

# NPA 2010 Abstracts

## Educational DVDs for NICU Care

Kenneth Herrmann, The Deaconess-Women's Hospital, Newburgh, IN

### Background

Parents often receive an orientation to their hospital's NICU before their baby delivers. Familiarity with the NICU helps to reduce anxiety. A high-risk mother might not be permitted to travel to the NICU for a variety of reasons. Antenatal consultations by the neonatologist consumed significant time and lacked visual teaching materials. We wished to provide basic information about NICU care in the mother's room, using familiar visual media. We wished to improve the use of the neonatologists' time during antenatal consultations.

### Content/Action

Using home digital video equipment (DVD camera, laptop computer, video editing program), we created our own video presentation. The DVD shows families the physical environment of our NICU, the equipment used to care for NICU patients, NICU staff members, and an introduction to the services provided in our NICU. Viewing of the "Virtual NICU Tour" was provided using the DVD player and television in the mother's room. A subsequent version of the "Virtual NICU Tour" copied the original presentation, using professional grade equipment. We give a copy of the revised DVD to all families with potential for NICU admission; families keep the DVD for repeated viewing. Following viewing of the "Virtual NICU Tour", a neonatologist visited with the parents (consultation) to answer questions specific to their high-risk pregnancy. Due to the success of the "Virtual Tour", two more DVD presentations were created: "Premature Baby Care & the NICU, 32 – 38 Weeks" and "Premature Baby Care & the NICU, Less than 32 Weeks". Parent interviews were included in the DVD for infants born before 32 weeks. These DVDs are provided by hospital staff members for family viewing prior to the antenatal consultation by the neonatologist. A presentation of the "Virtual NICU Tour" is included in the hospital prenatal classes.

### Lessons Learned

After viewing the "Virtual Tour", parents usually reported reduced anxiety regarding their infant's subsequent NICU admission. When a written survey was provided, 11 of 93 from prenatal class presentations and 10 of 24 from antenatal consultation presentations reported that they felt less anxiety about NICU care after viewing the DVD. In contrast, 2 of 93 from prenatal class presentations and 2 of 24 from antenatal consultation presentations reported that they felt more anxiety about NICU care after viewing the DVD.

The reproduction cost of the DVD "Virtual NICU Tour" was less than the unit cost of the printed brochure provided to families of NICU patients.

Using digital equipment for personal use, any NICU may develop similar DVD programs, within a limited budget. It is suggested that other NICUs revise and improve upon these prototype productions, using their own staff and facilities. Off-camera "voice-over" script reading and use of a teleprompter for on-camera segments can help to improve the quality of the production and reduce anxiety of the narrator.

### Implications for Practice

DVD education prior to antenatal consultations help families become familiar with the physical environment of the hospital NICU, the faces of the caretakers, and typical NICU care. The DVDs enable

the neonatologist to focus on the unique aspects of the high-risk pregnancy during the consultation and reduce the consultation time.

### **A Web Camera Service in the NICU**

Kenneth Herrmann, The Deaconess-Women's Hospital, Newburgh, IN

#### Background

Everyone wants to see the new baby. But sometimes it's just not possible, especially when the baby needs care in the NICU. Mothers are sometimes confined to their bed for medical reasons. Parents may be a long way from the NICU. Some mothers will deliver in other hospitals and then the baby is transferred to the NICU for care. Sometimes visitors need to stay away from the NICU because they have an infection, especially common during the winter cold and flu season. And some family members simply live too far away to visit. To help keep families in better contact with babies in the NICU, a web cam service was proposed and developed.

#### Content/Action

Feasibility was established by introducing a single webcam, placed on a Mayo stand, at the bedside in the NICU, with a hardwire connection to the internet. The pilot camera was popular, but expensive; the viewing angle provided a poor view of the infant; and the hardwire connection seemed to interfere with the workspace of the caregiver. Two families were reluctant to relinquish their camera to other families, and volunteered to purchase webcams for their infants. With perceived popularity, a grant application was approved by the March of Dimes to purchase an additional webcam and a connection port for wireless webcam connection to the internet. Mounting of the webcam was improved by using an adjustable arm designed to hold respiratory tubing in the NICU. Additional webcams and mounting assemblies were acquired through grants from the Deaconess Hospital Foundation. After increasing the number of internet based webcam assemblies to twelve, a wall mounted monitor was established in the NICU family waiting area for immediate viewing of newborn babies. Confidentiality is established by password protected, encrypted webcams. Parents have the responsibility for sharing connection and password information with others.

#### Lessons Learned

The service provided by webcams in the NICU is extremely popular with families, who typically report frequent viewing of the NICU babies by parents and extended family members. While the service does not replace standing at the bedside, touching the baby, or skin-to-skin contact, it provides a substantial improvement with visual interaction with the NICU baby for parents as well as their family and friends.

Some mothers have reported that they express milk at home, while watching their baby on the home monitor.

Family and friends who live at considerable distances from the hospital are especially appreciative of the service.

The service is sufficiently popular to receive philanthropic financial support.

#### Implications for Practice

Parents, family and friends can visit their NICU baby on the internet.

