | X                 | X            |
| Instrumental Improvisation |             | X                | X                 | X                 | X            |
| Live Music Listening       | X           | X                | X                 | X                 |              |
| Songwriting                |             | X                | X                 | X                 | X            |
| Lyric Analysis             |             |                  | X                 | X                 | X            |
| Drumming                   |             | X                | X                 |                   | X            |
| Sing Along                 |             | X                | X                 | X                 | X            |

(continued)

Table 4. Interventions and Populations (continued)

| Intervention                     | NICU | Pediatric | Adolescent | Individual | Group |
|----------------------------------|------|-----------|------------|------------|-------|
| Music and Multimodal Stimulation | X    |           |            | X          |       |
| Pacifier-Activated Lullaby       | X    |           |            | X          |       |
| Music and Movement               |      | X         | X          | X          | X     |
| Procedural Support               | X    | X         | X          | X          |       |

### Re-creative Music Therapy

**Population.** Children and adolescents (group and individual).

**Location.** Patient's room, playroom or adolescent lounge.

**Duration.** 45 minutes - 1 hour (group), 15 - 30 minutes (individual).

**Description.** The re-creative music therapy intervention gives patients the opportunity to play instruments to and sing along to their preferred music with the live accompaniment of the music therapist. A variety of instruments will be provided for patients. Patients and their family members are free to participate, and come and go as they please. Songs and instruments played by the will be group based on the preferences of the patients.

**Materials.** Orff xylophones, hand drums, djembes, maracas, hand bells, tambourines, guitar, keyboard, shakers, armless chairs, music stand, iPad, disinfecting wipes.

#### Benefits from literature review.

1. Contributes to a positive environment.
2. Decreases stress and anxiety.

3. Stabilizes mood and behavior.
4. Provides an atmosphere for safe self-expression.
5. Improves quality of life.

**Goals.**

1. Normalize hospital experience.
2. Increase self-esteem.
3. Enhance positive mood.
4. Provide opportunities for musical play.
5. Increase positive social interaction with family members and peers.
6. Provide opportunities for self-expression.
7. Provide opportunities for choice making.

**Expected outcomes.**

1. Patient will articulate musical preferences.
2. Patient will engage in active music making.
3. Patient will engage in positive behaviors.
4. Patient will interact musically with other group members such as peers and family members.
5. Patient will independently choose an instrument to play.

**Referral criteria.**

**Group.** Participant must be a current patient, or family member of a patient, in the pediatric medical unit, or adolescent unit in Stony Brook Children's Hospital. Patient may not be on isolation precautions.

**Individual.** Participant must be a current patient in the pediatric or adolescent medical unit at Stony Brook Children's Hospital. Patient can be on isolation precautions but cannot be seen if hospital staff need a face shield in order to enter the patient's room.

### **Instrumental Improvisation**

**Population.** Children and adolescents (group and individual).

**Location.** Patient's room, playroom or adolescent lounge.

**Duration.** 45 minutes - 1 hour (group), 15-30 minutes (individual).

**Description.** The instrumental improvisation group gives patients and their families the opportunity to explore rhythmic and melodic instruments freely through improvisation. The instruments will be modified as needed in order to ensure that every participant will be able to participate successfully, regardless of music skill or experience, and physical or cognitive functioning levels. Patients will have their choice of instruments. The music therapist will structure the experience to meet the needs of each participant, and will facilitate positive group dynamics. Patients and their family members are free to participate, and come and go as they please.

**Materials.** Orff xylophones, tone bars, hand drums, djembes, maracas, rhythm sticks, hand bells, tambourines, guitar, keyboard, shakers, armless chairs.

#### **Benefits from literature review.**

1. Improves neurological development.
2. Contributes to a positive environment.
3. Decreases stress and anxiety.
4. Decreases pain perception.

5. Stabilizes mood and behavior.
6. Provides an atmosphere for safe self-expression

**Goals.**

1. Increase self-esteem.
2. Enhance positive mood.
3. Provide opportunities for musical play.
4. Increase positive social interaction with family members and peers.
5. Provide opportunities for musical self-expression through improvising.
6. Provide opportunities for choice making.
7. Increase group cohesion and active listening skills.
8. Provide opportunities for success within a hospital setting.

**Expected outcomes.**

1. Patients will engage in active music making by playing an instrument of their choosing or using their voice (singing).
2. Patients will engage in positive behaviors.
3. Patients will interact musically with other group members such as peers and family members.
4. Patients will independently choose an instrument to play.

**Referral Criteria.**

**Group.** Participant must be a current patient, or family member of a patient, in the pediatric medical unit, or adolescent unit in Stony Brook Children's Hospital. Patient may not be on isolation precautions.

**Individual.** Participant must be a current patient in the pediatric or adolescent medical unit at Stony Brook Children's Hospital. Patient can be on isolation precautions but cannot be seen if hospital staff need a face shield in order to enter the patient's room.

### **Drumming Group**

**Population.** Pediatrics and adolescents.

**Location.** Pediatric playroom or adolescent lounge.

**Duration.** 45 minutes - 1 hour.

**Description.** The drumming group is similar to the instrumental improvisation group. In this group, only percussion instruments are played and the musical structure provided by the therapist may vary. Facilitation techniques such as echo, call and response, and rhythmic orchestrations may be utilized in addition to free improvisation. This type of active music making provides an opportunity for active listening and group cooperation, as well as opportunities to experience structure and exploration. The various rhythmic instruments being used can be adapted and modified to give patients of all abilities the ability to participate.

**Materials.** Hand drums, bongos, djembes, paddle drums, hand bells, maracas, rhythm sticks, claves, shakers, chairs placed in a circle.

#### **Benefits from literature review.**

1. Improves neurological development.
2. Contributes to a positive environment.
3. Decreases stress and anxiety.
4. Stabilizes mood and behavior.
5. Provides an atmosphere for safe self-expression.

6. Improves quality of life.

**Goals.**

1. Provide opportunities to self-expression.
2. Provide opportunity for musical play.
3. Enhance positive environment.
4. Increase group cohesion.
5. Increase impulse control.

**Expected outcomes.**

1. Patients will independently choose and play a rhythm instrument.
2. Patients will play according to the cues of the music therapist.
3. Patients will engage in positive behaviors indicating improved mood.
4. Patients will actively listen their peers in order to play cohesively.
5. Patients will explore a variety of rhythm instruments.

**Referral Criteria.** Participant must be a current patient, or family member of a patient, in the pediatric medical unit, or adolescent unit in Stony Brook Children's Hospital. It is recommended that patients do not attend this group if they become hyper-aroused and agitated by stimulation and noise. It is recommended that patients who are generally overstimulated and are interested in drumming be referred for individual drumming session with the music therapist. Patients may not be on isolation precautions.

**Live Music Listening**

**Population.** NICU (individual), pediatrics and adolescent (group and individual).

**Location.** Patient's room, playroom, or adolescent lounge.

**Duration.**

*NICU individual.* 5 - 15 minutes.

*Pediatric and adolescent.* 15 - 30 minutes (individual), 45 minutes- 1 hour (group).

**Description.**

*NICU individual.* Infants meeting criteria for music therapy (see below) receive live music at bedside by the music therapist. Live music listening can be facilitated while the infant is resting in his/her isolette or crib, during Kangaroo care, or during feeding, changing, or other types of personal care. This live music playing will be delivered sequentially in order to prevent overstimulation. The music therapist begins by singing soft vowel sounds at one note. If the infant appears relaxed and vital signs are stable, the music therapist can adjust the music by singing more than one note, incorporating words and lullabies into the singing, playing a gato box, a small, nylon stringed guitar (finger picking), or an ocean drum.

