

Proposal for Neonatal Intensive Care Unit Music Therapy Program at

Brookdale University Hospital Medical Center

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PROPOSAL FOR NEONATAL INTENSIVE CARE UNIT MUSIC THERAPY PROGRAM
AT BROOKDALE UNIVERSITY HOSPITAL MEDICAL CENTER

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Introductory Statement

The following is a proposal for the implementation of a music therapy program in the Neonatal Intensive Care Unit (NICU) at Brookdale University Hospital. This proposal provides the rationale for instituting a NICU music therapy program and details the content of the program including services provided, treatment methodology, documentation, required resources, projected outcomes, and evaluation. Recommendations are provided for the qualifications, responsibilities, and integration of a full-time music therapist into the NICU team. The aim of this proposal is to demonstrate the multitude of benefits that a music therapy program will offer the NICU at Brookdale, and provide a feasible plan for its initiation. The inclusion of music therapy services in the treatment modalities offered by the Brookdale NICU will demonstrate a commitment to innovative, family-centered care, and to the mission and core values of the One Brooklyn Health hospital system.

Statement of Need

Brookdale University Hospital Medical Center NICU

Founded in 1921, Brookdale University Hospital manages around 2,000 deliveries every year (Neonatal/Perinatal Division, 2018). The Neonatal/Perinatal Division offers a well baby nursery, and a Neonatal Intensive Care Unit (NICU) for premature and medically complex newborns. The New York State Department of Health designates four levels of perinatal care from Level I Perinatal Centers, which serve low-risk mothers and newborns and do not have NICUs, to Regional Perinatal Centers, which provide care to the most medically complex cases in the geographical area. The NICU at Brookdale is a Level III perinatal center staffed by an integrated team of neonatal professionals including neonatologists, perinatologists, nurses,

physicians, respiratory therapists, physical therapists, lactation consultants, social workers, and other specialists. The NICU at Brookdale offers a variety of services including high-frequency ventilation, pediatric surgery, and a family support group (Neonatal/Perinatal Division, 2018).

Definition and Philosophy of Music Therapy

Music therapy is a health and human service profession that has been practiced and documented in the United States since the post-WWII era. It is defined by the American Music Therapy Association (AMTA) as “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” (“Definitions and Quotes About Music Therapy,” 2020a). Following the completion of an approved academic program and music therapy internship, music therapists are eligible to earn board-certification by sitting for an examination administered by the Certification Board for Music Therapists (CBMT). Upon passing this examination, therapists earn the professional credential, MT-BC, Music Therapist-Board Certified (CBMT, 2011).

Music therapists work in a variety of settings including hospitals, schools, nursing and rehabilitation centers, psychiatric facilities, residential programs, community centers, and in private practice (AMTA, 2020b). Music therapy can serve a range of populations including, but not limited to: children and adults with diagnoses like autism, cerebral palsy, dementia, and Alzheimer’s; those in intensive, acute, and subacute medical care; children and adults in palliative and hospice care; people recovering from neurological trauma; children with learning and attention disorders; people with psychiatric conditions; and those seeking psychotherapy services (AMTA, 2020b). Many of these areas of practice utilize highly specialized approaches

and require additional post-graduate training. In the state of New York, many treatment settings require the therapist to hold a master's degree in music therapy, and licensure as a Licensed Creative Arts Therapist (LCAT) (Office of the Professions, 2017).

This proposal focuses on the implementation of a music therapy program in the neonatal intensive care unit (NICU), and is grounded in a medical music psychotherapy model (Loewy, 2013; Loewy & Scheiby, 2001; Scheiby, 2013). Medical music therapy was developed by music therapists working in hospital and rehabilitation settings to address the specific needs of patients and their families. Medical music therapy utilizes evidence-based interventions to support people undergoing medical treatment. Medical music therapy may address psychological distress, support painful procedures, and help normalize the hospital experience (Ghetti, 2012).

There is a great deal of research in a multitude of pediatric settings including neonatal intensive care units (NICU), pediatric intensive care units (PICU), general pediatrics and medical/surgical units, hematology, oncology, transplant, burn units, and in pediatric palliative care (Clark, Siden, & Straatman, 2014; Hanson-Abromeit & Colwell, 2008). Literature on the effectiveness of music interventions in pediatric settings has been published in a variety of academic journals such as *Issues in Perinatal Care*, *Frontiers in Behavioral Neuroscience*, *The American Journal of Hospice and Palliative Care Medicine*, *The Infant Mental Health Journal*, *The Journal Of Obstetric, Gynecologic, And Neonatal Nursing*, and *Pediatrics*. Literature on music therapy theory, research, and practice is also published by The American Music Therapy Association with Oxford University Press, *The Journal of Music Therapy*, *Music Therapy Perspectives*. International music therapy journals include the *Nordic Journal of Music Therapy* and the *Australian Journal of Music Therapy*, and *Music and Medicine*, the official journal of

The International Association for Music in Medicine, an interdisciplinary publication devoted to research on the applications of music in healthcare settings.

Music therapy models have also been developed to address mental health concerns. Music psychotherapy encompasses the integration of music experiences with traditional forms of verbal psychotherapy, namely psychoanalytic and psychodynamic approaches (Bruscia, 1998). Bruscia (1998) defines music psychotherapy as “the use of music experiences to facilitate the interpersonal process of therapist and client as well as the therapeutic change process itself” (p. 2). Bruscia details the range of music psychotherapy approaches from those that focus on the verbal processing of the music as the agent of change, to those which consider the musical experience itself as the main agent of change. An essential component of music psychotherapy, the therapeutic alliance, is the relationship that develops between the client, the therapist, and the music. This therapeutic alliance provides a structure for clients to examine their self-concept and gain insight, to explore unconscious material, difficult memories and emotions, to gain awareness of interpersonal relationships, and to identify personal resources for coping (Scheiby, 2013). Therapists and clients might recreate or move to meaningful songs (Mondanaro, 2016), analyze lyrics (Dvorak, 2017), engage in instrumental or vocal improvisation (Scheiby, 2010), or compose original music to explore and process personal content (Ettenberger, & Beltrán Ardila, 2018). Loewy (2000) offers a music psychotherapy assessment tool through which therapists can translate features of the musical experience with a client into a descriptive narrative of their presenting needs and resources.

Medical music psychotherapy integrates these two areas of practice, medical music therapy and music psychotherapy, to address the patient as a whole person. Rather than

compartmentalizing a patient's needs as either physical or psychological, this approach is rooted in a biopsychosocial perspective on health and wellness (Dileo, 1997). Medical music psychotherapy postulates a dynamic interaction between the physical, psychological, and social domains, all of which contribute to overall health (Loewy, 2013; Loewy & Scheiby, 2001; Scheiby, 2013).

Medical music psychotherapy considers the patient not only in the context of the hospital, but who they are in the context of their family and friends, their profession, their community and culture. As Mondanaro (2016) noted, serious illness poses a threat to one's fundamental identity, and the medical paradigm, mainly focused on physical status, can increase the risk of psychological distress in patients. Music therapists can incorporate culturally specific musical elements to support the affirmation of identity and resilience. Mondanaro (2016) draws on family systems theory and self-affirmation theory to demonstrate that music therapists are uniquely equipped to support holistic wellness:

Music therapists' attendance to music as an important facet of culture, identity, and family lineage may imminently contribute to a shift in hospital culture from one focused on symptoms to one that considers the unique aspects of each person, within the context of their illness and care. (p. 155)

Medical music psychotherapy encourages the use of a variety of methods to address physical, cognitive, emotional, social, and spiritual health in a creative and constructive way (Loewy & Scheiby, 2001). An understanding of family dynamics and each member's unique personal history are essential to the informed provision of appropriate services, especially in the context of pediatric care. The medical music psychotherapy model is consistent with the

family-centered care model, which has become a widely practiced approach in modern medicine, particularly in neonatal intensive care (Smith, 2018). Literature on the role and contributions of music therapy in family-centered care will be discussed in sections to follow.

Neonatal Intensive Care and Music Therapy

Preterm birth is defined by the World Health Organization (WHO, 2018), as birth prior to 37 weeks gestation. Babies born at 32 to 37 weeks are considered moderate or late preterm, those born at 28 to 32 weeks are considered very preterm, and babies born prior to 28 weeks are considered extremely preterm (WHO, 2018). Complications from preterm birth are the leading cause of death for children under the age of five. Globally, it is estimated that 15 million babies are born preterm each year, about one in ten births (WHO, 2018). According to the March of Dimes (2018), 9.93% of babies were born preterm in the United States in 2017, with numbers as high as 13.6% in some states. These figures show an increase in U.S. preterm births over the last three years (March of Dimes, 2018).

Recent years have also seen significant advancements in neonatal intensive care in the United States. Survival rates for preterm infants born at 24 weeks increased from 52% in 1993 to 65% in 2012 (Stoll et al., 2015). However, the innovative, life-saving care available for preterm and medically complex newborns in NICUs today represents a massive expenditure burden for medical facilities, insurance providers, and families. In 2013, care for preterm infants through the first year of life cost employer-sponsored healthcare plans an average of \$47,100 per baby, and \$600 million in total, with higher figures for infants born with significant defects, \$78,000 per baby, and \$14 billion in total (Grosse, Waitzman, Yang, Abe, & Barfield, 2017). Care for low birthweight infants alone is estimated at \$4 billion, making up 35% of all neonatal care costs

annually (Richardson et al., 2001). The cost burden of NICU care falls on families as well, and financial struggles can be a major stressor for NICU parents. Parents caring for hospitalized infants are often forced to take significant time off of work, pay for childcare services for older children, and meet the various costs of their baby's care during their hospitalization and post-discharge (Lakshmanan et al., 2017; Milford, 2016).

Music therapy is an effective treatment modality that has been shown to:

- reduce medical costs in neonatal intensive care units (Haslbeck, 2012; Schwartz, 1997);
- reduce length of stay for NICU babies (Ettenberger, et al., 2017; Gooding, 2010; O'Toole, Francis, & Pugsley, 2017; Haslbeck, 2012; Standley, & Swedberg, 2011); and
- alleviate stress and anxiety in parents (Arnon et al., 2014; Ettenberger, & Beltrán Ardila, 2018; Ettenberger et al., 2017; Friedman et al., 2010; Gooding & Trainor, 2018, Loewy, Stewart, Dassler, Telsey, & Homel, 2013; Mondanaro et al., 2016, Schlez et al., 2011).

The Musical Dyad

Babies are born primed to attend to a sonic environment. By 24 weeks gestation, the human fetus has developed the sensory organs involved in auditory perception, and responses to external auditory stimuli can be consistently measured between 25 and 28 weeks (American Academy of Pediatrics, 1997). From an evolutionary perspective, the capacity of newborns to react to auditory stimulation facilitates adaptive behaviors such as eliciting attention, perceiving threat vs. safety, activating the central nervous system, and bonding to the caregiver (Bowlby, 1977; Porges, 1995). The newborn, now outside the mother, must learn to attend to auditory stimulation in the new acoustic environment, and the mother's voice provides the bridge.