## **Invisible Enemy: Reducing Methicillin-Resistant Staphylococcus Aureus in the Neonatal Intensive Care Unit**

Tara Taylor, Children's National Medical Center, Washington, DC

### **Background**

In U.S. intensive-care units, the proportion of healthcare-associated staphylococcal infections due to Methicillin-Resistant Staphylococcus aureus (MRSA) has been increasing. Infants colonized with MRSA are at increased risk for developing MRSA infections that are associated with substantial morbidity and excess financial burdens. Tertiary-care Neonatal Intensive Care Units are especially susceptible as increasing numbers of infants arrive already colonized from referral facilities. As drug resistant organisms adapt, inpatient providers must also.

### **Content/Action**

Antimicrobial treatments are a reactive answer to a problem that demands proactive thinking. As such, our successful efforts towards control have focused on practice bundles including early detection using polymerase chain reaction (PCR), continued surveillance during inpatient stay and staff cohorting. The results have been striking: significantly reduced rates of MRSA colonization and infection in our unit, as well as demonstrated cost savings and decreased length of stay.

Our team utilized a Lean Plan-Do-Check-Act (PDCA) cycle approach, with a strong emphasis on the planning phase. This approach allowed us to collaborate as a multidisciplinary team with different strengths and areas of expertise. For example, front line staff brought forward concerns about delays in identification of MRSA colonized patients on admission. The group then convened and was able to spend time identifying next steps and ways to improve.

Our initial goal was to develop a bundle of optimal interventions for reducing the MRSA transmission rate by 50% within the first year. By fiscal year 2008, we aimed to sustain the decreased rate of transmissions at fewer than 5 per 1000 patient days. To track progress, we reported MRSA nosocomial transmission rates quarterly (per 1000 patient-days). Transmission was defined as an infant whose MRSA screen on admission was negative but who acquired MRSA after being hospitalized for 72 hours.

During the intervention period, 213 infants with MRSA were identified and 157 transmissions occurred. The transmission rate was 2.9 per 1000 patient days at risk overall, but reached 5.7 during the outbreak period. The transmission rate declined from 3.3 when using Bundle 1 to 2.4 when using Bundle 2 ( $p=0.07$ ). Infections caused by hospital-acquired MRSA declined from 1.5 when using Bundle 1 to 0.6 when using Bundle 2.

### **Lessons Learned**

For the team, a major turning point was when Bundle 2 replaced traditional microbiology culture for detection of MRSA with PCR testing. While our team had seen improvements in transmission rates with the interventions prior to this, it had been difficult to sustain a rate consistently below 5 per 1000 patient days. This put our patients at risk and threatened to hinder any gains made by implementation to date. The team noted that often a patient who was admitted to our unit already colonized was not identified by microbiological testing as such until days later, during which time interventions such as staff cohorting were rendered effectively useless.

### **Implications for Practice**

Consumer interest as evidenced by increasing amounts of media attention to the issue of MRSA helped to heighten awareness among staff and families. Although no current benchmark exists specifically for MRSA colonization in the NICU environment, we believe the trend toward increased incidence nationally calls for further investigation.

## **Hand in Hand: Perinatal Palliative Care**

Janice Coffing, Deaconess Hospital, Newburgh, IN

**Background:** Implementation of a perinatal palliative care program at *The Women's Hospital* has expanded the choices for families whose unborn children have anomalies that are incompatible with life or a limited life expectancy. Comfort care had been an option with an admission to the NICU but no formal program for palliative care in the mother's room or at home had been in place.

**Content/Action:** A multi-disciplinary team initiated steps to create a plan of action for staff so that a protocol of care could be followed for mothers who had special needs. An algorithm of care, care plan for delivery, brochure for families and brochure for professionals, a declination form and checklist for the *Hand in Hand* team were created. Staff education was achieved through in-service sessions with the aid of the brochures, discussion and PowerPoint. Assigned colors for charts and forms along with assigned special filing places assured the team that the staff would be able to get the information at the time of the mother's admission. A point person for each case is assigned, rotating amongst the team.

**Lessons Learned:** Hospice care is a must for babies discharged to home. Because of our desire to provide the family with as much time with their baby and to have that time be as normal as possible, a hospice care nurse allows the family to have time with the baby after the baby dies, while still at home, without having to call the coroner, have the baby taken from the home with urgency, and prevents the need for an autopsy. For staff, we have sought out the perspective of psychologists who have taught us of the need for all of our staff to process our special cases in special ways. Debriefing sessions have been established for follow up with all staff who are involved with *Hand in Hand Palliative Care* cases. Staff in-service was needed to bring all the hospital on board with the different approach to care that this program provides for our families.

**Implications for Practice:** To provide alternative choices for any family faced with diagnosis of fetal anomalies. To have a program in place that guides the entire hospital team in such cases in order to follow the wishes of the family. To have a program in place that guides the entire hospital team in such cases in order to follow the wishes of the family. Implementation and follow through of staff in-service about the new program completed. Development of de-briefing sessions for all staff involved in the patient care with repeat de-briefing at later intervals. The perinatologist is aware of the program and serves on the committee, along with the head of neonatology. Neonatologists are aware and on-board with the program.