*Pediatric and adolescent individual.* During individual sessions with the music therapist, the patient can engage in live music listening to their preferred music sung and played by the music therapist. Patients can actively engage if they prefer, or can maintain receptive engagement.

*Pediatric and adolescent group.* Patients can listen to the music therapist play their preferred music in a group setting. Typically, music listening will not be its own group, but patients have the option to just listen to the group music if they choose not to play an instrument.

**Materials.**

*NICU.* 3/4 sized nylon stringed guitar, gato box, ocean drum.

*Pediatric and adolescent.* Guitar, music stand, iPad, armless chairs.

**Benefits from literature review.**

1. Decreases heart rate, respiration rate and blood pressure
2. Improves neurological development
3. Increases NNS behaviors in NICU infants
4. Increases bonding and attachment between infants and caregivers
5. Contributes to a positive environment
6. Provides procedural support
7. Decreases stress and anxiety
8. Decreases pain perception
9. Stabilizes mood and behavior
10. Helps family members
11. Improves quality of life

**Goals.*****NICU individual.***

1. Increase tolerance to sensory stimulation.
2. Enhance neurological development.
3. Decrease heart rate.
4. Improve respiration rate.
5. Alleviate pain.

***Pediatric and adolescent group.***

1. Normalize hospital experience.
2. Provide opportunities for choice making.
3. Provide opportunities to express interests through musical selection.

4. Enhance positive environment.

***Pediatric and adolescent individual.***

1. Increase social interaction for patients in isolation.
2. Enhance positive environment.
3. Decrease anxiety.
4. Provide emotional support.
5. Provide opportunities for self-expression.
6. Increase self-esteem.
7. Decrease pain perception.

**Expected outcomes.**

***NICU.***

1. Patients will engage in behaviors indicating increased comfort level, decreased distress and increased relaxation.
2. Patients' vitals such as heart rate, respiration rate, and oxygen saturation rate will become more stabilized.

***Pediatric and adolescent group.***

1. Patients will actively listen to live music.
2. Patients will engage in positive behaviors indicating improved mood.
3. Patients will state their musical preferences.

***Pediatric and adolescent individual.***

1. Patients will actively listen to live music.
2. Patients will engage in positive behaviors indicating improved mood.
3. Patients will articulate musical preferences.

**Referral Criteria.**

*NICU.* Patient must be currently staying in the NICU of Stony Brook Hospital. Patient must be older than 24 weeks gestation and be gestationally mature enough to tolerate minimal auditory stimulation. Patient can be on isolation precautions but cannot be seen if hospital staff need to wear a face shield in order to enter patient's room.

*Pediatric/adolescent group.* Participant must be a current patient, or family member of a patient, in the pediatric medical unit, or adolescent unit in Stony Brook Children's Hospital. Patient may not be on isolation precautions.

*Pediatric/adolescent individual.* Participant must be a current patient in the adolescent medical unit at Stony Brook Children's Hospital. Patient can be on isolation precautions but cannot be seen if hospital staff need a face shield in order to enter the patient's room.

**Songwriting**

**Population.** Pediatric and adolescents (individual and group).

**Location.** Patient's room, pediatric playroom or adolescent lounge.

**Duration.** 45 minutes - 1 hour (individual and group).

**Description.** Songwriting is a compositional intervention that helps patients express themselves and their feelings. Songwriting can be done in an individual or group setting. The songwriting group can consist of group members writing a cohesive song together, or having group members write their own song and share their creations at the end. Based on the group's intellectual and musical abilities, the level of structure given by the music therapist can vary. The patients can freely write a song without any previous musical ideas, a song parody (creating different lyrics over an existing melody) or fill in blanks within existing lyrics. The songs will

surround a specific theme and can be playful or serious in nature. There are many opportunities for choice and creativity.

**Benefits from literature review.**

1. Decreases stress and anxiety.
2. Provides emotional support.
3. Provides an atmosphere for safe self-expression.
4. Improves quality of life.

**Materials.** Clip boards, pencils, chairs, paper, piano/keyboard, and guitar.

**Goals.**

1. Provide opportunities for self-expression.
2. Provide emotional support.
3. Increase self-esteem.
4. Foster feelings of accomplishment and success.
5. Increase group cohesion.
6. Increase positive socialization between family members and peers.

**Expected outcomes.**

1. Patients will write an individual song or write a cohesive song.
2. Patients will interact with peers and group members.
3. Patients will give positive feedback to group members when they share their songwriting creations.
4. Patients will express themselves through writing a song.
5. Patients will openly relate their song to life events, including current hospitalization.

**Referral Criteria.**

**Group.** Participant must be a current patient, or family member of a patient, in the pediatric medical unit, or adolescent unit in Stony Brook Children's Hospital. Patient may not be on isolation precautions.

**Individual.** Participant must be a current patient in the pediatric or adolescent medical unit at Stony Brook Children's Hospital. Patient can be on isolation precautions but cannot be seen if hospital staff need a face shield in order to enter the patient's room.

**Lyric Analysis**

**Population.** Adolescents (individual and group).

**Location.** Patient's room (individual) or adolescent lounge (group).

**Duration.** 45 minutes (individual and group).

**Description.** The lyric analysis intervention will be especially tailored toward the adolescent population due to the level of cognitive ability and abstract thinking required for this experience. This group will help participants explore the attached meaning of their preferred music, or new music, with relatable lyrics. This intervention gives adolescents an opportunity to express themselves by explaining how songs relate to, contribute to, or effect their emotions and life. The patients can also speak about various memories relating to a specific piece of music. The patients will actively listen to a song and then openly discuss their reactions to the specific song, in whatever way they choose to. The music therapist will act as the facilitator and ask related questions to help encourage group conversations and exploration. This group will be limited to only patients, and no family members, so that the patients may express themselves

more freely within in the group. If the session is done in an individual setting, the family can participate, as long as the patient is comfortable with their presence.

**Materials needed.** Recorded music player (iPod/iPad/Bluetooth speakers/CD player), chairs, clipboards, pencils.

**Benefits from literature review.**

1. Decreases stress and anxiety.
2. Provides emotional support.
3. Provides an atmosphere for safe self-expression.
4. Improves quality of life.

**Goals.**

1. Provide opportunities for self-expression.
2. Enhance identity formation.
3. Increase peer support and comradery.
4. Increase self-esteem.
5. Increase emotional support.
6. Increase positive socialization among peers in similar situations.

**Expected outcomes.**

1. Patients will actively listen to recorded music.
2. Patients will engage in group discussion about the recorded music.
3. Patients will speak openly about their perceived meanings behind specific songs.
4. Patients will relate lyrics to their emotions and current situation.
5. Patients will support and actively listen to their peers.

**Referral Criteria.**

**Group.** Participant must be a current patient, in the adolescent medical unit in Stony Brook Children's Hospital. Patient may not be on isolation precautions.

**Individual.** Participant must be a current patient in the adolescent medical unit at Stony Brook Children's Hospital. Patient can be on isolation precautions but cannot be seen if hospital staff need a face shield in order to enter the patient's room.

