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(See website for additional meetings)

#### 24th Annual Meeting of the European Society of Pediatric and Neonatal Intensive Care - ESPNIC 2013

Jun. 12-15, 2013; Rotterdam, Netherlands  
[www.kenes.com/espnice](http://www.kenes.com/espnice)

#### The Munich International Conference Improvement of Neurodevelopmental Outcome in Neonatology

Jul. 6, 2013; Munich, Germany and the Pre-Conference Workshop

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## An Unusual Case of Prenatal Diagnosis of a Large Left Ventricular Diverticulum and Its Intermediate Term Outcome

By Resham Kaur, MD; Javier Paiz, RDCS; John Brownlee, MD; Umang Gupta, MBBS, DCH

### Introduction

Congenital Ventricular Aneurysm or Diverticulum are very rare conditions. There are few reported cases of these lesions in the literature. Here we describe a rare case of wide-mouthed Left Ventricular (LV) Free Wall Diverticulum that was identified by fetal echocardiography and subsequently followed in our clinic.

### Case report

A 24 week pregnant G4P3A1L3 was referred for fetal echocardiography due to abnormality noted in the Left ventricular free wall and mild pericardial effusion.

The echocardiogram done in the clinic showed large LV free wall outpouching with a wide mouth and some synchronous contractility with the rest of LV free wall. A very small pericardial effusion was seen. The LV systolic function appeared to be depressed with marked reduction in the contractility in and around the lesion. No arrhythmias were seen. No intracardiac thrombi were identified.

She was worked up extensively for

conditions that could lead to dilated cardiomyopathy in fetus with no cause detected.

The patient was followed in the fetal clinic every 4 weeks by serial echocardiograms, the last being performed at 36 weeks of gestation (Figure 1). No changes were noted either in the size or the function of the LV and the diverticulum.

The fetus continued to show normal growth on prenatal examination and didn't develop hydrops and showed no arrhythmias. No mitral valve regurgitation was seen.

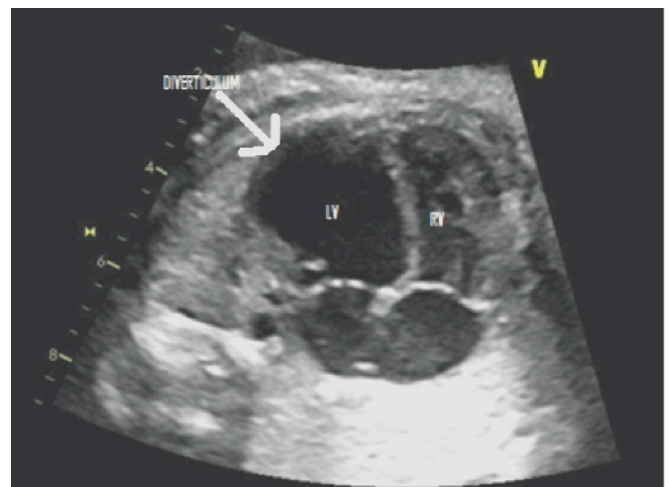


Figure 1. The four-chamber view at 36 week of gestational age showing the large diverticulum (Arrow) at the Left Ventricular Free Wall.

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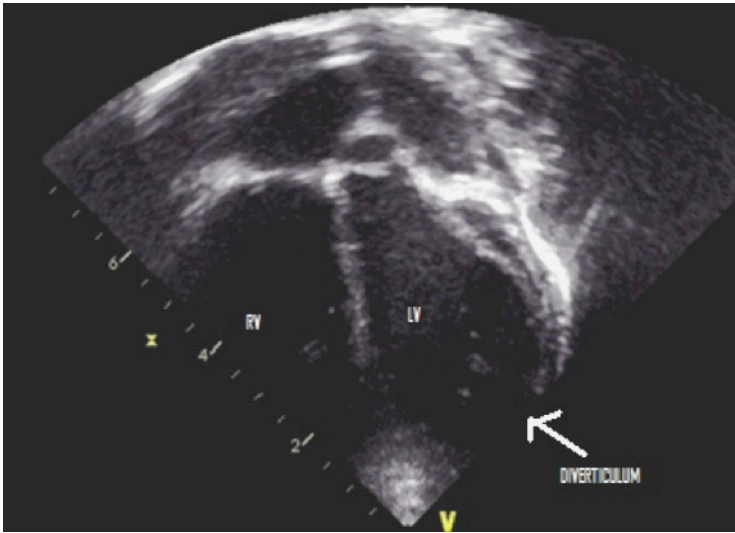


Figure 2. Four chamber view at 7 months of age showing the diverticulum (arrow) that appears to be much smaller relative to the size of LV.

Baby was subsequently delivered through an uneventful spontaneous vaginal delivery weighing 3420 grams. At birth no other congenital defects were identified.