## **The Birth of HUG Your Baby: An Innovative Approach to Helping Professionals Share Newborn Behavior with Expectant and New Parents**

Jan Tedder, Durham, NC 27715

**“Conception” (Background):** Research suggests, and perinatal professionals experience, that misunderstanding newborn behavior can undermine a new parent's confidence, decrease breastfeeding success, and reduce early parent-child attachment. Many of today's expectant and new parents are under stress, away from family, and lack experience with babies. They want and need help to learn about their newborn. Busy, yet dedicated professionals need efficient and effective tools for teaching these parents. Careful review of literature, study of current parenting programs, and pilot efforts to educate parents and the professionals who care for them were the germ of life for *HUG Your Baby*.

**“Gestation” (Content):** *HUG Your Baby* describes three newborn “Zones” (*The Resting, Ready, and Rebooting Zone*) and six *SOSs* (*Signs of Over-Stimulation*). Parents can be taught about the *Resting* (sleeping) *Zone* and gain insight into helping both baby and mother get a better night's sleep. Teaching parents how to bring a baby to the alert, *Ready Zone* gives moms and dads new skills to appreciate their baby's visual, auditory, and social abilities as well as to enhance breastfeeding. Parents and professionals discover the *Rebooting Zone* (fussing/crying), and learn a baby's unique contribution to calming and effective calming techniques that can be used by parents. Finally, *HUG Your Baby* helps parents see a baby “Sending out an *SOS*,” communication that includes body changes in color, movement, and breathing as

well as unique behavioral changes: *Spacing Out*, *Switching Off*, and *Shutting Down*. Using this *SOS* terminology, professionals can teach parents how to prevent and respond effectively to over-stimulation. Using language which is family-friendly, concise, and clear—as well as making use of professional A-V materials and resources—*HUG Your Baby* began to grow by developing a program to help professionals share newborn behavior with parents.

**“Labor & Delivery” (Action):** However, the enormous task of raising personal monies to fund the project, videotaping hundreds of hours of babies and parents, acquiring know-how in the recording studio, editing room, and the online world threatened the loss of this project before it could be born! But passion for filling the need (and old-fashioned hard work) finally brought results: *The HUG DVD* (in English and Spanish) and *The HUG* educational website and Blog for parents were born! Online and “live” training for professionals, monthly newsletters, Facebook presence, two peer-reviewed publications, academic research, and *Certified HUG Teacher Training* were delivered, full-term and ready to engage with the world!

**“Post-Partum” (Lessons Learned & Implications for Practice):** In its five years of life, *HUG Your Baby* has won three international educational awards. *The HUG Blog* has been read in over 120 countries around the world, while the DVD and parent handouts have been used by hospitals, doulas, nurses, midwives, and childbirth educators across the USA and the world. Sixty-four professionals recently evaluated *The HUG* training as follows:

	Strongly Disagree	Strongly Agree	Disagree	Agree
“This program gave me practical tools & strategies for teaching parents about newborn behavior.”	71%	29%	0	0
“Analyzing videos of parents and babies was helpful.”	61%	39%	0	0
“Learning about <i>The HUG Strategies</i> will help me better connect with and teach young families.”	63%	37%	0	0
“I would recommend this class to colleagues.”	65%	35%	0	0

***HUG Your Baby* offers professionals education and resources to help parents prevent and solve problems around a baby’s eating, sleeping, crying, and attachment...and to be the good moms and dads they want to be!**

### **A Multi-step/Multi-sensory Process Engaging Mothers in Expressive Arts to Emotionally Connect With Their NICU Infants**

Patricia Manning, Ringling College of Art and Design, Sarasota, FL

#### **BACKGROUND**

The purpose of this process is to provide mothers of critically ill newborns or very low birth-weight infants the ability to reduce stress, anxiety and concretely express their hopes, fears and dreams through conscious relaxation, guided imagery, journalistic writing and tessellation art. The need for NICU infants to be aware of their mother’s presence is extremely important for their overall growth and healing. The need for the mothers to feel they are actively involved in their infant’s healing process is just as important.

This program was developed as the final assignment for the Applications in Art and Healing Course /Art and Healing Certificate Program at the Ringling College of Art and Design, Sarasota, Fl. The assignment was to create a multi-step/multi-sensory process that would bring about a sense of healing through the use of expressive arts.

#### **CONTENT/ACTION**

While the mother is with her infant, she listens to a special guided imagery and relaxation CD to help redirect stress toward positive healing thoughts and feelings. Next, either one on one or in a group, she (the mother) is then guided through a special form of poetic journalism to easily express her thoughts, feelings and emotions in a concrete manner. The mother transfers the writing/poetry to a specially designed and colorfully shaped card. She may embellish the card by design or collage. This card(s) becomes a visual expression of the process - 'pieces of a dream' - that contains the written expression of the mother's hopes, fears and dreams. Finally, at the end of the process, these creative expressions can be read to her infant and the mother may leave her dreams (a piece of herself) with her infant in the NICU. At discharge, the mother is presented with all the beautiful and loving piece of expressive art - which becomes the representation of the time both she and her infant have spent on this journey- no matter what the outcome.

#### **LESSONS LEARNED**

This program has been presented to the Expressive arts community in Sarasota and to Art and Healing Certificate students and instructors at the Ringling College of Art and Design. It was also presented to a test group of 6 NICU mothers and currently at the Solve House – a shelter for women in crisis pregnancies – in Englewood, Florida. It has been well received by all participants. It was especially poignant for those who previously had infants in the NICU - even those whose experience was 20 years in the past. It provided participants with a sense of calm; an emotional out-let for their feelings; a sense of accomplishment with tangible evidence of their hope and fears through writing; and finally the creation of an interlocking whole design piece.