**Sing Along**

**Population.** Pediatrics and adolescent (group and individual).

**Location.** Patient's room, pediatric playroom, or adolescent lounge.

**Duration.** 45 minutes - 1 hour (group), 15 - 30 minutes (individual).

**Description.** Singing has been proven to enhance mood in people of all ages. Patients can engage in singing along with their peers and the music therapist in a sing along group, or with the music therapist during an individual session. The music chosen for the sing along will be based upon the preferences and developmental level of the patients currently on the unit. The music therapist will provide lyric sheets as needed and as appropriate to the context. Each session will begin with vocal warm ups and breathing exercises, and progress to singing familiar songs. Adaptations and various arrangement will be employed to encourage appropriate levels of participation. Receptive participation is possible for patients who are unable or unwilling to sing, but wish to attend.

**Materials needed.** Guitar, keyboard, music stand, chairs, lyric sheets.

**Benefits from literature review.**

1. Improves respiratory muscle function.

2. Improves neurological development.
3. Contributes to a positive environment.
4. Decreases stress and anxiety.
5. Decreases pain perception.
6. Stabilizes mood and behavior.
7. Improves quality of life.

**Goals.**

1. Improve breath support.
2. Enhance positive mood.
3. Increase positive behaviors.
4. Increase group cohesion.
5. Increase self-esteem.
6. Enhance positive environment.
7. Normalize hospital experience.

**Expected outcomes.**

1. Patients will sing along with the songs being sung by the group.
2. Patients who are able to read will refer to lyric sheets while singing along with the group.
3. Patients will engage in breathing exercises and vocal warm ups.
4. Patients will engage in positive behaviors indicating improved mood.
5. Patients will follow musical cues given by the music therapist (i.e. engage in call and response).

**Referral Criteria.**

**Group.** Participant must be a current patient, or family member of a patient in the pediatric or adolescent medical units of Stony Brook Children's Hospital. Patient may not be on isolation precautions.

**Individual.** Participant must be a current patient in the adolescent medical unit at Stony Brook Children's Hospital. Patient can be on isolation precautions but cannot be seen if hospital staff need a face shield in order to enter the patient's room.

**Music and Multimodal Stimulation (MMS)**

**Population.** NICU (individual).

**Location.** Patient's room.

**Duration.** Typically no more than 15 minutes (can be longer if patient can tolerate more stimulation or if the actual music intervention does not begin until later in the session).

**Description.** Music and multimodal stimulation (MMS) is an intervention that aims to stimulate an infant sequentially in order to increase his or her tolerance to auditory, tactile, visual and vestibular stimuli. The multimodal stimulation, also known as multi-sensory stimulation, can be taught to the infant's caregiver or done by the music therapist. MMS can be done during kangaroo care. The sequence in MMS begins with 30 seconds of quiet humming or lullaby singing (auditory stimulation), then adds light rocking (vestibular stimulation). After the infant appears stable when combining these two stimuli, the parent or music therapist will move onto the stroking or light massage (tactile stimulation). Lastly, visual stimulation is added by giving the infant cues to maintain eye contact.

**Materials needed.** Comfortable chair (required), gator box, ocean drum, and ¾ sized guitar (optional).

**Benefits from literature review.**

1. Decreases heart rate, respiration rate and blood pressure.
2. Improves neurological development.
3. Increases NNS behaviors in NICU infants.
4. Increases bonding and attachment with infants and caregivers.
5. Decreases stress and anxiety.
6. Stabilizes mood and behavior.
7. Helps family members.

**Goals.**

1. Increase infant's tolerance to multimodal stimuli.
2. Increase parent/infant bonding (if the parent is present).
3. Enhance neurological development.

**Expected outcomes.**

1. Patient will become safely stimulated by various stimuli.
2. The parent or caregiver will learn a technique used to bond with their child.
3. Patient's vital signs will become gradually more stable.
4. Patient will engage in relaxed behaviors indicating increased comfort.

**Referral Criteria.** Patient must be currently staying in the NICU of Stony Brook Hospital. Patient must be older than 32 weeks gestation and be gestationally mature enough to tolerate minimal amounts of multi-sensory stimulation. Patient can be on isolation precautions if

the parent is present and willing to learn this technique. It is not recommended for the music therapist to engage in MMS on an infant on isolation precautions.

### **Pacifier Activated Lullaby (PAL)**

**Population.** NICU (individual).

**Location.** Patient's room.

**Duration.** Typically no more than 15 minutes (can be longer if patient can tolerate more stimulation or if the actual music intervention does not begin until later in the session).

**Description.** The pacifier activated lullaby (PAL) device is a pacifier that plays music based upon the frequency and strength of the infant's suck. This musical reinforcement encourages the infant to continue the non-nutritive sucking (NNS) behaviors. The music played by the PAL is developmentally appropriate and consists of female voices singing lullabies at 65-70 dB.

This intervention can be mimicked with live music rather than using a device. The music therapist can reinforce the infants NNS behaviors by watching the infant closely and adjusting her singing and or instrument playing based upon the frequency of the infant's sucks when either using a pacifier or during feeding. If the infant stops sucking behaviors, the music therapist will stop playing music until sucking behaviors continue. The singing intervention can be taught to the infant's parent or caregiver to use during feeding, NNS while resting, or during kangaroo care.

#### **Benefits from literature review.**

1. Increases NNS behaviors.
2. Improves neurological development.

3. Helps family members

**Goals.**

1. Positively reinforce NNS behaviors.
2. Improve feeding.
3. Increase weight gain.
4. Enhance development.

**Expected outcomes.**

1. Patient will increasingly suck either a pacifier, their fingers, a nipple, or bottle due to the reinforcement given by the musical stimuli.
2. After continuous uses of the PAL device, patient will improve feeding.
3. Patient will gradually gain weight due to improved feeding.

**Referral Criteria.** Patient must be currently staying in the NICU of Stony Brook Hospital. Patient must be at least 34 weeks gestational age, be medically stable and have begun gavage feedings. Patient can be referred for this intervention if he or she is having trouble with oral feeding or is engaging in NNS behaviors as preparation for beginning to be orally fed.

**Music and Movement**

**Population.** Pediatric and adolescent (group and individual).

**Location.** Patient's room (individual), pediatric playroom, or adolescent lounge (group).

**Duration.** 45 min- 1 hour (group), 15- 30 minutes (individual).

**Description.** Music is a medium that encourages people to move naturally. Patients can move to music through instrument playing, dancing, swaying, foot tapping, and body percussion. These light movements will either be cued by the music therapist or done freely by the

participant. For younger children, the group will engage in popular and familiar nursery rhymes and songs encouraging playful movement. In individual sessions, with patients who are bed bound, the music therapist will encourage movements that will decrease the likelihood of developing bed sores and blood clots. Each participant will be encouraged to only move within their comfort levels and not engage in movements, done by the group, that cause pain or discomfort. The music therapist will closely monitor each participant for safety. All interventions will be modified and adapted to the physical abilities and clinical goals of the participants.

**Materials needed.** Adaptive instruments, iPad, iPod, speaker, CD player, chairs, keyboard

**Benefits from literature review.**

1. Increases immunity
2. Improves respiratory muscle function
3. Improves neurological development
4. Contributes to a positive environment
5. Decreases pain perception
6. Improves quality of life

**Goals.**

1. Increase fine and gross motor skills.
2. Encourage natural and rhythmic movement through musical stimuli.
3. Increase body awareness.
4. Decrease likelihood of developing bed sores and blood clots.
5. Increase physical activity.

6. Provide opportunities for musical play.

**Expected outcomes.**

1. Patient will engage in light movement to music.
2. Patient will freely and naturally move rhythmically to the music.
3. Patient will engage in physical play through music.
4. Patient will display good impulse control and only participate in cued movements if they are physically able.