There is evidence that fetuses develop a preference for their mother's voice in utero. DeCasper and Fifer (1980) used a non-nutritive sucking device with infants that produced a recording of their mother's voice, rather than another random female voice, upon sucking the mouthpiece. In a subsequent study, pregnant women sang "Mary Had a Little Lamb" to their stomachs several times a day for the last two weeks of pregnancy (Panneton & DeCasper, 1986). Neonates showed preference for the song learned in utero by working harder on the non-nutritive sucking device to produce this recording, over a recording of another song. A similar study with mothers reading a particular story in the last weeks of pregnancy showed neonates preferred the story heard prenatally, and learned to suck harder on a nonnutritive device in order to hear the mother's voice read the story, rather than a stranger's (DeCasper & Spence, 1986). Nöcker-Ribaupierre et al. (2015) demonstrated that infants who were exposed to their mother's voice on a regular basis showed improved language development at six years of age.

Newborns communicate with caregivers through bodily gestures, facial expressions, and vocalizations (Als, Tronick, Lester, & Brazelton, 1977). Wordless, or semi-wordless vocal interplay used by caregivers is referred to as infant-directed speech (IDS), described by Fernald et al. (1989) as caregivers use of high-pitched tones, short phrases, and long pauses between phrases when interacting with an infant. These speech modifications were consistent across mothers and fathers who spoke five different languages (Fernald et al., 1989). Caregiver-infant interactions like IDS have been described in the literature as inherently musical by Malloch and Trevarthen (2009). Meaning is conveyed and understood through musical qualities such as pitch contour, rhythm, dynamics (volume), timbre (tone), movements, and a shared sense of time

(Malloch & Trevarthen, 2009). Nakata and Trehub (2004) demonstrated that infants maintain attention for longer periods when caregivers employed infant-directed singing, rather than IDS.

Music therapists in the NICU have applied these concepts to clinical practice and developed interventions that enhance the social and communicative abilities of infants. Malloch et al. (2012) describe the propensity for infants and caregivers to engage in musical interactions with the term *communicative musicality*. The authors examined the effects of an intervention called contingent singing with infants in the NICU and found that those who received the intervention were less irritable, more open to physical contact with adults, and able to maintain self-regulation during interactions with adults longer than the control group (Malloch et al., 2012). Contingent singing, developed by Shoemark (2014), is an intervention in which the therapist improvises vocal responses to the physical, facial, and vocal gestures of the infant to stimulate reciprocal social interaction, and improve neurodevelopmental outcomes. This intervention has also been shown to support the rehearsal of mutual regulation between the infant and the caregiver, and has been implemented in psychoeducational programs aimed at empowering parents through interaction with their hospitalized infants (Shoemark, 2006, 2017b). Haslbeck (2014) analyzed parent interviews and video footage of live music therapy in the NICU using Creative Music Therapy (CMT), an approach which also utilizes improvisation based on the rate of respiration, state of arousal, and physical and vocal gestures of the newborn. Haslbeck found that CMT may promote the development of communication skills, musicality, and self-regulatory abilities, and may empower parents to engage in meaningful interactions with their babies (2014).

The infant brain is experience dependent, requiring emotional reciprocity from caregivers for healthy development. Ham and Tronick's (2009) work in psychophysiology and relational psychology in the mother-infant dyad asserts that infants engage in modulation of social interactions: "As research demonstrates, the interactions between mothers and infants is bidirectional and infants are active intentional partners in interaction" (p. 629). This social play with caregivers allows the infant to experience what Schore (2001) called *affect synchrony*, an adjusting and matching of emotional states through reciprocal interaction. The infant begins learning how to regulate arousal through these attentive social interactions and resilience is built through the caregiver-guided transitions between negative and positive emotional states. As the caregiver acquaints the infant with their new environment and how to respond to it, they encourage neurological patterning which will eventually allow the child to independently initiate responses. When the caregiver and the infant are synchronized in a loving interaction, such as infant-directed singing, they facilitate secure attachment and healthy neurological growth (Schore, 2006).

Early Stress and Hospitalization-Induced Trauma

Babies born prematurely are thrust into an environment that is in stark contrast to the comfort and security of the mother's womb. Neonatal intensive care units are host to a myriad of stimuli that can be overwhelming to newborns, particularly to premature and medically complex infants who have not developed the self-regulatory agencies of healthy term infants (D'Agata et al., 2017; Stewart, 2009). Infants in the NICU are subject to frequent, unpredictable physical pain and discomfort from heel sticks, intubation and placement of peripheral intravenous lines, nasal cannulas and CPAP apparatuses, oral suctioning, and various other invasive procedures.

Neonates are often exposed to high levels of intrusive, disorganized sound, such as monitor beeps and alarms, loud conversation, phones ringing, and opening and closing of isolette doors. Despite recommendations from the American Academy of Pediatrics that noise levels in NICUs not exceed 45 dB (1997), studies show that NICUs are typically significantly louder at 50-80dB, and can be as high as 120dB (Darcy et al., 2008; Williams et al., 2007).

Preterm and high-risk infants are often separated from parents for long periods of time, or are too fragile to be held by parents, interrupting the crucial period of initial bonding. Parents with newborns in intensive care often experience intense feelings of guilt, shame, and fear, and research has shown that many NICU parents report symptoms of acute and posttraumatic stress, further impeding the bonding process (Barr, 2011; Roque, Lasiuk, Radünz, & Hegadoren, 2017). Positive maternal interaction has been shown to both stimulate neurological growth in networks associated with self-regulation as well as to increase cortisol reception which contributes to resilience in stressful situations (Cozolino, 2014). In cases of maternal depression, crucial social interaction with the infant can be disorganized, intrusive, or completely withdrawn (Field, 1998). Infants of depressed mothers often demonstrate dysregulation in behavior, physiology, and biochemistry, and are at greater risk of toxic stress and neurodevelopmental disorders (Field, 1998).

The medical interventions provided in the NICU are necessary for premature and medically complex newborns, however current research is demonstrating that these events are also highly stressful for the infant, and can be experienced as traumatic. Chronic stress in young children induces continuously elevated cortisol levels which has been shown to impede brain development and increase the risk of psychological dysfunction later in life (Cozolino, 2014).

Preterm infants are at greater risk of neurodevelopmental disorders, learning and behavior impairments, psychiatric disorders, and anxiety disorders (D'Agata et al., 2017). They argue that there is a pervasive lack of understanding of infant experience in the NICU. D'Agata et al. (2017) term this phenomenon Infant Medical Trauma in the NICU (IMTN), defined as “the integrated embedded cumulative early life experiences of stress, pain, and parental separation occurring in conjunction with or because of medical care that may affect short- and long-term neurobiological-neurophysiological responses and developmental outcomes” (p. 310). D'Agata et al. (2017) advocate for more thorough education of NICU staff in recognizing and responding to infant cues signaling stress, and increased psychological services for parents. Stewart (2009) postulates that music therapy can be a preventative measure for babies exposed to potentially traumatic experiences. The Preventative Approach to Traumatic Experience by Resourcing the Nervous System (PATTERNS) utilizes trauma theory to identify music therapy techniques that modulate central nervous system responses to abate the effects of hospitalization-induced trauma and build resilience (Stewart, 2009).

Music Therapy in the NICU

There are a number of specialized treatment approaches used internationally by music therapists in the NICU to interpret the cues of neonates and address their unique medical and psychosocial needs. There are two prominent NICU training programs for music therapists in the United States. The first, The National Institute for Infant and Child Medical Music Therapy at Florida State University, offers a 30-hour training course to Board-Certified Music Therapists consisting of lectures, fieldwork, and an examination to earn the designation NICU-MT (Florida State University, 2019). Pioneered by Standley, this approach is rooted in the observation of

behavioral cues from the infant and the application of appropriate levels of auditory and tactile stimulation (Standley & Walworth, 2010). Both live and recorded music therapy interventions are utilized to support medical and developmental goals of NICU infants, such as the Pacifier-Activated Lullaby (PAL) System, a device which strengthens non-nutritive sucking by playing recorded music when a pacifier is sucked with a predetermined force (Standley, 1999).

The second training program, offered by the Louis Armstrong Department of Music Therapy at Mount Sinai Beth Israel in New York City, certifies trainees in Rhythm, Breath and Lullaby Music Therapy (RBL), an approach developed by Loewy (2000) that draws heavily on attachment theory. Using live vocal and instrumental interventions, NICU music therapists are trained to recreate the sonic environment of the womb to soothe and calm distressed infants, responding and adjusting to the infant in the moment. These interventions have been shown to regulate vital signs, improve sleep and feeding, enhance bonding, and support the psychosocial well-being of caregivers (Loewy et al., 2013). A detailed description of the RBL approach follows in later sections.

Music therapy in the NICU is a well-positioned specialty to address the physiological symptoms of premature and medically complex infants, provide developmentally-appropriate stimulation and psychosocial interaction, offer psychoeducative and psychotherapeutic services for parents, support NICU staff, and modulate the sound environment to promote health and well-being for all individuals on the unit. The effects of music interventions with infants in neonatal and pediatric intensive care have been documented in over 20 years of international practice and research (Standley, 2012b). The table below shows literature demonstrating positive impact on a myriad of physiological factors for NICU infants.

Table 1	
<i>Benefits of Music Therapy in the NICU</i>	
<u>Clinical goal</u>	<u>References</u>
Regulate heart rate	Arnon et al., 2014; Arnon et al., 2006; Del Olmo, et al., 2010; Garunkstiene et al., 2013; Loewy et al., 2013
Regulate respiration	Arnon et al., 2014; Bieleninik et al., 2016; Del Olmo et al., 2010; Loewy, et al., 2013
Improve oxygen saturation	Arnon et al., 2014; Del Olmo, et al., 2010; Loewy et al., 2013
Enhance restful sleep	Arnon et al., 2006; Loewy et al., 2013
Improve suck & feeding	Loewy, et al., 2013; Standley, 2012a, 2012b
Improve weight gain	Ettenberger et al., 2017; Loewy et al., 2013; Standley, & Swedberg, 2011
Prolong quiet-alert state	Loewy et al., 2013
Sustain attention	Nakata & Trehub, 2004
Improve cognition and motor function	Hamm, Chorna, Flanery, & Maitre, 2017
Maintain self-regulation and mutual regulation with adults longer	Malloch et al., 2012; Shoemark, 2006

Music Therapy as Part of Family-Centered Care

Family-centered care is an interdisciplinary approach to medicine that considers the well-being of the family unit as integral to that of the patient. A family-centered care approach recognizes the unique experience of each family member in the treatment process, and places the needs, perspectives, and values of the family at the center of the decision-making process (Gooding et al., 2011). Despite 60 years of available practice and literature on family-centered care, Smith (2018) has shown there is a serious lack of understanding among pediatric professionals about the practical implementation of these concepts. Smith asserts that the highly specialized medical environment, the multitude of equipment needed, and the intensity of the workflow in NICUs can create an atmosphere that is intimidating and uncomfortable for families. Baylis et al. (2014) identified the design of the NICU itself and the routines of staff as having a direct impact on crucial, first-time events between parents and their babies.

Many of the most frequently utilized clinical care guidelines and tools for evaluating the development of infants in the NICU, such as The Newborn Individualized Developmental Care and Assessment Plan, advocate for the education and inclusion of parents in activities of daily care such as feeding, diapering, and taking temperature (Als & Butler, 2008; Als, Butler, Kosta, & McAnulty, 2005; Als, Tronick, Lester, & Brazelton, 1977). However, simply including parents in these activities is not always enough; it is *how* parents are included. NICU parents have reported their perception of their baby's care being positively influenced by staff providing clear explanations, using a gentle tone of voice, and being affectionate with their babies (Guillaume et al., 2013). Music therapists can be key collaborators in building relationships between clinical staff and family members.