This is a melding of the emotional with the scientific and medicine with art. Some medical administrators may find this too "touchy feely" to implement. It also should be noted this process reaches deep into human emotions at a very vulnerable time. It would be wise to have a psychological support staff available, if necessary.

#### **IMPLICATIONS FOR PRACTICE**

This innovative process – to be implemented by the NICU Family Support Specialist -provides the tools to guide NICU mothers through a process that will reduce stress, establish strong mother/infant bonds and provide comfort and support. It will also help to bridge the gap between the high tech needs of the NICU and the high touch needs of the family.

### **What's Been Keeping You? Access to Prenatal Care in Southern New Jersey**

Helen Hannigan and Judith Stark RN BSN Southern New Jersey Perinatal Cooperative

#### **Introduction**

In February of 2008 the New Jersey Health Commissioner brought together nurses, physicians and health professionals focused on quality care for pregnant women and their families throughout the state to form the Prenatal Care Task Force. In response to the group's interest in issues relating to women's ability to access the care they need within the first trimester of their pregnancies, and the great disparity between the state rates for first trimester entry and no care and those in Atlantic County NJ the Healthy Mother's Healthy Babies Coalitions (HMHB) in Atlantic County and Atlantic City developed surveys to identify the barriers to early care facing women in their region.

In 2007 only 53% of women in Atlantic City got prenatal care in the first trimester while 3% got no care during their pregnancies. During the same period 76% of women in New Jersey got care in the first trimester and only 1% received no care during their pregnancies.

#### **Methodology:**

The survey tool was developed to determine county specific reasons why women did not enter into prenatal care in a timely manner. The Healthy Mothers Healthy Babies Coalitions and United Way's Success by Six

identified issues of concern to be included in questions. The final survey developed by Southern New Jersey Perinatal Cooperative MIS staff with oversight of the Coalitions. A Likert Scale was selected as most appropriate way to identify a range of responses. The HMHB coalitions in Atlantic County/City identified provider partners at health centers to survey women who came in for their first prenatal care appointment after their 13<sup>th</sup> week of pregnancy and labor and delivery contacts surveyed women who delivered with no prenatal care. The survey process began in May 2008. This presentation will highlight the process and findings of the survey.

#### Results:

The identified reasons for reported by women fell into two general categories:

Financial: Don't have Health Insurance, didn't have enough money to pay doctor, didn't have transportation

System: Didn't know where to go, I was afraid because I am not a citizen

#### Discussion

As a result of the survey, the HMHB Coalitions invited the County Medicaid eligibility office to come and outline process for presumptive eligibility (PE). They also brought PE certified providers to the table along with identified providers of low cost or free pregnancy tests. The group reached consensus to provide county residents with information on both free or low cost pregnancy tests and PE provider sites.

Of interest was the stakeholders' response. The survey findings and validity challenged by some Committee Members as they continued to argue for long held assumptions about the source of the problem – specifically teen pregnancy. This observation lends validity to the need to identify evidenced based strategies to address barriers. An informational flyer in English and Spanish has been designed and is being widely distributed to educate uninsured and underinsured women about services available to them.

## **Establishment of Inter-Observer Reliability Using the Finnegan Scoring Tool**

Karen D'Apolito, Vanderbilt University School of Nursing, Nashville, TN

The purpose of this poster is to emphasize the importance of establishing inter-observer reliability when assessing neonates for signs and symptoms of withdrawal using the Finnegan Neonatal Abstinence Scoring Tool. There are approximately 160,000 infants born with neonatal abstinence (National Survey on Drug Use and Health, 2006). Opiates such as heroin, methadone or prescription pain killers are among the drugs of abuse. It is estimated that 55% to 95% of newborns exposed to these drugs in utero will experience neonatal withdrawal (Harper, et al, 1974; Fricker et al, 1978; Madden et al, 1977). This withdrawal can be severe if not adequately assessed or treated. Therefore, it is essential that anyone caring for these infants must be able to assess for neonatal abstinence with accuracy. The standard assessment tool to determine the severity of neonatal abstinence is the Finnegan Neonatal Abstinence Scoring Tool (Finnegan et al, 1975; Finnegan, 1986). This tool is used throughout the US and abroad to assess signs and symptoms of withdrawal in drug-exposed infants. The tool consists of 21 signs and symptoms of neonatal abstinence. Infants are treated pharmacologically depending upon the withdrawal score obtained using this tool. The problem that has arisen is the lack of accuracy when completing this tool in the clinical setting. Several of the items comprising the tool are subjective which makes scoring inaccurate. Therefore, the decision to treat becomes difficult. In order to improve the accuracy of assessing neonates for signs and symptoms of withdrawal using this tool an inter-observer reliability program has been developed. The program is designed for staff nurses, physicians, nurse practitioners and researchers. The program includes definitions for each sign and symptom incorporated in the tool, a demonstration video, an infant being assessed for signs and symptoms of withdrawal and a review of the exam pointing out the signs and symptoms present. The demonstration video and exam review are narrated. Participants watch the exam, score the infant using the Finnegan Scoring Tool and watch the exam review which scores the infant. Participants compare their score with the score given to the infant during the review. Then participants check their inter-observer reliability using a percent agreement chart. This program has been used to train staff nurses to improve their inter-observer reliability using the Finnegan Scoring Tool. An inter-observer reliability score of 90-

100% has been achieved when using the program. The incorporation of this program into practice will allow health care professionals to become proficient in assessing neonatal abstinence and neonates will receive the treatment necessary to control signs and symptoms of neonatal abstinence.