**Referral Criteria.**

**Group.** Participant must be a current patient, or family member of a patient in the pediatric or adolescent medical units of Stony Brook Children's Hospital. Patient may not be on isolation precautions.

**Individual.** Participant must be a current patient in the adolescent medical unit at Stony Brook Children's Hospital. Patient can be on isolation precautions but cannot be seen if hospital staff need a face shield in order to enter the patient's room.

### **Music Therapy as Procedural Support**

**Population.** NICU, Pediatrics, adolescents (individual).

**Location.** Patient's room, surgical preparation room.

**Duration.** 10-15 minutes (typically), or the duration of the procedure.

**Description.** Procedural support is an intervention in which musical stimuli and therapeutic relationship between the patient and music therapist are used to decrease distress and anxiety when undergoing medical procedures. Various music therapy methods can be employed, including receptive methods or through active music making. Procedural support is done on an

individual basis and is done to assist the doctors and nurses in providing uncomfortable medical procedures to the patient. Some procedures that patients could benefit from having music therapy as procedural support include immunizations, intravenous starts, venipunctures, injections, and infant heel sticks.

**Benefits from literature review.**

1. Decreases heart rate, respiration rate and blood pressure
2. Contributes to a positive environment
3. Provides procedural support
4. Decreases stress and anxiety
5. Decreases pain perception
6. Stabilizes mood and behavior
7. Helps family members
8. Provides emotional support

**Goals.**

1. Decrease pre-procedural anxiety.
2. Decrease distressing behaviors.
3. Increase positive coping behaviors.
4. Decrease pain perception.
5. Enhance positive mood.

**Expected outcomes.**

1. Patient will tolerate procedure.
2. Medical professionals will more easily complete procedure.

3. Patient will engage in coping behaviors and use the coping behaviors during future procedures.
4. Patient's anxiety level and heart rate will decrease.

**Referral Criteria.** Participant must be a current patient either in the NICU, pediatric or adolescent medical units of Stony Brook Children's Hospital. Patient can be on isolation precautions but cannot be seen if hospital staff need a face shield in order to enter the patient's room. Patient can be referred for music as procedural support if a staff member, family member, or patient themselves, is aware that he or she will be undergoing an uncomfortable or painful procedure.

### **Financial Implications**

Not only does music therapy benefit the patients and family members receiving sessions, but it also benefits the hospital as a whole by saving money in the long-term (AMTA, 2006a; Robertson, 2009). Caine (1991) found that music therapy can significantly reduce hospital stay for infants in the NICU. The average length of stay for the infants receiving music therapy was 26 days whereas the control group's average length of stay was 31 days. Similarly, Austin (2010) found a reduction in length of stay in the pediatric intensive care unit (PICU) after participation in music therapy.

Music therapy can eliminate or reduce need for sedative use in pediatric patients (Walworth, 2005, p. 287). This not only is cost effective, but is safer for the child. Walworth used music therapy instead of medication for children having procedures such as ECGs and CT scans. Walworth had a 100% success rate for the children receiving ECG's and 80% success rate for children receiving CT scans. A 100% success rate for this study meant that all the children completed their procedures without the need of sedatives. For the 92 children requiring ECG

procedures, the use of music therapy saved \$7,005.80 by eliminating the need for the presence of an RN during the procedure and shortening the amount of time for the procedure.

### **Budget**

In developing a budget, the salary of the music therapist, including benefits, and the budget for equipment must be considered. In the year 2018, the average annual salary of a full-time music therapist in the state of New York was \$53,333 (AMTA, 2018).

A complement of instruments will need to be established over time. It is important to purchase high quality instruments for both longevity and authenticity in participation. Higher quality instruments decrease the probability of having to spend money over time on the instruments due to repairs or replacement.

After one year of employment at Stony Brook Children's Hospital, the music therapist, or therapists, can apply to be a national roster internship supervisor. As such, the music therapist can supervise two music therapy interns at a time. It also may be possible to partially fund the music therapy program through philanthropy and grants.

Table 5

#### *Yearly Expenses*

|                                      |                      |
|--------------------------------------|----------------------|
| Salary 1 music therapist New York    | \$53,333/year        |
| Estimated benefits                   | \$25,000/year        |
| Updated books/music/instruments      | \$500/year           |
| Instrument and equipment maintenance | \$500/year           |
| <b>Total yearly expenses</b>         | <b>\$79,333/year</b> |

Table 6

*Required Initial Expenses*

|   |                        |
|---|------------------------|
| Portable keyboard: <u>Yamaha NP12 61-Key Entry-Level Piaggero Ultra-Portable Digital Piano</u>  | \$179.99               |
| Bench: <u>Proline PL1100 Padded Keyboard Bench</u>  | \$39.99                |
| Piano Stand: <u>Proline PL100 X-Braced Keyboard Stand</u>   | \$37.99                |
| Pedal: <u>Proline Professional Sustain Pedal</u>  | \$29.99                |
| Steel stringed guitar: <u>Jasmine JO-36 Orchestra Acoustic Guitar</u>   | \$135.15               |
| ¾ nylon stringed guitar: <u>Yamaha CGS Student Classical Guitar</u>   | \$119.99               |
| Guitar straps (2): <u>Perri's 2" Nylon Guitar Strap</u>   | \$7.98 (\$3.99 each)   |
| Music stand: <u>Musician's Gear Folding Music Stand</u>   | \$9.99                 |
| Gato Box: <u>African Rhythms G 4-Pitch Piccolo Tongue Drum</u>  | \$111.00               |
| Ocean Drum: <u>Remo Ocean Drum Clear 2.5 In x 12 In</u>   | \$45.81                |
| Egg shakers ( <u>12 set</u> )   | \$23.99                |
| Guitar humidifiers ( <u>2, 1 per guitar</u> )   | \$49.90 (\$24.95 each) |
| Trophy Deluxe Rhythm 35-Player Band Set; includes: <u>2 - 8" tambourines, 2 - 6" Snare Boys with mallets, 2 - 5" x 5" tom toms with mallets, 2 sand block pairs, 4 tap taps, 7" cymbal pair with handles, 2 handle castanets, 3 - 3-bell cluster bells, 4 - 4-bell wrist bells, 5" cymbal with mallet, 2 Maracas, Round tone block with mallet, Guiro tone block, 3 - 5" triangles with strikers, 3 jingle taps, 4 rhythm stick pairs</u> | \$154.99               |
| Remo Buffalo Drums <u>3.5 x 8 (3 drums, 1 mallet)</u>   | \$35.95                |
| Orff xylophone: <u>Lyons Xylophone Regular Diatonic Soprano</u>   | \$199.99               |
| iPad: <u>Apple - iPad (Latest Model) with Wi-Fi - 32GB - Silver</u>   | \$279.99               |
| Bluetooth Portable Mini Speaker: <u>Rider BS-103T</u>   | \$9.99                 |
| <b>Total required initial expenses</b>  | <b>\$1,472.68</b>      |