Music therapists in NICU settings are equipped to address the health of the infant and the family as a whole. Music therapists in the NICU who have received advanced training are able to provide psychotherapeutic services for parents and family members who are struggling with the challenges of having a baby in intensive care. Through interventions like psychoeducation, therapeutic music listening, creating music through playing and singing, lyric analysis, and songwriting, music therapists in the NICU can work with families to reduce stress and anxiety (Arnon et al., 2014; Bieleninik et al., 2016; Ettenberger & Beltran Ardila, 2018; Ettenberger et al., 2017; Gooding & Trainor, 2018; Loewy, 2015; Schlez et al., 2011) and empower parents to interact with their infants (Loewy et al., 2013; Mondanaro et al., 2016; Shoemark, 2017a, 2017b). By utilizing parent-preferred music, music therapists incorporate the family's cultural background and support their unique ways of relating to and bonding with their newborn (Gilad & Arnon, 2010; Loewy, 2015; Mondanaro et al., 2016). There is considerable evidence that music therapy can enhance caregiver-infant bonding by helping parents to relax, detach from distractions, and focus on the infant. This can be particularly effective in tandem with kangaroo care (Abad & Edwards, 2004; Edwards, 2011a, 2011b; Ettenberger et al., 2017; Haslbeck & Stegemann, 2018).

Detailed Description of Program

The proposed NICU Music Therapy Program at Brookdale University Hospital Medical Center will be grounded in the Rhythm, Breath, and Lullaby model (RBL) (Loewy, 2000). Developed at the Louis Armstrong Department for Music and Medicine at Mount Sinai Beth Israel, the Rhythm, Breath and Lullaby model of music therapy aims to recreate the auditory environment of the womb to soothe physical and psychosocial distress in newborns (Loewy,

2000, 2015; Loewy et. al, 2013). RBL utilizes a three-pronged approach to treatment: 1) interventions that address the health of the baby, 2) interventions that address the health of the family, and 3) those that address the health of the NICU environment. The model is rooted in principles of bonding and attachment theory, and research on the prenatal auditory experience.

Interventions for Infants

The RBL approach consists of musical interventions using instruments specially developed for use with premature and medically complex babies. The First Sounds; Rhythm, Breath, and Lullaby kit available through Remo includes an ocean disc, a gato box, and a handy carrying case for transportation on the unit (West Music, 2019). The figure below displays the contents of the kit and a description of the cost and suggested vendors are available in the Financial Justification section that follows.



Figure 1. Remo First Sounds: Rhythm, Breath and Lullaby Kit.

Respiratory and sleep support. The ocean disc is a shallow drum-shaped instrument containing small metal balls which roll across a padded surface to simulate the sound of waves, or amniotic fluid, when gently turned. Apnea, respiratory distress syndrome (RDS), and

bronchopulmonary dysplasia (BPD) are all highly common respiratory issues for infants born premature or with compromised lung function (American Academy of Pediatrics, 2019). The ocean disc has been shown to regulate respiration and increase oxygen saturation (Loewy et al., 2013). Music therapists in the NICU are trained to observe the respiratory rate of the infant and then entrain, or match, the turning of the disc to the rhythm of the breath (Loewy, 2009, Stewart, 2009a). Once the therapist and the baby are entrained, the therapist gradually slows the rate of the turns, reducing the rate of respiration, soothe the infant to sleep, and increase restful sleep (Loewy et al., 2013).

Cardiac and feeding support. The gato box is a rectangular wooden drum with two tones a major third apart, which simulates the mother's heartbeat when tapped with the fingers. To address bradycardia or elevated heart rate, the music therapist first observes the infant's heart rate on the monitor and entrains to it. The therapist then plays the gato box, the higher tone followed by the lower tone, at half the rate of the baby's heart rate. A healthy newborn's heart rate is around 120-160 beats per minute, about twice as fast as the typical adult (Stanford Children's Health, 2019). This intervention mimics the mother's heart rate, which was heard in utero, to soothe physiological distress. The gato box has also been shown to stimulate the suck response and support feeding (Loewy et al., 2013). Eating too fast can produce gastrointestinal discomfort. Entraining the gato box to the baby's suck and maintaining a steady beat provides an auditory cue for the baby to pace the suck-swallow-breathe pattern and has been shown to increase sucking behaviors (Loewy et al., 2013).

Calming and soothing. RBL also incorporates the use of breath sounds and tonal vocal holding, a technique in which the therapist uses long, steady vowel sounds to calm and soothe

infants (Loewy, 2009). The music therapist first matches the pitch and tone of the baby's cry, echoing the sounds back to the infant to create a sense of being heard. The therapist then gradually slows and elongates their tones, creating a blanket of comforting, relaxing sound around the baby (Abrams et al., 2000). When the infant is calm, or transitioning to sleep, the therapist removes the vocal stimulus and transitions to slow, smooth, audible breath sounds, entraining to the baby's respiration rate to help them further relax (Loewy et al., 2013).

Lullaby. A central component of RBL is the use of the "song of kin", or parent-preferred music adapted to serve as a lullaby for the infant (Loewy, 2015). Research has shown that the use of music that is meaningful to the parents results in better outcomes for the baby than common nursery rhymes, such as increased caloric intake during feeding (Loewy et al., 2013). Parents can choose a song from their childhood, a song that is sentimental to them like a wedding song, or any song that conveys a loving message to their child. The song of kin does not need to be a traditional lullaby, or even a ballad. Music therapists in the NICU are able to take music from any genre and transform it into a lullaby by slowing the tempo, changing the meter of the song to a three-beat pattern that simulates rocking, choosing a single verse or chorus to repeat, or adding the baby's name in the lyrics (Loewy, 2015).

Social stimulation. To meet the psychosocial needs of hospitalized newborns NICU music therapists can incorporate infant-directed singing into their practice (Haslbeck, 2012, 2014; Nakata & Trehub, 2004; Shoemark, 2006, 2008; Shoemark & Grocke, 2010). As previously stated, contingent singing is a music therapy technique in which the therapist responds to the movements, facial expressions, and vocal gestures of the infant in an improvisatory way (Shoemark, 2014). This mirroring and responding of the infant's expressions

promotes reciprocal interaction, a conversation-like, mutual regulation experience between the therapist and infant (Shoemark, 2014, 2017b). Engaging the infant in this musical interaction supports psychosocial wellbeing, neurobehavioral development, and self-regulation (Hamm et al., 2017; Malloch et al., 2012; Shoemark, 2012, 2018).

Interventions for Family Members

Bonding support. As previously mentioned, music therapists can play an important role in helping to enhance caregiver-infant bonding. Parent-infant bonding is the first step in establishing healthy, loving attachment to the child and is crucial to the infant's physiological, neurobehavioral, and psychosocial health (Bowlby, 1977; Schore, 2006). In the unfamiliar and intensely active environment of the NICU, it can be difficult for parents and caregivers to relax and feel comfortable with their infants (Barr, 2011; Roque, Lasiuk, Radünz, & Hegadoren, 2017). Some parents may be hesitant to hold their babies or unsure of how to connect with them. In some cases, infants are too medically fragile to be held. Music therapists can support the parent-infant dyad by playing and singing their song of kin during kangaroo care or, when parents are at bedside, encouraging them to join in; therapists may even help parents to compose their own lullabies (Abad & Edwards, 2004; Edwards, 2011; Ettenberger & Beltran Ardila, 2018; Haslbeck & Stegemann, 2018; Mondanaro et al., 2016; Schlez et al., 2011).

Psychoeducation for parents and caregivers. One of the most important aspects of the music therapist's role in the NICU is educating parents and caregivers about the power of their own voices, heartbeats, and breath sounds, and teaching techniques they can use on their own and after the baby is discharged (Shoemark, 2017a, 2017b; Shoemark & Dearn, 2008). As medical music therapy is considered an advanced area of practice, postgraduate training is

required for music therapists to be educated about the prenatal auditory experience and able to share information with NICU parents (Hanson-Abromeit, Shoemark & Loewy, 2009). Music therapists can teach parents to position their infant over the left side of their chest to better hear the heartbeat during kangaroo care, to use contingent singing to communicate with them, tonal vocal holding to calm and soothe, and to employ their own breath sounds to help the baby relax and transition to sleep (Loewy, 2009; Shoemark, 2017a, 2017b). This knowledge can help parents and family members feel more confident and empowered to interact with their babies (Clark, Siden, & Straatman, 2014; Ettenberger, & Beltrán Ardila, 2018; Loewy, 2015; Whipple, 2000).

Psychosocial support for families. The experience of having a newborn in intensive care can be extremely distressing for parents, siblings, and all family members involved in the baby's life. Music therapists with postgraduate training in counseling and psychotherapeutic approaches can offer services to help individual family members, or the family as a whole, process their feelings and decrease stress and anxiety (Arnon et al., 2014; Bieleninik et al., 2016; Ettenberger & Beltran Ardila, 2018; Ettenberger et al., 2017; Gooding & Trainor, 2018; Loewy, 2015; Schlez et al., 2011). Through collaboration with others like Child Life specialists, music therapists can also help to include siblings who may be having a hard time understanding or processing the baby's hospitalization, or those who are unable to enter the unit with the family (Abrams et al., 2000). Through the use of recording technology, music therapists can help siblings record a lullaby or favorite song which can be played to the baby at bedside (Standley & Walworth, 2010).

It is common for music therapists to be referred to cases that are considered high-need by the medical team, such as families of infants who are critically ill and those who are having extreme difficulty coping as a result of anxiety or other mental health concerns (Gooding & Trainor, 2016). Music therapy has been shown to be an effective treatment modality for pregnant and postpartum women living with depression, bipolar disorder, schizoaffective disorder, schizophrenia, and psychosis (Friedman et al., 2010).

Palliative and end-of-life care. Music therapists can also play a crucial role in providing holistic support for families with infants receiving palliative care or those who are facing the end of life. Musical interventions foster positive experiences by offering opportunities for patients and families to engage with each other creatively (Clark, Siden, & Straatman, 2014). Evidence shows that music therapy for children in palliative care can alleviate pain and discomfort, support family communication, even in the midst of physical and cognitive decline, and improve overall quality of life for parents (Lindenfelser, Hense, & McFerran, 2012).

Music therapists in the NICU can provide procedural support and pain relief for infants, and offer support and counseling to parents as they cope with their child's impending death (Mondanaro, Ettenberger, & Park, 2016). Music therapists can work with chaplains to provide spiritual support and musical accompaniment for religious services (Abrams et al., 2000). When an infant enters the actively dying phase, music therapists can support the family by using their musical preferences to create a soundscape that holds the space, allows for emotional expression, and provides an aesthetically peaceful atmosphere for the child's final moments of life (Ettenberger, 2017). Unfortunately, opportunities for connectivity, beauty, and ritual are often not available in end of life situations in hospital settings. As Ettenberger wrote:

Saying good-bye is often a silent and solitary act in the NICU, without music, poetry, or the presence of friends or even important family members. Rituals can thus be crucial elements during end-of-life care in the NICU and can help families to find a support, meaning and to initiate their grief process in the context of a structured and shared experience. (p.12)

Music therapists can work with families in anticipation of an infant's passing to create legacy projects like original songs or recordings of precomposed music, which serve as a transitional object to help families cope with the loss when they return home from the hospital (Clements-Cortés, 2017). Music therapy cardiography can also be utilized for legacy work. In this approach pioneered by music therapist Brian Schreck, a stethoscope microphone is used to record the child's heartbeat, which becomes the rhythmic foundation for a song of the parents' choice (Clements-Cortés, 2017). The chosen song can be played/sung by family members, or the therapist, depending on preference. This intervention has been provided to families of children in neonatal intensive care, perinatal hospice, pediatric palliative care, cardiac intensive care, and oncology units. Involving the family in the creative process provides an opportunity to feel self-efficacy and express difficult emotions. The finished songs act as a lasting and tangible item by which families can remember their loved one (Clements-Cortés, 2017).