### **Bridging the Gaps to Baby Friendly Designation**

Becky Law, Texas Health,

The journey to becoming a Baby Friendly Hospital is challenging. The World Health Organization and UNICEF developed the Baby Friendly Hospital Initiative (BFHI) to decrease infant mortality throughout the world. Making the BFHI a quality initiative for the thirteen hospitals within this system and utilizing a team approach allowed six hospitals to attain the designation of Baby Friendly. These six hospitals are the only designated facilities in the state of Texas. The poster will provide a snapshot of the work required to become a Baby Friendly Hospital. Strategic planning, addressing challenges to win support and foster change within the thirteen hospitals will be discussed. This collaborative and supportive process resulted in breastfeeding policies modeled after the Ten Steps of Successful Breastfeeding as well as other system policies and practices that strongly support best practices within the organization. Staff education programs, implementation tools, and other creative ideas will be shared. This poster will present the change processes and the creative ideas used for implementation of the BFHI program. Cost effectiveness and cost savings realized when implementing the Ten Steps will be offered. As a result of the work done in this system there are numerous implications of practice that will be reviewed. Execution of successful mock and actual surveys will allow for the discussion of improved outcomes for healthier moms and babies.

### **Fantastic Fathers: Increasing Father's Participation and Support in the Neonatal ICU**

Stephanie Eidson, Texas Health

Back ground: We are a 63 bed, 172 staff, level 3 Neonatal ICU in a large metropolitan city. Our Unit Based Committee made a goal to increase our participation of our father's at the bedside and in the unit.

Content Action: We recognized that staff education was vital in this implementation. After visiting with one very active, ever present, visual father and asking him to write down a few points about his time in the NICU, the light bulb moment occurred when he stated that if he and the mother of the infant were both present at the bedside, all comments and or information were directed at the mother. Staff education included: discussions during Dr. T. Berry Brazelton's "Touchpoints" education and training, staff meetings, UBC, orientation of new staff and at the bedside. Another goal was to have more fathers participate in our weekly family support group.

Lessons Learned: With more fathers becoming active at the bedside of their infants, we also found that with their support of the breastfeeding mother, the supply of breast milk for our infants was increased. We also had more father's participate in Kangaroo Care, bathing of the infant and general care of the infant.

Implications For Practice: Staff will be able to: Verbalize the importance of father's participation and bonding with the infant in the NICU. Voice understanding of directing conversations and information to both the father and the mother. Increase presence, participation, engagement and bonding of fathers with their infants in our Neonatal ICU.

## **A Captive Audience Preconceptional Risk Reduction Education in County Jails**

Suzanne Kinkle and Helen Hannigan, Southern New Jersey Perinatal Cooperative

### Introduction:

Southern New Jersey Perinatal Cooperative (SNJPC) is one of New Jersey's six regional Maternal Child Health Consortia (MCHC). Licensed by the New Jersey Department of Health and Senior Services (NJDHSS), the MCHC are responsible for conducting prevention activities, consumer and professional education, total quality management, data analysis, coordinating perinatal transport systems and developing comprehensive regional perinatal plans. In 2002, the New Jersey Department of Health and Senior Services initiated the Perinatal Addictions Prevention Project (PAPP), with a goal of implementing uniform screening in all public and private prenatal settings, statewide, along with providing public information and education about perinatal substance use. Each MCHC implements a PAPP. Based on estimates that drug related offences account for over 50% of incarcerations, SNJPC PAPP staff contacted the county jails and are providing education on the topic of substance use and pregnancy along with general preconceptional risk reduction education to prisoners in those facilities.

### Methodology:

An educational program was developed that focuses on Substance Use and Pregnancy. The educational program is delivered in three sessions: "The Effects of Alcohol on Pregnant Women", "Substance Use and Pregnancy" (including tobacco), and the third session is an interactive game. The game provides "answers", facts contained in the two previous sessions, and participants to provide the questions that correspond to those answers. A pre/post survey tool was developed to measure the increase in knowledge about the dangers and effects of substance use in pregnancy. Incentives are provided to participants.

### Results:

The pre/post survey has demonstrated an increase in knowledge of the inmates following the presentation. The poster presentation will highlight the findings of the survey.

### Discussion:

The population of people in jail are typically ignored by many community providers. The county jails welcome the staff of SNJPC into their settings as it helps serve their inmates and also helps the jails to comply with requirements that they coordinate with community agencies. The staff at SNJPC find both the male and female population interested in this topic. The educational sessions open up discussion with the inmates about alcohol; tobacco and drug use while pregnant and clear up many misperceptions. Male populations are not typically targeted for this type of education, however research has shown that males have an impact on whether a pregnant women use substance while pregnant, so providing education to them is also beneficial to their partners. As a result of this survey, the staff at SNJPC now provide this education to both male and female inmates at the seven county jails.