Table 7

*Optional Initial Expenses*

|  |                       |
|--|-----------------------|
| Bongos   | \$15.99               |
| Tuner: <u>Snark Super Snark 2 Clip-On Tuner</u>  | \$29.99               |
| Nylon guitar strings: <u>D'Addario EJ45 Pro-Arte Normal Tension Classical Guitar Strings (2)</u>                 | \$17.98 (\$8.99 each) |
| Steel guitar strings: <u>Martin MA130S Marquis Silk &amp; Steel Custom Authentic Acoustic Guitar Strings (2)</u> | \$17.98 (\$8.99 each) |
| Gathering drum: <u>8 x 16 inch</u>   | \$72.00               |
| Lollipop paddle drum: <u>6 inch (2)</u>  | \$19.86 (\$9.93 each) |
| Tambourine: <u>CP 8" Headless Single Row Wood Tambourine (2)</u>   | \$16.00 (\$8.00 each) |
| Glockenspiel: <u>Sonor Soprano Diatonic Glockenspiel C3-F4</u>   | \$44.00               |
| Chimes: <u>A Days Work A Days Work Hand Held Chime and Holder 20 Solid Brass Bars</u>                            | \$59.95               |
| Boomwhackers: <u>C major diatonic scale</u>  | \$21.99               |
| Adaptive mallets: <u>American Drum PK/CF4 Adaptive Mallet Cuff and Mallet Pack, Set of 4</u>                     | \$47.00               |
| Rhythm ribbons: <u>West Music YTC-106 Rhythm Ribbons, Set of 6</u>   | \$22.95               |
| Adaptive guitar picks: <u>D'Andrea 4PACMON Monster Picks, 4 Pack</u>   | \$10.80               |
| Rhythm sticks: <u>Rhythm Band Lummi Sticks, Set of 12 pairs</u>  | \$28.99               |
| Adaptive jingle bells: <u>Rhythm Band RB811 Wrist or Ankle Jingle Bell (6)</u>                                   | \$20.94 (\$3.49 each) |
| <b>Total optional initial expenses</b>   | <b>\$428.44</b>       |

**Larger Facility Context**

The music therapist can be a vital part of the treatment team. Music therapists are trained to collaborate with other professionals in order to provide the most effective and meaningful treatment for each individual patient and family. Music therapists have the potential to provide a

unique perspective of the patient's experience in the hospital, and to address both physiological and psychosocial needs (AMTA, 2006a).

When the music therapist is on either the NICU or pediatrics unit, she would attend the unit's morning meeting in order to become updated on the status of the patients currently in the NICU and pediatrics units. She would collaborate and work closely with the Child Life Department. Individual sessions will be done on a consistent basis and the music therapist will communicate with family and staff for scheduling of sessions. The group sessions will consistently occur during the same times every week in order to promote consistency.

After each individual and group session, the music therapist will document the each patient's progress related to their clinical goals, in the electronic medical records. This will give staff members of other disciplines on the patient's treatment team, the ability to follow their patients' progress. This can help other disciplines treat their patients more effectively.

The music therapists can collaborate with other professionals and other departments in the hospital. Music therapists collaborate with the doctors and nurses when doing procedural support interventions. Bower and Shoemark (2009) collaborated with the speech therapist in order to achieve the clinical goals of the patient. Register (2002) conducted a survey asking about the collaborative habits of board-certified music therapists. The results of her survey suggest that most music therapists (87.5%) have collaborated with another discipline or professional in order to treat a client or patient, sometime in their careers. A music therapist can treat clients and even run group and individual interventions with physical therapists, recreation therapists, psychologists, occupational therapists, nurses, social workers, speech pathologists, art therapists, drama therapists, dance/movement therapists, Child Life specialists and various other healthcare professionals. It is important for the music therapists to collaborate and work

alongside other professionals in order to build comradery among coworkers and treat their patients through multiple approaches at once.

### **Outcomes and Assessment**

Music therapy is a tool that can help pediatric patients achieve their clinical goals. If a patient or family is interested in receiving music therapy services, or if a staff member believes a patient will benefit from individual music therapy sessions, the patient, family member, or staff member can complete a referral form. When the music therapist receives this referral form, she will assess the patient through an individual intake session. This will assess the patient on all domains, including the musical domain. The music therapist will get to know the child and determine musical goals, related to their documented clinical goals from other professionals on the treatment team.

Proposed individual referral and assessment forms for NICU and pediatric patients are located in the appendix section. Appendix D is the NICU referral form; Appendix E is the pediatric referral form; Appendix F is the NICU assessment form; and Appendix G is the pediatric assessment form. Referral and assessment forms are very different between the NICU patients and pediatrics because the areas of need and therapeutic goals are extremely different between the two populations. It is recommended that the assessment forms for each patient be included on the electronic medical record so that other professionals on the treatment team have access to each patient's goals and progress in music therapy. The patient's progress will be written in narrative form, in the electronic medical record, after every group and individual session.

### **Conclusion**

The implementation of a music therapy program specifically for the NICU and pediatrics units will benefit the patients and Stony Brook Children's Hospital greatly. Music therapy is an affordable, holistic, approach to medicine that can reduce the costs of general care for the pediatric patients in the hospital. It is hoped that over time, the hospital will employ a team of music therapists to work on various units of the University Hospital. For now, I propose this program for the new children's hospital because I have been able to see music therapy benefit the NICU and pediatric patients here, throughout my internship.

Stony Brook University Hospital is becoming one of the biggest health systems on Long Island. This newly built Children's Hospital that will be opening its doors to the public in the summer of 2019 will benefit the community as a whole. I hope that when implementing these changes by opening this new building, a new music therapy program will be taken into consideration as well. Music therapy will not only benefit the hospital on a financial basis, but enhance the lives of the patients, their families, and the Stony Brook community in a unique and necessary way.

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## Appendix A

### Music Therapy Fact Sheet

#### **What is music therapy?**

Music therapy is an evidence based practice that gives people with various needs and abilities, the opportunity to achieve their clinical goals with music. Music is a medium that has the ability to affect people in unique ways, which is why it is an important tool when treating those with various issues.

#### **How can one become a music therapist?**

Music therapists must earn a bachelor's degree in music therapy from one of the 70 nationally approved schools and complete a minimum of 1,200 hours of clinical music therapy training through internship and fieldwork experiences (AMTA, 2015). This allows for trained music therapists to take the board-certification examination through the Certification Board for Music Therapists (CBMT). Music therapists must reach competences established by the AMTA such as proficiency on piano, guitar, and voice.

#### **What populations do music therapists work with?**

Music therapists have the opportunity to work with people across the entire lifespan. Clients can be just beginning their lives as newborns in the NICU, or near the end of life in a nursing facility or hospice care. Music therapists can work with infants in the NICU, children with disabilities, hospitalized children and adolescents, children and adults with special needs, older adults in nursing homes, hospice patients, and people with psychiatric illnesses, people in forensic institutions, veterans, and people with disorders of consciousness. Music therapists can work in various institutions or take clients through private practice by coming to client's homes.

**What does a music therapy session look like?**

Every music therapy session is different because each session is individualized to meet the needs of the patients. Music therapy sessions can be group or individual and the session is structured in order to help the client succeed in life. A group session typically lasts about 45 minutes and an individual session can be as long or as short as needed. Music therapy sessions encourage clients to participate in meaningful ways that help them achieve their clinical goals.

**Do you have to be a musician in order to participate in music therapy?**

No! The music therapist modifies all music so that each client can succeed musically, regardless of their musical abilities. I actually do not agree with the wording of this question because I believe that everyone can be a musician. Innate musicality is what makes us human!

**How does a music therapist fit into the treatment team?**

Music therapists can be included in various departments of a typical hospital's treatment team such as therapeutic recreation, functional therapeutic activities or child life. What we find in music therapy sessions can other disciplines come up with creative interventions for their own practice.