Interventions for the NICU Environment

Support for staff. The inclusion of music therapy in the clinical services of the NICU benefits not only patients and families, but staff as well. Music therapists serve the wellbeing of the unit as a whole, which includes nurses, doctors, social workers, child life specialists, physical therapists, occupational therapists, respiratory therapists, lactation specialists, and all other staff

who care for NICU babies and their families (Abrams et al., 2000). NICU staff work under immense physical and psychological pressure, but many professionals do not receive training on how to process and recover from the emotional burden of working in the NICU (Kraemer, 2006). Research on work stress has shown that NICU nurses are at high risk for burnout and secondary post-traumatic stress, but this risk is mediated by strong social support (Barr, 2017). Music therapists can provide staff wellness groups that offer opportunities to make music, experience joy, share with colleagues about successes and challenges, and decompress from stressful work days.

Environmental Music Therapy. Patients, families, and staff alike can be negatively affected by the noise level in the NICU. While particularly dangerous for neonates, alarms and monitors, phones constantly ringing, and the conversations and movements of families and staff all can contribute to an increased sense of stress. Modulating the auditory environment of the unit can have positive effects for everyone in the area (Stewart & Schneider, 2000).

Environmental Music Therapy (EMT) is an approach in which the music therapist treats not an individual or a group, but a space as a whole (Canga, Hahm, Lucido, Grossbard, & Loewy, 2012; Rossetti & Canga, 2013; Schneider, 2005). This is achieved by a music therapist listening intently to the existing sounds in a public space and improvising music around these sounds to create a more pleasing soundscape. They can draw upon precomposed music as well to incorporate the preference of staff (Rossetti & Canga, 2013).

Financial Justification

Proposed Budget

A NICU music therapy program at Brookdale University Hospital Medical Center can be implemented with relatively low startup expenses. The following budget includes an itemized table of the necessary materials, a description of the NICU music therapist’s salary and benefits, and a budget line for maintenance of materials.

Initial cost for materials. The following table details the materials required to implement a NICU music therapy program, the cost per item, and suggested vendors. A reference list is provided in Appendix A.

Table 2		
<i>Required Materials and Suggested Vendors</i>		
<u>Item</u>	<u>Cost</u>	<u>Suggested Vendor</u>
Yamaha CGS104A Classical Guitar	\$139.99	West Music
On-Stage GBC4770 Deluxe Classical Guitar Gig Bag	\$35.95	West Music
Remo DP-FSRK-00 First Sounds Rhythm, Breath and Lullaby Kit: Gato Box, Ocean Disc, & Backpack	\$246.90	West Music
Apple iPad 10.2 inch display	\$329.00	Apple
Thinklabs One Digital Stethoscope	\$499.00	Thinklabs
Total:	\$1,250.84	

Salary and benefits. The NICU music therapist would be a full-time line staff position. According to ZipRecruiter (2019), the average salary for a music therapist in New York City is \$58,281.00 per year. It is recommended that the NICU music therapist starting salary fall within

the same range as the art therapist currently employed by Brookdale, \$52,000.00-\$57,000.00 per year as reported by Glassdoor (2019). It should be noted that according to the Society for Human Resource Management, the average cost per hire for companies in the United States is \$4,129.00, as reported in the Human Capital Benchmarking Survey (2016).

As with many employees within the One Brooklyn Health System, this position would require membership to 1199 SEIU United Healthcare Workers East. Benefits would be provided through the 1199 Greater New York Fund. As a full-time employee, the NICU music therapist would qualify for Eligibility Class I. The Greater New York Fund provides eligible members with medical, prescription, dental, and vision coverage, paid time off, disability, and retirement benefits with little or no copays for most services. 1199 SEIU provides a full summary plan description via PDF on their website (2017).

Hiring Plan

Requirements and responsibilities of the NICU music therapist. It is recommended that the NICU music therapist employed by Brookdale University Hospital Medical Center must meet the following requirements:

- hold a Master's Degree in music therapy;
- hold current certification as an MT-BC (Music Therapist-Board Certified);
- hold current licensure as an LCAT (Licensed Creative Arts Therapist), or achieve Limited Permit status within one year of hire;
- one year of experience providing music psychotherapy preferred;
- one year of experience in an acute care setting preferred; and

- have completed, or must complete within a year of hire, Rhythm, Breath and Lullaby Music Therapy Training from the Louis Armstrong Center for Music & Medicine;.

It is recommended that the NICU music therapist employed by Brookdale University Hospital Medical Center maintains the following responsibilities:

- maintain a full-time (35 hour) weekly work schedule;
- review the unit census daily upon arrival and prioritize work independently;
- provide individual sessions for infants referred to music therapy;
- provide individual, dyad, and group sessions for family members;
- provide opportunities for family members to record music for their infant;
- provide a staff wellness group at least once per month;
- provide Environmental Music Therapy on the unit at least 2-3 times per week;
- maintain an active caseload and chronological documentation of referrals;
- maintain detailed documentation of referrals, assessments, chart notes, and evaluations in the infant's chart;
- regularly review chart notes of physicians, nurses, physical, occupational, and respiratory therapists, and all other members of the infant's care team;
- collaborate with other members of the infant's care team such as Social Work, Child Life, and Chaplaincy as needed on an individual case basis, and for special events such as holiday celebrations and memorial services;
- attend and participate in weekly discharge rounds;
- offer in-service presentations for NICU staff on music therapy once per quarter;
- offer parent information sessions on music therapy once per quarter; and

- review emergent literature on NICU music therapy.

Recruitment Strategy and Projected Timeline

As a current employee of Kingsbrook Jewish Medical Center (JKMC) and One Brooklyn Health, I am the ideal candidate to spearhead the development of a NICU music therapy program at Brookdale. During my graduate studies in music therapy at the State University of New York at New Paltz, I was an intern in the NICUs of Mount Sinai Hospital and Mount Sinai West. At the time, I completed the Rhythm, Breath, and Lullaby NICU Music Therapy training. This experience afforded me the opportunity to learn and apply the RBL approach in practice with medically complex and high-risk infants and their families, participate as a member of the interdisciplinary team, engage in clinical music therapy research, and provide staff education about the benefits of music therapy through in-service presentations.

In January of 2019, I came on board as the pediatric recreation therapist serving medically complex residents ages 0-22 at Rutland Nursing Home. Rutland Nursing Home at KJMC offers a 32-bed specialty pediatric unit for sub-acute, long-term, and respite care, and is the only program of its kind in the borough of Brooklyn. Common diagnoses of our residents include, but are not limited to: anoxic brain injury; traumatic brain injury; seizure disorders; chromosomal disorders; cerebral palsy; failure to thrive; neurodevelopmental disorders including intellectual disabilities, autism spectrum disorder, and Rett syndrome; congenital heart disease; chronic respiratory illness; immunodeficiency syndromes; sickle cell disease; hydrocephalus; cystic fibrosis; metabolic disorders; and feeding disorders including sensory food aversion. In this position, I provided a breadth of therapeutic programming including music therapy groups and 1:1 sessions. Much of my work drew upon the principles of the RBL method and I found

that many of the interventions could be adapted to meet the needs of residents far beyond infancy.

In November of 2019 I accepted the position of Assistant Director of Child Life and Young Adult Programs. With this new title came a host of new responsibilities beyond direct patient care including: developing new therapeutic programming; strategizing for future expansion and advancement of clinical services; overseeing clinical training, vocational, and volunteer programs; assisting with marketing and outreach initiatives; and working directly with the Admissions Department to review incoming referrals, coordinate Comprehensive Care Plans, and collaborate with social workers and case managers at every major hospital in the New York City area. This position has allowed me to expand my skill set and deepen my knowledge of healthcare administration and program development.

Given the processing time required to create a new 1199SEIU position, the projected hiring timeline would be between six months and one year. Following the approval of the implementation of a NICU music therapy program in the 2021 budget, negotiations for the exact job description, salary, and benefits package would begin with the new fiscal year on October 1, 2020 with the aim of posting the position by the beginning of the second quarter (January 1, 2021). Following protocol, the position would be posted internally through the One Brooklyn Health Careers Page and various job boards within Brookdale University Hospital Medical Center for one month before the position would be advertised externally. The interview and selection process would ideally be completed by the third quarter.

Course of Treatment

Documentation. All referrals, assessments, session notes, and discharge summaries must be documented and entered into the infant's chart in the appropriate format and signed with the therapist's name, credentials, and office extension. Sample documents can be found in Appendix B-E.

Referral. Referrals for music therapy typically come from attending physicians, nurses, social work, child life, and chaplaincy, but anyone on the infant's care team may make a referral. Parents and family members may make requests for music therapy services to a member of their care team, or directly to the music therapist. It is the responsibility of the music therapist to keep a chronological record of referrals to ensure families receive services in a timely manner.

Referral forms should be available on the unit as hard copies in a mailbox provided for the therapist. The referral form contains the identifying information for the infant including name, date of birth, gestational age at birth, corrected gestational age, their medical status, and presenting needs. The referral form also contains space to identify family members and their presenting needs. For an example of the referral form, please see Appendix B. The music therapist may also accept referrals via email but an official referral form should be completed and charted.

Criteria for referral.

- Infant must be at least 32 weeks corrected gestational age. Referrals for infants less than 32 week must come directly from the attending physician.
- Infant must require support in one or more of the following areas: respiratory, cardiac, feeding, sleep, procedural, psychosocial, family bonding, calming/soothing irritability.

- If the infant is less than 32 weeks, the family can still be referred for services. Individual sessions with the infant may begin when the baby has reached 32 weeks, or when deemed appropriate by the attending physician.

Assessment. Once a baby or family has been referred to music therapy, the therapist must review the infant's medical chart and complete a music therapy assessment. The first portion of the assessment documents relevant identifying and medical information including name, date of birth, gestational age at birth, corrected gestational age, their diagnoses, medications, type of feeding, any respiratory support they are on, other therapies and support services they are receiving, and any ongoing procedures. The assessment also gathers important demographic information about the parents and family such as names, primary language, relevant medical information, religious affiliations, and their song of kin.

The second portion of the assessment is completed at bedside to evaluate each infant's unique responses to various musical interventions. The music therapist provides the ocean disc, gato box, and tonal vocal holding. Narrative notes are taken on the baby's responses to each intervention, along with average vital signs. Once the assessment is completed, it is charted. For an example of the assessment form, please see Appendix C.