## **What is the Meaning of Normal Birth?**

Sharon Dalrymple and Debra Bingham, Lamaze International

**Introduction:** For the past 50 years Lamaze International has been promoting normal birth practices in North America and more recently worldwide. Despite these educational efforts, women are being over treated more now than they have for over 30 years. For example, 31% of women are having surgical births in the United States. The overuse of non-evidenced based interventions has led to worse outcomes for both mothers and newborns. Furthermore, women do not get adequate information so they are aware of the additional, un-necessary risks they and their infants are being exposed to.

**Methods:** Lamaze International hired a public relations market research firm to conduct research to identify which messages are the most effective for persuading women to adopt normal birth practices. On-line surveys were conducted, n=811 women of childbearing age between the ages of 16-44 (margin of error +/- 3.4% in 95 out of 100) and n= 408 Lamaze Certified Childbirth Educators.

**Results:** The meaning of the words “normal” and “natural” were not interpreted by the women and educators to mean the same thing. For example, 36% of women felt that ALL vaginal births are ‘normal birth’, while 63% of Lamaze Certified Childbirth Educators defined ‘normal birth’ to be a birth without medical intervention. Women and Lamaze childbirth educators alike are divided when deciding if the terms “natural birth” and “normal birth” are generally similar or generally different in meaning. Women who attended Lamaze classes are more likely than both women who took a childbirth class other than Lamaze and those who did not take any class to prepare a birthing plan AND actually follow the plan during labor.

**Discussion:** Conversations and language affect how persuaded others are to make a change. There are five stages for the diffusion of innovations. Persuasion is the second stage. Yet, it is not universally understood or agreed upon how to define a normal birth, the differences between normal and natural birth, and which behaviors constitute a normal birth. Lamaze International found that the words “Safe” and “Healthy” are the most effective words for communicating and promoting the Six Key Practices that support normal/natural birth. These six evidence-based key practice papers were updated Fall 2009.

### **Analysis of Fetal Heart Rate Obtained by Magnetocardiography**

M. Terese Verklan, Audrius Brazdeikis, and Nikhil. S. Padhye, The University of Texas Health Science Center at Houston, TX and Texas Center for Superconductivity, University of Houston, Houston, TX

**Introduction:** The exact contribution of the Autonomic Nervous System (ANS) to the phenotypic expression of fetal heart rate (FHR), as well as the response of the FHR to various perturbations is poorly understood. fMCG records the magnetic field generated by the electrical activity of the fetal heart such that the heart signals obtained will have the usual EKG waveforms, permitting accurate quantification of beat-to-beat variability. Nonlinear and linear analysis of the signal may provide information regarding ANS influence that may indicate fetal physiologic stability or instability. fMCG is a new technique capable of assessing both FHR and rhythm, providing important diagnostic information previously unobtainable. The long term goal of the research program is to develop a methodology that will evaluate the fetal ANS to aid in the recognition of the healthy and high-risk fetus.

**Methods:** A non-experimental, prospective design was used to address the objectives: (1) obtain fetal magnetocardiography (fMCG) recordings in a magnetically shielded and electromagnetically noisy environment, and (2) examine fetal heart rate variability (HRV) using spectral and nonlinear analysis to evaluate changing autonomic influence with increasing post-menstrual age (PMA). The convenience sample consisted of 13 fMCG recordings from 5 fetuses with PMA ranging from 30-35 weeks obtained in the Magnetoencephalography Laboratory of the UTHSCH. The woman was comfortably positioned in a semi-sitting position and ECG leads were placed to obtain her HR signal. A multichannel SQUID biomagnetometer, positioned over the abdomen, obtained signals representing magnetic field gradient characteristics at nine spatial locations that were simultaneously digitized at a sampling frequency of 1 kHz simultaneously with maternal HR. The fMCG was recorded for 5 minutes both in the magnetically shielded room and in the electromagnetically noisy environment. Modified Pan-Tompkins algorithm was

implemented for automated QRS detection. The Lomb periodogram was computed on data segments chosen to minimize nonstationarities to provide consistent estimates for spectral power.

Findings: Resulting spectra were integrated into a low frequency (LF) band of 0.05-0.25 Hz and a high frequency (HF) band of 0.25-1.0 Hz. Statistically significant (at 95% level) linear models were obtained. The increase in LF and HF power is slightly less than 2 dB per week; while total power increases approximately 1.5 dB per week.

Discussion: The total power, or the variance, as well as the LF and HF powers independently, indicate an increasing trend with increasing PMA. LF and HF spectral energies are considered to be indicative of sympathovagal activity. Investigation into FHRV with the use of FMCG may lead to advances in the recognition of the fetus at risk and the development of timely interventions to prevent/ameliorate damage to developing systems.

## **DIFFERENCES IN HRV IN NEONATES WITH CONGENITAL HEART ANOMALIES**

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Introduction: The project will address autonomic nervous system (ANS) influences on the heart as the neonate with congenital heart anomalies transitions to extrauterine life. Previous studies have suggested that analysis of HRV perturbations of ANS control is reflective of outcome. The great majority of neonates with cardiac defects have little to no physiological stress placed on the heart prior to birth as the placenta and the fetal shunts (ductus arteriosus and foramen ovale) permit optimal oxygenation and ventilation during gestation. At time of birth, exposure to room air facilitates closure of the ductus and decreasing pulmonary vascular resistance. The defective cardiac structure and altered blood flow from/into the heart may not be able to meet the body's increasing demand for oxygen and ventilation. Thus, analysis of HRV may provide an estimation of how the neonate with congenital heart defects is adapting to extrauterine life, and permit estimation of neonatal outcome. The aim of this pilot study was to examine the differences in heart rate variability in neonates with congenital heart defects pre- and post-surgical intervention.