## Appendix B

### Resume

Alexandra Gail Bie

#### Work Experience

- Recreation/Music Therapy Assistant, Long Island State Veterans Home, Stony Brook NY, (June 2012- Present)
- Teacher's Assistant, Building Blocks Developmental Preschool, Commack, NY, (January 2018- June 2018)
- Recreation Specialist, Elant Nursing Home, Wappingers Falls NY, (June 2015-August 2015)
- Cashier, Target, Commack NY, (October 2014- January 2015)
- Musician, Verde Wine Bar and Ristorante, Deer Park, NY, (June 2014- March 2016)
- Recreation/Music Therapy Assistant in Behavioral Health, Nassau University Medical Center, East Meadow, NY, (June 2010- August 2011)
- Camp Counselor, Kenwal Day Camp, Melville, NY, (June 2008-August 2009)

#### School Internship Experience (Music Therapy)

- Intern, Stony Brook University Hospital, Stony Brook, NY (August 2018- February 2019)
- Intern, Brooklyn Conservatory of Music, Brooklyn, NY (Spring 2017)
- Fieldwork Student, Alternatives for Children, Setauket, NY (Fall 2016)
- Fieldwork Student, Elant Nursing Home, Wappingers Falls, NY (Spring 2015)
- Practicum Student, Anderson Center for Autism, Staatsburg, NY (Fall 2013)

#### Volunteer Experience

- New Paltz Child Care Center, New Paltz, NY
- Little Shelter Animal Rescue and Adoption Center, Huntington, NY
- Stony Brook University Hospital, Pediatrics, Stony Brook, NY

#### Education

- SUNY New Paltz , New Paltz, NY- Master of Science in Music Therapy- (May 2019)
- SUNY New Paltz, New Paltz, NY- Bachelor of Science in Contemporary Music Studies/Pre Music Therapy Minor in Psychology- Magna Cum Laude (December 2013)
- Charles University in Prague, Prague, Czech Republic- Study Abroad- (Spring 2013)

#### Awards and Honors

- Americanism Award- June 2013
- SUNY New Paltz Dean's List- Fall 2010 - Fall 2018
- American Heart Association Honoree (Raised \$325,000)- April 2009
- Counselor of the week- 2008 & 2009

#### Professional Associations

- American Music Therapy Association (AMTA)- Member since January 2014

## Appendix C

## Annotated Bibliography

Batson Malone, A. (1996). The effects of live music on the distress of pediatric patients receiving intravenous starts, venipunctures, injections and heel sticks. *Journal of Music Therapy*, 33(1), 19-33.

This study assessed the use of live music therapy procedural support on the distress levels of 20 children ages 11 months to 7 years. The participants were undergoing needle insertion procedures such as intravenous starts, venipunctures, injections, and infant heel-sticks. The 20 children in the experimental group's anxiety levels were compared with a control group, of another 20 children who did not receive music therapy. The music therapy interventions consisted of singing age appropriate songs and encouraging interaction between child and music therapist. All 40 participant's needle insertion procedures were videotaped and analyzed. Results showed statistically significant evidence ( $F = 9.6, p < .05$ ) supporting the use of music therapy as procedural support.

Bower, J., & Shoemark, H. (2009). Music therapy to promote interpersonal interactions in early pediatric neurorehabilitation. *Australian Journal of Music Therapy*, 20, 59-75.

This case study describes a ten-year-old pediatric patient, with an acquired brain injury, who struggled with engaging with others through conversation. Consistent music therapy sessions helped this patient improve musical engagement with others. The sessions consisted of a greeting song and a goodbye song, singing familiar songs, and engaging in non-verbal, rhythmic, interactional activities with the music therapist. The music therapist then began conducting sessions alongside the

speech therapist. Through collaboration between music therapy and speech therapy, this patient was able to transfer his musical engagement abilities into conversational engagement, thus achieving his clinical goals.

Bradley Palmer, J., Lane, D., & Mayo, D. (2017). Surgical music therapy: the significance and implementation of music therapy in the operating arena. *Music Therapy Perspectives*, 35(1), 30-35.

This randomized controlled trial, lasting two years, examined the effects of providing music therapy in the operating room, for 207 women as they were undergoing breast cancer surgery. The study investigated the effects of live and recorded music therapy on the patients' anxiety levels, anesthesia requirements, recovery time and satisfaction. Results indicated that music therapy helped decrease preoperative anxiety but had no effect on the amount of anesthesia needed. The patients engaging in live music based preoperative music therapy sessions had a shorter recovery time than the patients engaging in recorded music based sessions. The responses from patients, staff, and family members indicated high levels of satisfaction and a belief that music therapy enhanced the environment. Staff stated that music therapy engendered an environment that facilitated greater competence in the medical staff.

Cevasco, A. M., & Grant, R. E. (2005). Effects of the pacifier activated lullaby on weight gain of premature infants. *Journal of Music Therapy*, 42(2), 123-139.

In this study, Cevasco and Grant examined the effects of the PAL device of 188 premature infants over a two year period. Through three analyses, the researchers

compared the differences in weight gain and sucking behaviors with the amount of PAL trials completed (1-4), weight gain before, during and after PAL usage, and the proximity of the PAL usage with the infant's feeding schedule. The analyses showed trends in weight gain but no statistically significant data. Results indicated that the PAL increases NNS behaviors which then reinforce behaviors needed in order to eat. Infants in the study who used the PAL system immediately before feeding gained the most weight.

Colwell, C. M., Davis, K., & Schroeder, L. K. (2005). The effect of composition (art or music) on the self-concept of hospitalized children. *Journal of Music Therapy, 42*(1), 49-63.

This study explored the effect of composition, in both music and art forms, on the self-concept of hospitalized children. Participants consisted of 24 pediatric patients ages ranging from 7-18. The participants who composed art work were in the contact control group and were given various drawing materials to create a picture. The participants in the experimental group used a compositional CD program to create their own musical composition. The Piers-Harris Children's Self-Concept Scale was used before and after the children composed their art or music, in order to examine the differences between pre and posttest self-concept levels. Both groups showed improvements in self-concept though neither totals were statistically significant. The music group showed significant improvements in the categories of school status (INT) and physical appearance (PRY).

Daveson, B. A. (2001). Music therapy and childhood cancer: goals, methods, patient choice and control during diagnosis, intensive treatment, transplant and palliative care. *Music Therapy Perspectives, 19*(2), 114-120.

This article identifies four stages that many pediatric patients with acute lymphoblastic leukemia (ALL) and acute myeloid leukemia (AML) may experience. These stages, or phases, include the initial diagnosis, intensive treatment, bone marrow transplant and palliative care. For each stage, the author identifies common goals and music therapy methods that can benefit the patient through the various issues that typically arise in each stage of treatment. A description of the goals and methods that can be used for each stage is followed by a successful case study of a pediatric oncology patient receiving music therapy sessions during that corresponding stage.

de l'Etoile, S. K. (2015). Self-regulation and infant-directed singing in infants with Down syndrome. *Journal of Music Therapy*, 52(2), 195-220.

This study examined how infants (ages 3-9 months), with and without Down syndrome, responded to infant-directed singing. Data was collected through videotaping mothers singing to their infants for two minutes. Mothers were encouraged to sing whatever song/songs they chose and discouraged from making hand movements or touching their child. The responses were measured and coded by using Infant Behavior Rating Scales (IBRS) across cognitive and affective domains. Results found that infants with and without Down syndrome maintain better eye contact, self-regulation and attention when being sung to by adults.

Froehlich, M. (1984). A comparison of the effect of music therapy and medical play therapy on the verbalization behavior of pediatric patients. *Journal of Music Therapy*, 21(1), 2-15.