Treatment implementation. Following the completion of the assessment, the baby and/or family may receive music therapy on a regular basis. It is the responsibility of the therapist to prioritize their session work based on a number of factors: the amount of babies on their caseload awaiting assessments, the medical status of each baby, any major procedures a baby is undergoing that day, the time of day and sleeping/eating routines, the visitation routines of each family, and the general activity level on the unit.

Evaluation. When the infant is nearing discharge from the unit, or following the passing of an infant, the music therapist completes a discharge summary which describes the nature of the services the infant and family received, the trajectory of the treatment, and the final outcomes. A detailed description should be given of the baby's medical status at the time of the assessment and any major changes that occurred over the course of treatment. The therapist should offer their professional impressions of the outcomes of music therapy on the infants and the family. The therapist may choose to include brief vignettes of particularly important sessions, quotes from family members, or staff regarding the impact of music therapy on the baby's care. The discharge summary should be entered into the baby's chart. A sample document is provided in Appendix D.

Outcomes and Assessment

Outcome measures and assessment of program. Upon discharge from services, all families who received music therapy during the course of their child's NICU stay will be given the opportunity to provide anonymous feedback through a caregiver satisfaction survey. A sample of this survey can be found in Appendix E. Responses will be analyzed and summarized by members of the Education and Research Division at six months and one year following implementation of the program, and the results disseminated to the Executive Leadership Team and the Directors of Neonatal/Perinatal Medicine.

Professional development and research. The music therapist in the NICU maintains the responsibility to stay apprised of relevant publications and literature pertaining to the theory, practice, and research of NICU music therapy. The therapist must participate in continuing education experiences such as workshops, symposia, and trainings in accordance with the

retention of the MT-BC credential. Additionally, the NICU music therapist is encouraged to attend regional and/or national conferences to support their own professional development.

Conclusion

The provision of music therapy in the NICU at Brookdale University Hospital Medical Center would offer a myriad of benefits to hospitalized infants in a crucial period of development, and a time when their families may be feeling vulnerable and overwhelmed. Music therapy in the NICU would help to alleviate stress and anxiety in parents (Arnon et al., 2014; Ettenberger, & Beltrán Ardila, 2018; Ettenberger et al., 2017; Friedman et al., 2010; Gooding & Trainor, 2018; Loewy, Stewart, Dassler, Telsey, & Homel, 2013; Mondanaro et al., 2016; Schlez et al., 2011) and improve vital signs, sleep, and feeding for NICU infants (Loewy, Stewart, Dassler, Telsey, & Homel, 2013). A NICU Music Therapy Program could also reduce length of stay for NICU babies (Ettenberger, et al., 2017; Gooding, 2010; O'Toole, Francis, & Pugsley, 2017; Haslbeck, 2012; Standley, & Swedberg, 2011), and effectively reduce medical costs in the NICU (Haslbeck, 2012; Schwartz, 1997). Music therapy in the NICU has the potential to improve patient outcomes, caregiver satisfaction, and the wellness of all NICU staff. The initiation of this program would further demonstrate Brookdale's commitment to an innovative, multidisciplinary treatment approach, and to holistic, family-centered care. This proposal is submitted to the Executive Board with gratitude for its consideration.

Bibliography

- 1199SEIU. (2017). *Greater New York benefit fund* [PDF file]. Retrieved from <https://www.1199seiubenefits.org/wp-content/uploads/2017/06/Greater-New-York-Benefit-Fund-SPD.pdf>
- Abad, V., & Edwards, J. (2004). Strengthening families: A role for music therapy in contributing to family centred care. *Australian Journal of Music Therapy*, *15*, 3-17.
- Abrams, B., Dassler, A., Lee, S., Loewy, J., Silverman, F., & Telsey, A. (2000). Instituting music therapy in the NICU: A team centered approach. In J. V. Loewy (Ed.), *Music therapy in the neonatal intensive care unit* (pp. 21-37). New York, NY: The Louis & Lucille Armstrong Music Therapy Program.
- Als, H., & Butler, S. (2008). Newborn Individualized Developmental Care Assessment Program (NIDCAP): Changing the future for infants and families in intensive and special care nurseries. *Early Childhood Services: An Interdisciplinary Journal of Effectiveness*, *2*(1), 1-19.
- Als, H., Butler, S., Kosta, S., & McAnulty, G. (2005). The Assessment of Preterm Infants' Behavior (APIB): Furthering the understanding and measurement of neurodevelopmental competence in preterm and full-term infants. *Mental Retardation & Developmental Disabilities Research Reviews*, *11*(1), 94-102. doi:10.1002/mrdd.20053
- Als, H., Tronick, E., Lester, B. M., & Brazelton, T. B. (1977). The Brazelton Neonatal Behavioral Assessment Scale (BNBAS). *Journal Of Abnormal Child Psychology*, *5*(3), 215-231. doi:10.1007/BF00913693
- American Academy of Pediatrics. (1997). Noise: A hazard for the fetus and newborn.

Pediatrics, 100(4), 724-727. doi:10.1542/peds.100.4.724

American Academy of Pediatrics. (2019). Health issues of premature babies. Retrieved from:

<https://www.healthychildren.org/English/ages-stages/baby/preemie/Pages/Health-Issues-of-Premature-Babies.aspx>

American Music Therapy Association. (2020a). What is music therapy? Retrieved October 14,

2018, from <https://www.musictherapy.org/about/musictherapy/>

American Music Therapy Association. (2020b). Music therapy with specific populations: Fact

sheets, resources, & bibliographies. Retrieved October 14, 2018, from

<https://www.musictherapy.org/research/factsheets>

Arnon, S., Diamant, C., Bauer, S., Regev, R., Sirota, G., & Litmanovitz, I. (2014). Maternal

singing during kangaroo care led to autonomic stability in preterm infants and reduced maternal anxiety. *Acta Paediatrica*, 103(10), 1039-1044. doi:10.1111/apa.12744

Arnon, S., Shapsa, A., Forman, L., Regev, R., Bauer, S., Litmanovitz, I., & Dolfen, T. (2006).

Live music is beneficial to preterm infants in the neonatal intensive care unit environment. *Birth: Issues in Perinatal Care*, 33(2), 131-136.

doi:10.1111/j.0730-7659.2006.00090.x

Barr, P. (2017). Compassion fatigue and compassion satisfaction in neonatal intensive care unit

nurses: Relationships with work stress and perceived social support. *Traumatology*,

23(2), 214-222. doi:10.1037/trm0000115

Barr, P. (2011). Posttraumatic growth in parents of infants hospitalized in a neonatal intensive

care unit. *Journal Of Loss & Trauma*, 16(2), 117-134.

doi:10.1080/15325024.2010.519265

- Baylis, R., Ewald, U., Gradin, M., Nyqvist, K. H., Rubertsson, C., & Blomqvist, Y. T. (2014). First-time events between parents and preterm infants are affected by the designs and routines of neonatal intensive care units. *Acta Paediatrica*, *103*(10), 1045-1052.
doi:10.1111/apa.12719
- Bell, S. M., & Ainsworth, M. S. (1972). Infant crying and maternal responsiveness. *Child Development*, *43*(4), 1171-1190.
- Bieleninik, Ł., Ghetti, C., & Gold, C. (2016). Music therapy for preterm infants and their parents: A meta-analysis. *Pediatrics*, *138*(3), doi:10.1542/peds.2016-0971
- Bowlby, J. (1977). The making and breaking of affectional bonds. I. Aetiology and psychopathology in the light of attachment theory. An expanded version of the fiftieth Maudsley lecture, delivered before the Royal College of Psychiatrists, 19 November 1976. *The British Journal of Psychiatry*, *130*, 201-210.
<http://dx.doi.org.libdatabase.newpaltz.edu/10.1192/bjp.130.3.201>
- Bradt, J. (2008). Music entrainment for breathing regulation. In Azoulay, R. & Loewy, J. (Eds.), *Music, the breath and health: Advances in integrative music therapy*. (pp. 11-19). New York: Satchnote Press.
- Begum, E. A., Bonno, M., Obata, M., Yamamoto, H., Kawai, M., & Komada, Y. (2006). Emergence of physiological rhythmicity in term and preterm neonates in a neonatal intensive care unit. *Journal Of Circadian Rhythms*, *4*(1-7).
- Brazelton, T. (1992). Newborn parents. In Brazelton, T. (Ed.) *Touchpoints: Your child's emotional and behavioral development* (2nd ed.). (pp. 37-52). Cambridge, MA: Da Capo Press.

- Bruscia, K. E. (1998). An introduction to music psychotherapy. In K. E. Bruscia (Ed.), *The Dynamics of music psychotherapy* (pp. 1-15). Gilsum, NH: Barcelona.
- Canga, B., Hahm, C. L., Lucido, D., Grossbard, M. L., & Loewy, J. V. (2012). Environmental music therapy: A pilot study on the effects of music therapy in a chemotherapy infusion suite. *Music and Medicine*, 4(4), 221–230.
<https://doi-org.libdatabase.newpaltz.edu/10.1177/1943862112462037>
- The Certification Board for Music Therapists. (2011). CBMT. Retrieved November 3, 2018, from <http://www.cbmt.org/>
- Charpie, M. (2002). *Music therapy in the NICU: a bridge between mother and baby*. New York University, Satchnote Press.
- Clark, B. A., Siden, H., & Straatman, L. (2014). An integrative approach to music therapy in pediatric palliative care. *Journal Of Palliative Care*, 30(3), 179-187.
- Clements-Cortés, A. (2017). Brian Schreck and the preliminary effects of music therapy cardiography. *Canadian Music Educator / Musicien Educateur Au Canada*, 58(2), 34-36.
- Cozolino, L. (2014). The impact of early stress. In *The neuroscience of human relationships: attachment and the developing social brain* (2nd ed.), Norton Series on Interpersonal Neurobiology, (pp. 258-276). New York, NY: W. W. Norton & Company.
- D'Agata, A. L., Sanders, M. R., Grasso, D. J., Young, E. E., Cong, X., & Mcgrath, J. M. (2017). Unpacking the burden of care for infants in the NICU. *Infant Mental Health Journal*, 38(2), 306-317.

- Darcy, A. E., Hancock, L. E., & Ware, E. J. (2008). A descriptive study of noise in the neonatal intensive care unit. *Advanced Neonatal Care* 8(3), 165–175. Doi: 10.1097/01.ANC.0000324341.24841.6e
- Dearn, T., & Shoemark, H. (2014). The effect of maternal presence on premature infant response to recorded music. *Journal Of Obstetric, Gynecologic, and Neonatal Nursing*, 43(3), 341-350. doi:10.1111/1552-6909.12303
- DeCasper, A., & Fifer, W. (1980). Of human bonding: Newborns prefer their mother's voices. *Science*, 208(4448), 1174-1176.
- DeCasper, A., & Spence, M. (1986). Prenatal maternal speech influences newborns' perception of speech sounds. *Infant Behavior and Development*, 9(2), 133-150.
doi:<http://www.sciencedirect.com/science/article/pii/0163638386900251>
- Department of Health (n.d.). 34 Level 3 perinatal centers in new york. Retrieved October 7, 2019, from https://profiles.health.ny.gov/hospital/designated_center/Level+3+Perinatal+Center
- Del Olmo, M. J., Rodriguez Garrido, C., & Tarrío, F. R. (2010) Music therapy in the PICU 0-6 month old babies. *Music and Medicine*. 2(3), 158-166.
- Dileo, C. (1997). Reflections on medical music therapy: Biopsychosocial perspectives of the treatment process. In J. V. Loewy (Ed.), *Music therapy and pediatric pain*. (pp. 125–143). New York, NY: The Louis & Lucille Armstrong Music Therapy Program.
- Dileo, C., & Loewy, J. V. (2005). *Music therapy at the end of life*. Cherry Hill, NJ: Jeffrey Books.