Methods: The cardiac signal, captured by 3-lead EKG and directly uploaded to the study computer was digitized at 1000 Hz for 5 minutes on days of life 1, 4, 7, 10 and 14. The R-wave – R-wave series was automatically identified with a QRS detector and distributions of the RR intervals were compared pre- and post-surgery. The asymmetry of the distribution was computed along with its variance and time domain measures of short-term and intermediate-term variability. Ten newborn infants with a variety of cardiac defects with increased and decreased pulmonary blood flow lesions were enrolled in the study from the neonatal intensive care units of a large tertiary medical center.

Results: The asymmetry ratio reduced in every case after surgery. The mean reduction was by 0.29 (SD = 0.37). The variance and time domain measures of short- and intermediate-term heart rate variability dropped sharply post-surgery in 3 of 4 cases while showing a modest increase in the fourth case. The mean reductions in variance, rMSSD, and standard deviation of 15-interval means were 518.9, 17.2, and 5.4 respectively (corresponding SD's were: 630.3, 20.2, 7.7).

Discussion: Typically, heart rate variability increases after an intervention in which the patient is better stabilized. However, all subjects had prolonged depolarization times related to the obstructive cardiac lesions. Decreasing the workload of the heart by correcting or relieving the obstruction appears to have evened out the cardiac time intervals such that a more regular heart rate results in a decrease in variability. The decreased asymmetry ratio can then be interpreted as the surgical intervention was successful in alleviating the aberrant pressures in the defective cardiac chambers.

**THE RISK OF POTENTIAL ALUMINUM TOXICITY CAN BE REDUCED  
SAFELY BY USE OF AN AUTOMATED PROGRAM TO SUBSTITUTE  
CALCIUM GLUCONATE WITH CALCIUM CHLORIDE IN NEONATAL  
TOTAL PARENTERAL NUTRITION (TPN).**

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**Introduction:** Use of TPN in the Neonatal Intensive Care Unit is the mainstay of nutrition for neonates who are unable to tolerate enteral feeding. While extensive research has been done to optimize nutritional content, there are other factors that can potentially engender the growth and development of the newborn. One such concern is Aluminum. Excessive Aluminum can cause encephalopathy, metabolic bone disease and microcytic anemia (Sedman 1992). Its effects are exacerbated in the presence of decreased renal function. The standard form of mineral delivering Calcium in most neonatal TPN's is Calcium Gluconate. Calcium Gluconate is known to contribute a significant Aluminum load to TPN. Replacing Calcium Gluconate with Calcium Chloride has been shown to reduce Aluminum delivery by as much as 70% (Bishop et al. 1989). We asked if a change in the Calcium salt could be accomplished safely, without issues of precipitation, decrease in Calcium delivery, or physician, pharmacist, and nurse confusion as to the intended dose. **Methods:** An automated TPN program was constructed using MS Excel 2007 (Microsoft, Redmond, WA). To facilitate conversion between Calcium Gluconate and Calcium Chloride, "a switch" was programmed into the spreadsheet at the time of its initial development. Calcium Gluconate had been the standard for the initial eight years that the program had been in use. Physicians were asked to enter Calcium in mEq when ordering. Calcium solubility was ascertained by use of standard curves comparing the presence of phosphorus in solution with that of Calcium. Safe zones were identified. Alerts were displayed if the solution was at risk of precipitation and the physician was given the opportunity to correct the issue before ordering. As part of ongoing quality improvement, a decision was made by the physician group to "flip" the switch to Calcium Chloride. All TPN manufacture was outsourced to Central Admixture Pharmacies (CAPS, B. Braun, Santa Fe, CA). All reports of incompatibility, precipitation, nursing/physician difficulty were tabulated after the switch. To identify any potential additional concerns, 50 random orders before the switch were compared to 50 following the switch. **Results:** No precipitation was identified in either group, and there were no reports of difficulty in formulation from the outside manufacturer. No nursing complaints related to the switch to Calcium Chloride were received by the Medical Director. Comparisons of the TPN orders did not identify decreased utilization of Calcium, increased potential for precipitation, or other anomalies potentially relatable to the change. All TPN's with

Calcium Chloride (CaCl<sub>2</sub>) did contain 2 mEq more Chloride per mEq of Calcium than those with the same amount of Calcium written as Gluconate as an obvious consequence of the difference in formulation.

**Discussion:** Conversion to TPN formulation with Calcium Chloride can be accomplished safely without significant difficulty, potentially reducing Aluminum toxicity in at risk neonates. The additional benefit of increased Chloride availability can obviate the need for additional salts of Chloride (e.g., NH<sub>4</sub>Cl and ArginineCl) in achieving electrolyte balance.

### SONATAL AS A METHOD OF ENHANCING ADAPTATION RESERVES OF THE INFANT'S SYSTEM IN PRENATAL PERIOD

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*Introduction:* In 1983 the Health School for children suffering from bronchial asthma was founded at the medical exercises dispensary No. 4 of Moscow. The rehabilitation course there included singing, dancing, breathing and water exercises. A group of pregnant mothers whose children already suffered from bronchial asthma was also created to promote prenatal prophylactics of the bronchopulmonary diseases in children.