This experimental study compared the effects of music therapy and medical play therapy on verbalization behaviors in 40 school aged pediatric patients. The children in the experimental, music therapy group received a 30 minute session in their room consisting of movement, instrument playing, and fill in the blank lyrical composition consisting of songs relating to hospitalization. Participants in both groups answered four questions relating to their hospital experience. The responses to these questions were coded and analyzed. Results indicate that the Children who participated actively in music therapy engaged in more meaningful, involved, and expressive verbalizations about their hospital experience in comparison to the children who engage in play therapy.

Gooding, L., Swedberg Yinger, O., & Iocono, J. (2016). Preoperative music therapy for pediatric ambulatory surgery patients: a retrospective case series. *Music Therapy Perspectives*, 34(2), 191–19.

This retrospective case series explored the effects of music therapy in a pediatric ambulatory surgery center through a pilot music therapy program. Participants consisted of 103 pediatric patients, ages 2-9, and their accompanying parents. Each live music therapy session was structured the same way, utilized a cognitive-behavioral framework, and consisted of instrument playing, and singing or listening to, familiar, age appropriate songs. The researchers assessed the patient's affect before and after the session, and behavioral responses. The parents were also given a questionnaire about their opinions on the session. Results indicated that music therapy helped decrease the anxiety levels of the pediatric patients and their parents, prior to surgery.

Keith, D. R., Russell, K., & Weaver, B. S. (2009). The effects of music listening on inconsolable crying in premature infants. *Journal of Music Therapy, 46*(3), 191-203.

This study examined the effects of recorded music on the crying behaviors of premature infants. The participants consisted of 24 infants in a level III NICU with developmental ages ranging from 32-40 weeks. NICU nurses volunteered to be researchers for this study and administered the music condition. The music condition was a sound tested, developmentally appropriate recording, consisting of a female voice singing unaccompanied soft lullabies. The study lasted four days and all participants received the music condition on alternating days. While receiving the music condition, the participants showed reductions in the duration and frequency of their crying episodes, as well as improvements in heart rate, respiration rate, oxygen saturation rate and mean arterial pressure. One major limitation of this study was that a music therapist was not employed in this hospital, so the infants listened to recorded music rather than having a live music therapy session.

Lindenfelser, K. J., Grocke, D., & McFerran, K. (2008). Bereaved parents' experiences of music therapy with their terminally ill child. *Journal of Music Therapy, 45*(3), 330-348.

The authors of this qualitative study conducted in depth interviews with seven parents who have lost children in palliative care. All of the parents were present for at least one music therapy session with their child before he or she passed away. The purpose of this study was to understand the influence of music therapy in pediatric palliative care. Five themes emerged from a phenomenological analysis of the interviews. Parents reported a belief that music therapy altered their views

of having a terminally ill child, helped them cope, provided the family with songs to remember their child by, gave the parents pleasure and a time out and provided an opportunity for the parents to see their children thrive even during the last days of their life.

Loewy, J., Stewart, K., Dassler, A., Telsey, A., & Homel, P. (2013). The effects of music therapy on vital signs, feeding, and sleep in premature infants. *Pediatrics, 131*(5), 902-918.

The researchers argue that recorded music puts premature infants at risk for overstimulation. This randomized controlled multisite trial consisted of 272 premature infants over 32 gestational weeks old, from 11 different NICUs. The researchers used elements of rhythm, breath, and parent preferred lullabies in their live music therapy sessions with each participant, three times a week, for two weeks. Results indicated significant improvements in heart rate, sucking behavior, caloric intake, sleep patterns, and the caregivers' perception of stress.

Marley, L. S. (1984). The use of music with hospitalized infants and toddlers: a descriptive study. *Journal of Music Therapy, 21*(3), 126-132.

This descriptive study examined the effects of music on the stress behaviors of 27 hospitalized infants and toddlers, ages ranging from five weeks to 36 months. Interventions included music and relaxation, experimental music games, music and movement interventions, and the use of simple songs. The participants experienced enhancement in their motor, social, and verbal skills, while increasing relaxation and decreasing stress responses such as crying, throwing objects, and tensing the body.

Millett, C. R., & Gooding, L. F., (2017). Comparing active and passive distraction-based music therapy interventions on preoperative anxiety in pediatric patients and their caregivers. *Journal of Music Therapy, 54*(4), 460-478.

This study explored active and passive distraction-based music therapy interventions and their effectiveness in decreasing preoperative anxiety in pediatric patients. Participants in the active music therapy group engaged in musical alternate engagement and the passive group engaged in a music assisted relaxation intervention. Anxiety levels were measured with both the modified Yale preoperative anxiety scale (m-YPAS) and the state-trait anxiety inventory Y-6 item (STAI-Y6). Results indicated that pediatric patients and their families who received music therapy interventions experienced much less preoperative anxiety than families receiving no music therapy. However, there were no significant differences between the preoperative anxiety levels of the participants who engaged in either active or passive music therapy interventions.

O’Gorman, S. (2007). Infant directed singing in neonatal and paediatric intensive care. *Australian & New Zealand Journal of Family Therapy, 28*(2), 100-108.

This article first gives the reader a brief understanding about infant-directed singing and mentions research regarding attachment theory. The author identifies criteria that determine the security of the attachment between infants and their primary caregivers. These criteria include availability, coherency, responsiveness, synchrony, and reciprocity. The environment of the NICU can place many stressors on the inner and outer worlds of both primary caregiver and baby. The article explains how infant directed singing meet each of the five criteria needed

to establish secure attachments. The article ends with a case vignette describing a success story of a mother using infant directed singing in order to bond with her premature infant.

Robb, S. L., Nichols, R. J., Rutan, R. L., Bishop, B. L., & Parker, J. C. (1995). The effects of music assisted relaxation on preoperative anxiety. *Journal of Music Therapy*, 32(1), 2-21.

This study examined the effects of music assisted relaxation (MAR) on 20 pediatric burn patients aged 8-20, who were about to undergo surgery. Purposes of the study were to see how this intervention impacted the physiological measures and anxiety levels of these pediatric patients. Interventions consisted of music listening, deep diaphragmatic breathing, progressive muscle relaxation, and imagery. Participants in the experimental group engaged in the interventions while the control group received standard preoperative care. Results indicated a significant reduce in anxiety levels for the experimental group but no significant changes in physiological measures.

Shoemark, H., Hanson-Abromeit, D., & Stewart, L., (2015). Constructing optimal experience for the hospitalized newborn through neuro-based music therapy. *Frontiers in Human Neuroscience*, 9(487), 1-5. doi: 10.3389/fnhum.2015.00487.

This case study, describes a premature infant found that a premature infant's sleep patterns, breathing rate, and neurodevelopment improved in response to music therapy interventions and careful auditory stimulation techniques. The sensory environment of the NICU, and this patient's room placement (right next to the nursing station) was overstimulating for this infant. A change in room location

and coupled with a 20-minute playlist of developmentally appropriate soundscapes and lullabies played daily resulted in a return normal sleep schedule within 48 hours.

Swedberg Yinger, O. (2016). Music therapy as procedural support for young children undergoing immunizations: A randomized controlled study. *Journal of Music Therapy* 53(4), 336-363.

This randomized controlled trial has various participants consisting of 58 children ages 4-6 years old receiving immunization shots, their parents, and the nurses administering the immunizations. Half of the 4-6 year old participants received music therapy directly before, during, and directly following an immunization and half did not. The children involved in music therapy displayed fewer distressing behaviors such as yelling and crying. The parents in the experimental group reported that their children's distress levels were much lower when they had music therapy as part of the immunization process.