- Dvorak, A. L. (2017). A conceptual framework for group processing of lyric analysis interventions in music therapy mental health practice. *Music Therapy Perspectives, 35*(2), 190–198. Retrieved from <https://libdatabase.newpaltz.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=psyh&AN=2017-56218-011&site=ehost-live>
- Edwards, J. (2005). A reflection on the music therapist's role in developing a program in a children's hospital. *Music Therapy Perspectives, 23*(1), 36-44. doi:10.1093/mtp/23.1.36
- Edwards, J. (2011a). Music therapy and parent-infant bonding. In J. Edwards (Ed.), *Music therapy and parent-infant bonding* (pp. 5-21). New York, NY: Oxford University Press.
- Edwards, J. (2011b) The use of music to promote attachment between parents and infants. *The Arts in Psychotherapy, 3*(8), 190-195.
- Edwards, J., Scahill, M., & Phelan, H. (2007). Music therapy: Promoting healthy mother-infant relations in the vulnerable refugee and asylum seeker community. In J. Edwards (Ed.), *Music: Promoting health and creating community in healthcare contexts* (pp. 154-168). Newcastle, UK: Cambridge Scholars.
- Ettenberger, M. (2017). Music therapy during end-of-life care in the neonatal intensive care unit (NICU) – Reflections from early clinical practice in Colombia. *Voices: A World Forum for Music Therapy, 17*(2). doi:10.15845/voices.v17i2.921
- Ettenberger, M., & Beltrán Ardila, Y. M. (2018). Music therapy songwriting with mothers of preterm babies in the neonatal intensive care unit (NICU) – A mixed-methods pilot study. *Arts In Psychotherapy, 58*, 42-52. doi:10.1016/j.aip.2018.03.001

- Ettenberger, M., Rojas Cárdenas, C., Parker, M., & Odell-Miller, H. (2017). Family-centred music therapy with preterm infants and their parents in the neonatal intensive care unit (NICU) in Colombia—A mixed-methods study. *Nordic Journal of Music Therapy*, 26(3), 207-234. doi:10.1080/08098131.2016.1205650
- Fernald A., Taeschner T., Dunn J., Papousek M., de Boysson-Bardies B., Fukui I. (1989). A cross-language study of prosodic modifications in mothers' and fathers' speech to preverbal infants. *Journal of Child Language*.16(3), 477–501.
- Field, T. (1998). Maternal depression effects on infants and early interventions. *Preventive Medicine*, 27(2), 200-203. doi:10.1006/pmed.1998.0293
- Florida State University (2019). National Institute for Infant and Child Medical Music Therapy. Retrieved from <https://music.fsu.edu/NICU-MT>
- Friedman, S. H., Kaplan, R. S., Rosenthal, M. B., & Console, P. (2010). Music therapy in perinatal psychiatry: Use of lullabies for pregnant and postpartum women with mental illness. *Music and Medicine*, 2(4), 219-225. doi:10.1177/1943862110379584
- Garunkstiene, R., Buinauskiene, J., Uloziene, I., & Markuniene, E. (2013). Controlled trial of live versus recorded lullabies in preterm infants. *Nordic Journal of Music Therapy*, 23(1), 71-88. doi:10.1080/08098131.2013.809783
- Ghetti, C. M. (2012). Music therapy as procedural support for invasive medical procedures: Toward the development of music therapy theory. *Nordic Journal of Music Therapy*, 21(1), 3–35. <https://doi-org.libdatabase.newpaltz.edu/10.1080/08098131.2011.571278>

Gilad, E., & Arnon, S. (2010). The role of live music and singing as a stress-reducing modality in the neonatal intensive care unit environment. *Music and Medicine*, 2(1), 18-22.

doi:10.1177/1943862109357070

Gooding, L. F. (2010). Using music therapy protocols in the treatment of premature infants: An introduction to current practices. *Arts in Psychotherapy*, 37(3), 211–214.

<https://doi-org.libdatabase.newpaltz.edu/10.1016/j.aip.2010.04.003>

Gooding, L. F. (2014). *Medical music therapy: Building a comprehensive program*. Silver Spring, MD: American Music Therapy Association.

Gooding, L. F., & Trainor, B. (2018). Working with parents in the neonatal intensive care unit: An analysis of music therapy practice in the United States of America. *Arts In Psychotherapy*, 59, 1-6. doi:10.1016/j.aip.2017.12.005

doi:10.1016/j.aip.2017.12.005

Gooding J.S., Cooper L.G., Blaine A.I., Franck L.S., Howse J.L., & Berns S.D. (2011). Family support and family-centered care in the neonatal intensive care unit: Origins, advances, impact. *Seminars in Perinatology*, 35, 20–28. doi:10.1053/j.semperi.2010.10.004

Guillaume, S., Michelin, N., Amrani, E., Benier, B., Durrmeyer, X., Lescure, S., & ... Caeymaex, L. (2013). Parents' expectations of staff in the early bonding process with their premature babies in the intensive care setting: a qualitative multicenter study with 60 parents. *BMC Pediatrics*, 13(18), 1471-2431. doi:10.1186/1471-2431-13-18

Grosse, S. D., Waitzman, N. J., Yang, N., Abe, K., & Barfield, W. D. (2017).

Employer-sponsored plan expenditures for infants born preterm. *Pediatrics*, 140(4), 2-7.

doi:10.1542/peds.2017-1078

- Ham, J., & Tronick, E. (2009). Relational psychophysiology: Lessons from mother–infant physiology research on dyadically expanded states of consciousness. *Psychotherapy Research, 19*(6), 619-632. doi:10.1080/10503300802609672
- Hamm, E. L., Chorna, O. D., Flanery, A., & Maitre, N. L. (2017). A parent–infant music therapy intervention to improve neurodevelopment after neonatal intensive care. *Acta Paediatrica, 106*(10), 1703-1704. doi:10.1111/apa.13952
- Hanson-Abromeit, D. (2003). The Newborn Individualized Developmental Care and Assessment Program (NIDCAP) as a model for clinical music therapy interventions with premature infants. *Music Therapy Perspectives, 21*(2), 60-68.
- Hanson-Abromeit, D., & Colwell, C. (Eds.). (2008). *Medical music therapy for pediatrics in hospital settings*. Silver Spring, MD: American Music Therapy Association.
- Hanson-Abromeit, D., Shoemark, H., & Loewy, J. V. (2008). Music therapy with pediatric units: Newborn Intensive Care Unit. In D. Hanson-Abromeit & C. Colwell (Eds.), *Medical music therapy for pediatrics in hospital settings*. Silver Spring, MD: American Music Therapy Association.
- Haslbeck, F. B. (2012a). Music therapy for premature infants and their parents: An integrative review. *Nordic Journal Of Music Therapy, 21*(3), 203-226.
doi:10.1080/08098131.2011.648653
- Haslbeck, F. B. (2012b). Research strategies to achieve a deeper understanding of active music therapy in neonatal care. *Music and Medicine, 4*(4), 205-214.
doi:10.1177/1943862112458706

- Haslbeck, F. B. (2014). The interactive potential of creative music therapy with premature infants and their parents: A qualitative analysis. *Nordic Journal of Music Therapy*, 23(1), 36-70. doi:10.1080/08098131.2013.790918
- Haslbeck, F. B., & Bassler, D. (2018). Music from the very beginning—A neuroscience-based framework for music as therapy for preterm infants and their parents. *Frontiers in Behavioral Neuroscience*, 12. doi:10.3389/fnbeh.2018.00112
- Haslbeck, F., & Hugoson, P. (2017). Sounding together: Family-centered music therapy as facilitator for parental singing during skin-to-skin contact. In M. Filippa, P. Kuhn, B. Westrup (Eds.), *Early vocal contact and preterm infant brain development: Bridging the gaps between research and practice* (pp. 217-238). New York, NY. Springer International Publishing. doi:10.1007/978-3-319-65077-7_13
- Haslbeck, F., & Stegemann, T. (2018). The effect of music therapy on infants born preterm. *Developmental Medicine & Child Neurology*, 60(3), 217. doi:10.1111/dmcn.13677
- Henning, I. (2012). Music therapy with premature infants: Insights and recommendations from the current literature and a German pilot project. *Canadian Journal of Music Therapy*, 18(1), 26-44.
- Hodges, A. L., & Wilson, L. L. (2010). Effects of music therapy on preterm infants in the neonatal intensive care unit. *Alternative Therapies in Health & Medicine*, 16(5), 72-73.
- Kraemer, S. B. (2006). So the cradle won't fall: Holding the staff who hold the parents in the NICU. *Psychoanalytic Dialogues*, 16(2), 149–164. Retrieved from <https://libdatabase.newpaltz.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=pbh&AN=21639642&site=ehost-live>

- Lakshmanan, A., Agni, M., Lieu, T., Fleegler, E., Kipke, M., Friedlich, P. S., ... Belfort, M. B. (2017). The impact of preterm birth <37 weeks on parents and families: A cross-sectional study in the 2 years after discharge from the neonatal intensive care unit. *Health and Quality of Life Outcomes*, 15(1), 38.
<https://doi-org.libdatabase.newpaltz.edu/10.1186/s12955-017-0602-3>
- Lindenfelser, K. J., Hense, C., & McFerran, K. (2012). Music therapy in pediatric palliative care: Family-centered care to enhance quality of life. *American Journal of Hospice & Palliative Medicine*, 29(3), 219-226. doi:10.1177/1049909111429327
- Litovsky, R., & Ashmead, D. (1997). Development of binaural and spatial hearing in infants and children. In R. Glikey & T.R. Anderson (Eds.), *Binaural and spatial hearing in real and virtual environments* (pp.571-592). Mahwah, N.J.: Lawrence Erlbaum Associates.
- Loewy, J. V. (2000). *Music therapy in the neonatal intensive care unit*. New York, NY: The Louis & Lucille Armstrong Music Therapy Program.
- Loewy, J. (2009). Musical sedation: Mechanisms for breathing entrainment. In R. Azoulay & Loewy, J. (Eds.), *Music, the breath and health: advances in integrative music therapy* (p.p.). New York, NY.: Satchnote Press.
- Loewy, J. (2013). Respiratory care for children. In Bradt J. (Ed.), *Guidelines for music therapy practice pediatric care* (pp. 403–441). Gilsum, NH: Barcelona Publishers.
- Loewy, J. (2015). NICU music therapy: Song of kin as critical lullaby in research and practice. *Annals Of The New York Academy Of Sciences*, 1337(1), 178-185.
doi:10.1111/nyas.12648

- Loewy J. & Scheiby B. (2001, May). Developing the culture of music psychotherapy in the medical setting. Paper presented at the Evening Lecture Series at New York University/Nordoff-Robbins Center for Music Therapy, New York, NY.
- 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. Retrieved April 23, 2015, from <http://pediatrics.aappublications.org/>
- Malloch, S., Shoemark, H., Črnčec, R., Newnham, C., Paul, C., Prior, M., & ... Burnham, D. (2012). Music therapy with hospitalized infants-the art and science of communicative musicality. *Infant Mental Health Journal*, *33*(4), 386-399. doi:10.1002/imhj.21346
- Malloch, S., & Trevarthen, C. (2009). Musicality: Communicating the vitality and interests of life. In S. Malloch & C. Trevarthen (Eds.), *Communicative musicality: Exploring the basis of human companionship* (pp. 1–11). New York, NY: Oxford University Press. Retrieved from <https://search-ebSCOhost-com.libdatabase.newpaltz.edu/login.aspx?direct=true&db=psyh&AN=2008-14595-001&site=ehost-live>
- Mampe, B., Friederici, A., Christophe, A., & Wermke, K. (2009). Newborns' cry melody is shaped by their native language. *Current Biology*, *19*(23), 1994-1997. <http://dx.doi.org/10.1016/j.cub.2009.09.064>
- Marcellus, L. (2014). Supporting women with substance use issues: Trauma-informed care as a foundation for practice in the NICU. *Neonatal Network: NN*, *33*(6), 307-314. doi:10.1891/0730-0832.33.6.307

March of Dimes. (2018). *2018 Premature Birth Report Card: United States*. March of Dimes.