*Methods:* The *Sonatal* method (from Latin *sonus* – sounding and *natal* – birth) was developed for this purpose; it included voice exercises of the pregnant woman performed to the accompaniment of a specially authored musical program, adequate tactile patting and movements performed at a certain time during the day. The allois theory /R. P. Nartsissov/ provided the methodological basis for this approach.

*Results:* The research covered more than 10,000 children (Moscow, Naberezhnye Chelny, Solikamsk).

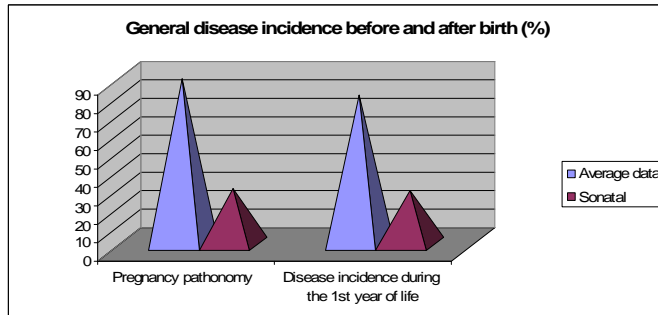
Disease incidence (%)

Type of pathology	Sonatal	Average data
Pregnancy pathonomy (gestosis, anemia, etc.)	38	98.6
Chronic fetal hypoxia	21.8	40.6
Newborn disease incidence	20.7	50.3
Disease incidence during the 1 <sup>st</sup> year of life	28	91

Nosology disease incidence (% , Naberezhnye Chelny)

Nosology	General group	Sonatal
Cerebral palsy	0.6	0.3
Bronchial asthma	0.45	0
Neurology	0.8	0.3
Auditory inefficiency	0.1	0
Arrested speech development	2.93	1.28
Hypertension syndrome	4.8	2.2

Summing up



#### Psychomotor development

Feature	Sonatal	Russian norms
Smiling	19 days	1 month
First words	9 months	10-12 months
Holding the head straight	16 days	3-4 weeks
Autocinesia	1 month	2 months
Picking toys up	3 months	5 months
Rolling from the back to the tummy	3.5 months	5 months
Sitting up with support	3.5 months	5 months
Standing with support	7 months	8 months

*Conclusion:* The collected data makes it possible to conclude that the *Sonatal* method has multisided positive effect on the pregnancy process, on the prenatal health of the child, on childbirth, health and development of the child after birth, and that it could be regarded as a method of non-specific prophylactic of infantile adaptosis (author's term), or the reduction in the adaptation reserves of the system.

#### SLEEP CHARACTERISTICS IN BREASTFEEDING AND FORMULA FEEDING MOTHERS

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*Background:* New mothers are faced with biopsychosocial changes including sleep. Biologically, we need sleep to feel rested, to be alert and to function effectively. The birth itself often interrupts sleep, and the demand of an infant who needs frequent feedings exacerbates this change in early maternal sleep patterns. Sleep loss is a common concern expressed by new mothers and may contribute to early weaning from the breast in hopes of obtaining more sleep. This study's purpose was to investigate the difference between sleep architecture, descriptions and self-perception of sleep in breastfeeding and formula-feeding mothers, 4-6 weeks post-partum (N = 44).

*Study Design:* A convenience sample of first time mothers, 22 breastfeeding and 22 formula feeding participated in this descriptive replication study. Descriptive statistics were used for the subjective measures of sleep, including the St. Mary's Hospital Sleep Questionnaire (4 nights) as well as background sleep patterns, factors influencing sleep and demographic information. Objective measurement tools included 3 nights of wrist actigraphy and one night of home polysomnography. These measures were analyzed with MANCOVA comparing the sleep architecture characteristics of light sleep, deep sleep, and REM sleep while controlling for age, education and nicotine use. Total sleep time was compared by t-test.

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*Results:* MANCOVA revealed no statistically significant differences between the two groups of new mothers on sleep architecture characteristics of light sleep, deep sleep and REM sleep. The two feeding groups were not significantly different in total sleep time measured by home polysomnography. Both groups averaged 2-3 sleep interruptions per night, primarily related to baby feeding. Total sleep time ranged from 4 hours 6 minutes to 9 hours and 11 minutes. No differences were noted across the nights on perception of sleep, which was important to confirm the assumption that the wrist actigraphy, home

polysomnography and sleep questionnaire would not unduly burden the new mother. No differences were found on the subjective measures of sleep depth, quality, satisfaction and drowsiness upon awakening. The variance in sleep characteristics was greater within the formula-feeding mothers. There was a mean of 6.6 hours of sleep in both groups with overall sleep satisfaction. In contrast to the study being replicated, sleep architecture was not significantly different between groups. Wrist actigraphy data reflected more sleep than either polysomnography or self-report.

*Conclusions:* Method of infant feeding did not impact total sleep time, sleep characteristics, or sleep interruptions in this sample of new mothers. There was a wide range of sleep patterns between women and greater variation in the formula feeding group and less variance among the breastfeeding mothers. The means of all sleep patterns were not significantly different between groups. Overall the mothers were fairly to very satisfied with their sleep.