Walworth, D. D., (2005). Procedural-support music therapy in the healthcare setting: a cost-effectiveness analysis. *Journal of Pediatric Nursing*, 20(4), 276-284.

This comparative analysis examined the cost effectiveness of music therapy as procedural support. Walworth used music therapy instead of medication for children having procedures such as ECGs and CT scans. Walworth had a 100% success rate for the children receiving ECG's and 80% success rate for children receiving CT scans. A 100% success rate for this study meant that all the children completed their procedures without the need of sedatives. For the 92 children requiring ECG

procedures, the use of music therapy saved \$7,005.80 by eliminating the need for the presence of an RN during the procedure and shortening the amount of time for the procedure.

Walworth, D., Standley, J.M., Robertson, A., Smith, A., Swedberg, O., & Jarred Peyton, J.

(2012). Effects of neurodevelopmental stimulation on premature infants in neonatal intensive care: randomized controlled trial original research article. *Journal of Neonatal Nursing, 18*(6), 210-216.

This randomized controlled trial examined the developmental effects of music and multimodal stimulation on over 100 premature infants in four different NICU's. The participants in the experimental group received 20 minutes music and multimodal stimulation sessions with a board certified music therapist once a week during the duration of their stay while the control group received standard care. Results indicated that participants in the experimental group had an average length of stay 12.9 days less than the infants in the control group. Participants in the experimental group were also found to have an easier time learning feeding behaviors than the control group.

Whipple, J. (2003). Surgery buddies: a music therapy program for pediatric surgical patients.

*Music Therapy Perspectives, 21*(2), 77-83.

This program description describes a procedural support program, entitled "Surgery Buddies" that the author uses with hospitalized pediatric patients before they undergo procedures or surgery. The goal of this program is to decrease anxiety in pediatric patients and their family members. An assigned music therapist is

considered the child's "Buddy" when he or she has to go through a painful procedure or surgery. The author describes four unique cases of children who participated in the program, further considerations, and future program development.

Whitehead-Pleaux, A. M., Zebrowski, N., Baryza, M. J., & Sheridan, R. L. (2007). Exploring the effects of music therapy on pediatric pain: phase 1. *Journal of Music Therapy*, 44(3), 217-241.

This exploratory experimental study uses qualitative and quantitative data to measure the effects of music therapy on the heart rate, blood oxygenation level, and pain, anxiety and engagement level of nine pediatric burn patients undergoing nursing procedures. The music therapy sessions consisted of procedural support interventions including the music therapist singing and playing guitar along with the patient's preferred music. Sessions and procedures lasted between 4 and 52 minutes long. Results indicated that music therapy significantly reduced pain perception, and increased relaxation in both the patients and their parents.

Yurkovich, J., Burns, D. S., & Harrison, T., (2018). The effect of music therapy entrainment on physiologic measures of infants in the cardiac intensive care unit: Single case withdrawal pilot study. *Journal of Music Therapy*, 55(1), 62-82.

This single case withdrawal pilot study examined the effects of music therapy entrainment on heart rate, respiratory rate, blood pressure and oxygen saturation rate, of five infants suffering from congenital heart disease, in the cardiac intensive care unit. Participants received music therapy entrainment sessions

before and after heart surgery, and consistently, 3-5 times a week for up to three weeks. These physiological measures were recorded every 15 seconds after the music therapy intervention began, until 20 minutes after the intervention was complete. The study had an 80% success rate, meaning four of the five infants experienced decreases in average heart rate and respiratory rate and improvements in the derivative of the heart rate signal.

Appendix D

NICU Music Therapy Referral Form

NICU Music Therapy Referral Form

Patient name: \_\_\_\_\_ Room: \_\_\_\_\_

DOB: \_\_\_\_\_ Gestational age: \_\_\_\_\_ Diagnosis: \_\_\_\_\_

Reasons for referral (circle all that apply):

Decrease Pain      Decrease respiratory distress      Enhance neurologic development

Increase parent/infant bonding      Increase relaxation      Difficulty sleeping

Increase sucking behaviors      Increase tolerance to multimodal stimulation

Decrease crying/irritability      Procedural support      Psychosocial issues

Other (specify): \_\_\_\_\_

Additional comments: \_\_\_\_\_

Referred by: \_\_\_\_\_ Date: \_\_\_\_\_

Please return to the music therapist

Appendix E

Pediatric/Adolescent Music Therapy Referral Form

Pediatric/Adolescent Music Therapy Referral Form

Patient name \_\_\_\_\_ Room: \_\_\_\_\_

DOB: \_\_\_\_\_ Age: \_\_\_\_\_ Grade in school: \_\_\_\_\_

Admitting Diagnosis: \_\_\_\_\_

Reason for referral (circle all that apply):

- Decrease pain            Decrease respiratory distress            Increase relaxation
- Decrease stress/anxiety            Decrease depression            Emotional support
- Enhance coping abilities            Increase self-esteem            Improve mood
- Increase socialization            Increase self-expression            Procedural support
- Increase stimulation/engagement            Improve motor skills            Improve cognitive skills
- Increase quality of life            Other: \_\_\_\_\_

Musical activities patient participates in: \_\_\_\_\_

\_\_\_\_\_

Musical preferences: \_\_\_\_\_

Additional Comments: \_\_\_\_\_

Referred by : \_\_\_\_\_ Date: \_\_\_\_\_

Please return to the music therapist

Appendix F

NICU Music Therapy Assessment Form

NICU Music Therapy Assessment Form

Patient name:                      DOB:                      Gestational age:                      Diagnosis:

Reasons for referral: \_\_\_\_\_ Physical domain: \_\_\_\_\_

Psychosocial/family domain: \_\_\_\_\_ Developmental domain: \_\_\_\_\_

Pre music therapy vitals:    HR\_\_\_\_\_                      O2 sat\_\_\_\_\_                      RR\_\_\_\_\_

Post music therapy vitals:    HR\_\_\_\_\_                      O2 sat\_\_\_\_\_                      RR\_\_\_\_\_

Specific stimulation provided and infant’s responses:

Auditory: \_\_\_\_\_

                    Response: \_\_\_\_\_

Tactile: \_\_\_\_\_

                    Response: \_\_\_\_\_

Vestibular: \_\_\_\_\_

                    Response: \_\_\_\_\_

Visual: \_\_\_\_\_

                    Response: \_\_\_\_\_

Music therapy goals: \_\_\_\_\_

Previous musical exposure: \_\_\_\_\_

(continued)

Appendix E. NICU Assessment Form (continued)

Parent/caregiver's musical preferences: \_\_\_\_\_

Length of session: \_\_\_\_\_ Date/time of assessment: \_\_\_\_\_

Appendix G

Pediatric/Adolescent Music Therapy Assessment Form

Pediatric/Adolescent Music Therapy Assessment Form

Patient name \_\_\_\_\_

DOB: \_\_\_\_\_ Age: \_\_\_\_\_ Grade in school: \_\_\_\_\_

Date of hospital admission: \_\_\_\_\_ Admitting Diagnosis: \_\_\_\_\_

Reasons for referral: \_\_\_\_\_

Domains:

Physical: \_\_\_\_\_

Cognitive: \_\_\_\_\_

Social/emotional: \_\_\_\_\_

Family: \_\_\_\_\_

Spiritual: \_\_\_\_\_

Musical: \_\_\_\_\_

Additional comments describing assessment session: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Music Therapy Goals: \_\_\_\_\_

Length of session: \_\_\_\_\_ Date/time of assessment: \_\_\_\_\_