Retrieved from:

<https://www.marchofdimes.org/materials/PrematureBirthReportCard-United%20States-2018.pdf>

McCraty, R., Atkinson, M., Tomasino, D., & Tiller, W. (1998). The electricity of touch:

Detection and measurement of cardiac energy exchange between people. In K. Pribram (Ed.), *Brain and values: Is a biological science of values possible* (pp. 359-397).

Mahwah, N.J.: Lawrence Erlbaum Associates.

Milford, C. A. (2016). Care of the family of an infant with a congenital heart defect during the

NICU hospitalization. *The Journal of Perinatal & Neonatal Nursing*, *30*(1), 64–67.

<https://doi-org.libdatabase.newpaltz.edu/10.1097/JPN.000000000000155>

Mondanaro, J. F. (2016). Multiculturally focused medical music psychotherapy in affirming

identity to facilitate optimal coping during hospitalization. *Music Therapy Perspectives*, *34*(2), 154–160. <https://doi-org.libdatabase.newpaltz.edu/10.1093/mtp/miw019>

Mondanaro, J. F., Ettenberger, M., & Park, L. (2016). Mars rising: Music therapy and the

increasing presence of fathers in the NICU. *Music and Medicine*, *8*(3), 96-107.

Music therapy annual salary in New York City, NY. (2019). Retrieved from

<https://www.ziprecruiter.com/Salaries/How-Much-Does-a-Music-Therapy-Make-a-Year-in-New-York-City, NY>

Neonatal/Perinatal Division. (2018). Retrieved from

<http://www.brookdalehospital.org/neonatalperinatal-division.html>

Nakata, T., & Trehub, S. E. (2004). Infants' responsiveness to maternal speech and singing.

Infant Behavior & Development, 27(4), 455–464.

<https://doi-org.libdatabase.newpaltz.edu/10.1016/j.infbeh.2004.03.002>

National Institute on Drug Abuse. (2015, September 01). *Dramatic increases in maternal opioid use and neonatal abstinence syndrome*. Retrieved November 6, 2018, from

<https://www.drugabuse.gov/related-topics/trends-statistics/infographics/dramatic-increases-in-maternal-opioid-use-neonatal-abstinence-syndrome>

Nicholson, J. M., Berthelsen, D., Abad, V., Williams, K., & Bradley, J. (2008). Impact of music therapy to promote positive parenting and child development. *Journal of Health Psychology*, 13(2), 226-238. doi:10.1177/1359105307086705

Psychology, 13(2), 226-238. doi:10.1177/1359105307086705

Nöcker-Ribaupierre, M. (2004). *Music therapy for premature and newborn infants*. Gilsum, NH: Barcelona Publishers.

Nöcker-Ribaupierre, M., Linderkamp, O., & Riegel, K. P. (2015). The effects of mothers' voice on the long term development of premature infants: A prospective randomized study.

Music and Medicine, 7(3), 20–25. Retrieved from

<https://libdatabase.newpaltz.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=psyh&AN=2015-42993-004&site=ehost-live>

Office of the Professions. (2017, December 27). Creative arts therapy license requirements.

Retrieved November 3, 2018, from <http://www.op.nysed.gov/prof/mhp/catlic.htm>

O'Toole, A., Francis, K., & Pugsley, L. (2017). Does music positively impact preterm infant outcomes? *Advances in Neonatal Care*, 17(3), 192–202.

<https://doi-org.libdatabase.newpaltz.edu/10.1097/ANC.0000000000000394>

- Panneton, R. K., & DeCasper, A. J. (1986, April). Prenatal auditory experience with melodies: Effects on postnatal auditory preferences in human newborns. International Conference on Infant Studies, Los Angeles, CA.
- Papoušek, M., & Papoušek, H. (1989). Forms and functions of vocal matching in interactions between mothers and their precanonical infants. *First Language*, 9(26, Pt 2), 137-157. doi:10.1177/014272378900900603
- Pearce, J. (1977). *Magical child: Rediscovering nature's plan for our children* (1st ed.). New York, NY: E. P. Dutton.
- Pearce, J. (2012). *The heart-mind matrix: How the heart can teach the mind new ways to think* (2nd ed.). Rochester, VT: Park Street Press.
- Picciolini, O., Porro, M., Meazza, A., Gianni, M. L., Rivoli, C., Lucco, G., & ... Mosca, F. (2014). Early exposure to maternal voice: effects on preterm infants development. *Early Human Development*, 90(6), 287-292. doi:10.1016/j.earlhumdev.2014.03.003
- Porges, S. W. (2003). Social engagement and attachment: A phylogenetic perspective. *Annals of the New York Academy of Sciences*, 100(8), 31-47.
- Porges, S. W. (1995). Orienting in a defensive world: mammalian modifications of our evolutionary heritage. A Polyvagal Theory. *Psychophysiology*, 32(4), 301-318.
- Quinn, J. F. (1984). Therapeutic touch as energy exchange: Testing the theory. *Advances In Nursing Science*, 6(2), 42-49.
- Rand, K., & Lahav, A. (2014). Maternal sounds elicit lower heart rate in preterm newborns in the first month of life. *Early Human Development*, 90(10), 679-683. doi:10.1016/j.earlhumdev.2014.07.016

Rhythm, Breath and Lullaby Kit. (2019). Retrieved from

<https://remo.com/products/product/rhythm-breath-lullaby-kit/>

Richardson, D. K., Zupancic, J. A. F., Escobar, G. J., Ogino, M., Pursley, D. M., & Mugford, M.

(2001). A critical review of cost reduction in neonatal intensive care I. The structure of costs. *Journal of Perinatology*, 21(2), 107. Retrieved from

<https://libdatabase.newpaltz.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=8882415&site=ehost-live>

Rossetti, A., & Canga, B. (2013). Environmental music therapy: Rationale for 'multi-individual'

music psychotherapy in modulation of the pain experience. In J. F. Mondanaro & G. A. Sara (Eds.), *Music and medicine: Integrative models in the treatment of pain* (pp.

275-294). New York, NY: Satchnote Press.

Roque, A. T. F., Lasiuk, G. C., Radünz, V., & Hegadoren, K. (2017). Scoping review of the

mental health of parents of infants in the NICU. *Journal of Obstetric, Gynecologic & Neonatal Nursing*, 46(4), 576–587.

<https://doi-org.libdatabase.newpaltz.edu/10.1016/j.jogn.2017.02.005>

Scheiby, B. (2010). Analytical music therapy and integrative medicine. In K. Stewart (Ed.),

Music therapy & trauma: Bridging theory and clinical practice (pp. 74-87). New York, NY: Satchnote Press.

Scheiby, B. (2013). Analytical music therapy for pain management and reinforcement of

self-directed neuroplasticity in patients recovering from medical trauma. In J. F.

Mondanaro, & G. A. Sara (Eds.), *Music and medicine: Integrative models in the treatment of pain* (pp. 149–180). New York, NY: Satchnote Press.

- Schlez, A., Litmanovitz, I., Bauer, S., Dolfin, T., Regev, R., & Arnon, S. (2011). Combining kangaroo care and live harp music therapy in the neonatal intensive care unit setting. *The Israel Medical Association Journal*, 13(6), 354-358.
- Schneider, S. (2005). Environmental music therapy, life, death and the ICU. In C. Dileo & J.V. Loewy (Eds.), *Music therapy at the end of life*. (pp. 219–225). Cherry Hill, NJ: Jeffrey Books. Retrieved from <https://libdatabase.newpaltz.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=psyh&AN=2008-06430-021&site=ehost-live>
- Schore, A. (2001). Effects of a secure attachment relationship on right brain development, affect regulation, and infant mental health. *Infant Mental Health Journal*, 22, 7-66. Retrieved March 25, 2015, from <http://www.allanschore.com/pdf/SchoreIMHJAttachment.pdf>
- Schore, A. (2006). Minds in the making: Attachment, the self-organizing brain, and developmentally-oriented psychoanalytic psychotherapy. *British Journal of Psychotherapy*, 17(3), 299-328. Retrieved April 23, 2015, from <http://onlinelibrary.wiley.com>
- Schore, J. R., & Schore, A. N. (2008). Modern attachment theory: The central role of affect regulation in development and treatment. *Clinical Social Work Journal*, 36(1), 9-20.
- Schwartz, F. J. (1997). Perinatal stress reduction, music and medical cost savings. *Journal Of Prenatal & Perinatal Psychology & Health*, 12(1), 19-29.
- Shoemark, H. (2006). Infant-directed singing as a vehicle for regulation rehearsal in the medically fragile full-term infant. *Australian Journal Of Music Therapy*, 17, 54-63.

- Shoemark, H. (2008). Mapping progress within an individual music therapy session with full-term hospitalized infants. *Music Therapy Perspectives*, 26(1), 38-45.
doi:10.1093/mtp/26.1.38
- Shoemark, H. (2012). Frameworks for using music as a therapeutic agent for hospitalized newborn infants. In N. S. Rickard & K. McFerran (Eds.), *Lifelong engagement with music: Benefits for mental health and well-being* (pp. 1-20). Hauppauge, NY: Nova Science Publishers.
- Shoemark, H. (2014). Contingent singing as a therapeutic intervention for the hospitalised full-term neonate. In C. Paul & F. Thomson-Salo (Eds.), *The baby as subject: Clinical studies in infant-parent therapy* (pp. 45-55). London: Karnac Books.
- Shoemark, H. (2015). Culturally transformed music therapy in the perinatal and paediatric neonatal intensive care unit: An international report. *Music And Medicine*, 7(2), 34-36.
- Shoemark, H. (2017a). Empowering parents in singing to hospitalized infants: The role of the music therapist. In M. Filippa, P. Kuhn, & B. Westrup (Eds.), *Early vocal contact and preterm infant brain development: Bridging the gaps between research and practice* (pp. 205-215). New York, NY. Springer International Publishing.
doi:10.1007/978-3-319-65077-7_12
- Shoemark, H. (2017b). Time Together: A feasible program to promote parent-infant interaction in the NICU. *Music Therapy Perspectives*, 36(1), 1-11. doi:10.1093/mtp/mix004
- Shoemark, H., & Dearn, T. (2008). Keeping parents at the centre of family centred music therapy with hospitalised infants. *Australian Journal Of Music Therapy*, 19, 3-24.

Shoemark, H., & Grocke, D. (2010). The markers of interplay between the music therapist and the high risk full term infant. *Journal Of Music Therapy*, 47(4), 306-334.

doi:10.1093/jmt/47.4.306

Smith, W. (2018). Concept analysis of family-centered care of hospitalized pediatric patients. *Journal Of Pediatric Nursing*, 42, 57–64.

<https://doi-org.libdatabase.newpaltz.edu/10.1016/j.pedn.2018.06.014>

Society for Human Resource Management. (2016). *Average cost per hire for companies*.

<https://www.shrm.org/about-shrm/press-room/press-releases/pages/human-capital-benchmarking-report.aspx>

Stanford Childrens' Health. (2019). Assessment of Newborn Babies. Retrieved from:

<https://www.stanfordchildrens.org/en/topic/default?id=assessments-for-newborn-babies-90-P02336>

Standley, J. M. (2012a). A discussion of evidence-based music therapy to facilitate feeding skills of premature infants: The power of contingent music. *The Arts in Psychotherapy*, 39(5),

379-382. doi:10.1016/j.aip.2012.06.009

Standley, J. (2012b). Music therapy research in the NICU: an updated meta-analysis. *Neonatal Network*, 31(5), 311-316. doi:10.1891/0730-0832.31.5.311

Standley, J. M., & Swedberg, O. (2011). NICU music therapy: Post hoc analysis of an early intervention clinical program. *The Arts In Psychotherapy*, 38(1), 36-40.

doi:10.1016/j.aip.2010.10.004

Standley, J. M., & Walworth, D. (2010). *Music therapy with premature infants: Research and developmental interventions*. Silver Spring, MD: American Music Therapy Association.

- Standley, J. M. (1999). Music therapy in the NICU: Pacifier-activated-lullabies (PAL) for reinforcement of nonnutritive sucking. *International Journal of Arts Medicine*, 6(2), 17–21. Retrieved from <https://search-ebshost-com.libdatabase.newpaltz.edu/login.aspx?direct=true&db=psyh&AN=2000-13541-003&site=ehost-live>
- Stewart, K. (2009a). Dimensions of the voice: The use of voice and breath with infants and caregivers in the NICU. In R. Azoulay & J.V. Loewy (Eds.), *Music, the breath and health: Advances in integrative music therapy* (pp. 235-250). New York, NY: Satchnote Press.
- Stewart, K. (2009b). PATTERNS—A model for evaluating trauma in NICU music therapy: Part 1—Theory and design. *Music and Medicine*, 1(1), 29-40.
doi:10.1177/1943862109338370
- Stewart, K. (2009c). PATTERNS—A model for evaluating trauma in NICU music therapy: Part 2—Treatment parameters. *Music and Medicine*, 1(2), 123-128.
doi:10.1177/1943862109344858
- Stewart, K. & Schneider, S. (2000). The effect of music therapy on the sound environment in the Neonatal Intensive Care Unit: A Pilot Study. In J.V. Loewy (Eds.), *Music therapy in the neonatal intensive care unit*. (pp. 85-100). New York, NY: Satchnote Press.
- Stoll, B. J., Hansen, N. I, Bell, E. F., et al. (2015). Trends in care practices, morbidity, and mortality of extremely preterm neonates, 1993-2012. *JAMA* 314(10),1039–1051.
doi:10.1001/jama.2015.10244

The Brookdale Hospital Medical Center creative arts therapist salaries in New York City, NY

Area. (2016). Retrieved from

https://www.glassdoor.com/Salary/The-Brookdale-Hospital-Medical-Center-Creative-Arts-Therapist-New-York-City-Salaries-EJI_IE18251.0,37_KO38,61_IL.62,75_IM615.htm

Trehub, S.E. (2001). Musical predispositions in infancy. *Annals of the New York Academy of Sciences* 930, 1–16.

Tronick, E., & Beeghly, M. (2011). Infants' meaning-making and the development of mental health problems. *American Psychologist*, 66(2), 107-119. doi:10.1037/a0021631

Walworth, D., Standley, J. M., Robertson, A., Smith, A., Swedberg, O., & Peyton, J. J. (2012).

Effects of neurodevelopmental stimulation on premature infants in neonatal intensive care: Randomized controlled trial. *Journal Of Neonatal Nursing*, 18(6), 210-216.

doi:10.1016/j.jnn.2012.01.001

West Music (2019). Remo DP-FSRK-00 First Sounds Rhythm, Breath and Lullaby Kit: Gato

Box, Ocean Disc & Backpack. Retrieved from

<https://www.westmusic.com/drums-percussion/group-drumming/group-drumming-collections/204827>

Whipple, J. (2000). The effect of parent training in music and multimodal stimulation on

parent–neonate interactions in the neonatal intensive care unit. *Journal Of Music*

Therapy, 37(4), 250-268. doi:10.1093/jmt/37.4.250

Williams, A. L., van Drongelen, W., and Lasky, R. E. (2007). Noise in contemporary neonatal

intensive care. *The Journal of the Acoustical Society of America*, 121, 2681–2690. doi:

10.1121/1.2717500

World Health Organization. (2018). Preterm birth. Retrieved November 3, 2018, from

<http://www.who.int/en/news-room/fact-sheets/detail/preterm-birth>

Younge, N., Goldstein, R., Bann, C., Hintz, S., Patel, R., Smith, P., . . . Cotten, C. (2017).

Survival and neurodevelopmental outcomes among periviable infants. *New England Journal of Medicine*, *37*(3), 617-628. doi:10.1097/01.aoa.0000521247.86996.2d

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. doi:10.1093/jmt/thx017

Appendix A

Required Materials and Suggested Vendors Reference List

Apple ipad. (2019). Retrieved from <https://www.apple.com/shop/buy-ipad/ipad-10-2>

On-Stage GBC4770 Deluxe Classical Guitar Gig Bag. (2019). Retrieved from

<https://www.westmusic.com/guitars-folk/accessories/guitar-folk-bags-cases/instrument=classical-guitar/on-stage-gbc4770-deluxe-classical-guitar-gig-bag-356023?returnurl=%2fguitars-folk%2faccessories%2fguitar-folk-bags-cases%2finstrument%3dclassical-guitar%2f>

West Music (2019). Remo DP-FSRK-00 First Sounds Rhythm, Breath and Lullaby Kit: Gato Box, Ocean Disc & Backpack. Retrieved from

<https://www.westmusic.com/drums-percussion/group-drumming/group-drumming-collections/204827>

Thinklabs One Digital Stethoscope. (2019). Retrieved from

<https://store.thinklabs.com/products/thinklabs-one-digital-stethoscope> Yamaha CGS104A

Classical Guitar. (2019). Retrieved from

<https://www.westmusic.com/guitars-folk/classical-guitars/yamaha-cgs104a-classical-guitar-302880?returnurl=%2fguitars-folk%2fclassical-guitars%2f%3fcount%3d36>

Appendix B

NICU Music Therapy Referral Form

Name of Patient _____ Date of birth _____

Gestational age _____ Chronological age _____ Gender _____

Attending physician _____ Contact number _____

Diagnoses _____

Reason for referral (check all that apply)

Respiratory support _____ Irritability _____

Cardiac support _____ Procedural support/pain management/sedation _____

Sleep support _____ Social stimulation _____

Feeding/weight gain _____ Bonding support _____

Psychosocial support for family/caregivers _____ Define needs (examples include: ACS Hold, intrauterine exposure to drugs/alcohol, family history of trauma, illness, stress, violence, and/or separation) _____

Person referring _____ Contact number _____ Date _____

Adapted from Loewy, J. V. (2000). *Music therapy in the neonatal intensive care unit*. New York, NY: The Louis & Lucille Armstrong Music Therapy Program.

Appendix C

NICU Music Therapy Assessment

Name of Patient _____ Date of birth _____

Gestational age _____ Chronological age _____ Gender _____

Diagnoses _____

Average heart rate: Sleeping: _____ bpm Awake: _____ bpm Stress: _____ bpm

Does the infant experience bradycardia? Yes No

Average rate of respiration: _____ Average oxygen saturation: _____

Does the infant experience tachypnea? Yes No

Does the infant require sleep support? Yes No

Does the infant experience significant irritability? Yes No

Crying pitch: High Low Average Absence of cry

Colic: Yes No

Does the infant require pain management/procedural support/sedation? Yes No

Describe indicators of pain, pain levels, and on-going procedures: _____

Is the infant taking a sedative? Yes No

Medications: _____

Does the infant require feeding/weight gain support? Yes No

Intake method: GT NG Bottle Breast

Is the infant's suck response in need of support? Yes No

Feeding schedule _____

Is Physical Therapy, Occupational Therapy, or Speech Therapy involved? Yes No

Is the infant developing appropriate muscle tone? Yes No

Is the infant able to self-regulate? Yes No Auditory Screen completed Yes No

Auditory Screen results: _____

Does the infant require social stimulation? Yes No

Is the infant organized in: Sound Yes No Touch Yes No Movement Yes No

Psychosocial Needs:

Name(s) of parents/caregivers/family members: _____

Cultural background and religious preferences: _____

Are the parents/caregiver/family members in need of bonding support? Yes No

ACS Hold? Yes No Palliative Care/Hospice Care involved? Yes No

Music Therapist: _____ Contact _____ Date _____

Adapted from Loewy, J. V. (2000). *Music therapy in the neonatal intensive care unit*. New York, NY: The Louis & Lucille Armstrong Music Therapy Program.

Appendix D

NICU Music Therapy Discharge Summary

Name of Patient _____ Date of birth _____

Gestational age _____ Chronological age _____ Gender _____

Diagnoses _____

Services provided:

Respiratory support _____ Irritability _____

Cardiac support _____ Procedural support/pain management/sedation _____

Sleep support _____ Social stimulation _____

Feeding/weight gain _____ Bonding support _____

Psychosocial support for family/caregivers _____

Summary of Services: _____

_____ Music

Therapist: _____ Contact _____ Date _____

Adapted from Loewy, J. V. (2000). *Music therapy in the neonatal intensive care unit*. New York, NY: The Louis & Lucille Armstrong Music Therapy Program.

Appendix E

NICU Music Therapy Caregiver Satisfaction Survey

How were you referred to our NICU Music Therapy Program?

The music therapist_____ Nursing staff_____ Attending physician_____

Social worker_____ Chaplaincy_____ Other_____

Were you informed the reason for referral to the NICU Music Therapy Program? Yes [] No []

Were you given clear explanation of the services provided by the music therapist? Yes [] No []

Were the services provided as described by the music therapist? Yes [] No [] Sometimes []

Were the services provided in a timely manner? Yes [] No [] Sometimes []

Were the services provided with a kind and courteous attitude? Yes [] No [] Sometimes []

Do you feel that music therapy services were provided in a manner that was attentive and respectful of your family’s unique background and needs? Yes [] No [] Sometimes []

Do you feel that music therapy helped your baby? Yes [] No [] Sometimes []

Do you feel that music therapy helped you as the caregiver/family Yes [] No [] Sometimes []

Please share any comments on your experience with the NICU Music Therapy Program:

Adapted from Loewy, J. V. (2000). *Music therapy in the neonatal intensive care unit*. New York, NY: The Louis & Lucille Armstrong Music Therapy Program.