He was subsequently transferred to a transplant center for evaluation and underwent an extensive work up to rule out any genetic/metabolic abnormalities all of which were negative. He was started on Carvedilol and Enalapril and after a period of observation was discharged home. At the time of discharge patient was feeding very well, was very vigorous and was growing normally. No arrhythmias were identified at any time during the hospital stay.

He has subsequently been followed very closely in the cardiology clinic and at the time of his last visit was 7 months old and showed normal growth and development.

He has had no episodes of arrhythmias. His diverticulum continues to decrease in size relative to his LV chamber size (Figure 2) with continued improvement in contractility.

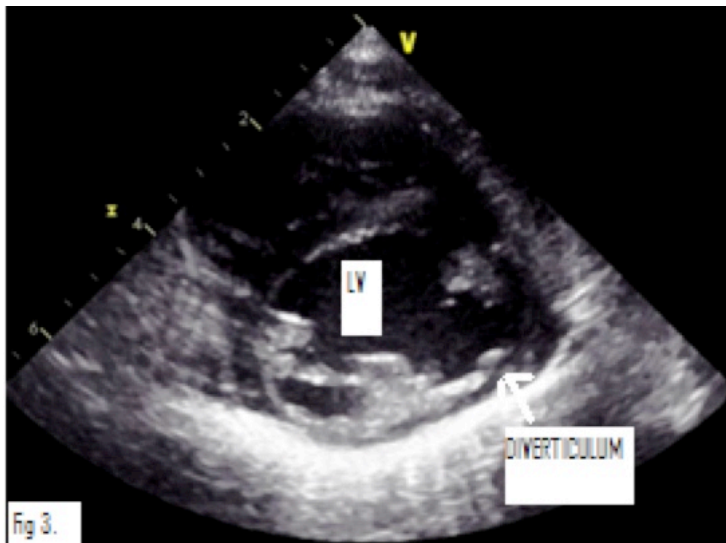


Fig 3.

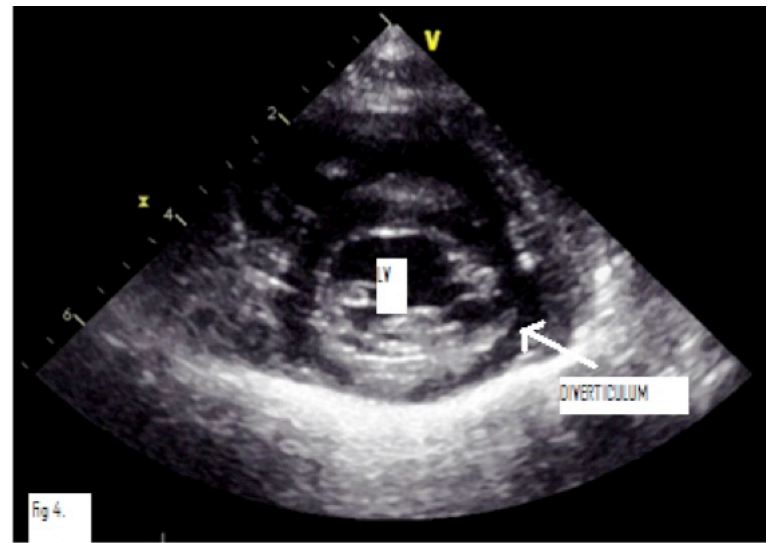


Fig 4.

Figure 3 & Figure 4. Showing the diastolic and systolic frame of LV and diverticulum in parasternal short axis view. Note the synchronous contractility of the diverticulum with the rest of the LV.

## Discussion

Congenital Ventricular wall aneurysm or diverticulum is a very rare condition. There are few reported cases of congenital ventricular aneurysm in the literature.<sup>1,2,3,4,5,8</sup> The finding of congenital diverticulum is even rarer.<sup>1, 8, 9, 11, and 12</sup> Many of these have been diagnosed after birth and only a handful have been diagnosed to date using fetal echocardiography.<sup>1,2,3,4,5,8,9,11</sup>

The reason for referral for fetal echocardiography in most cases have varied from abnormalities on the four chamber views to hydrops/pericardial effusion to arrhythmias (including atrial arrhythmias) seen during routine prenatal ultrasound examination.<sup>1,2,3,4,5,8,9</sup>

Our case was referred to us due to “abnormality” detected on the LV free wall and small pericardial effusion.

Most of these congenital diverticula are described as showing synchronous contractility with the rest of the chamber and usually have a narrow mouth, characteristics, that help differentiate them with aneurysms.<sup>10</sup>

In our case, the mouth of the lesion was wide, which had initially confounded us to believe it to be an aneurysm (Figure 1). Later imaging proved it to have synchronous systolic contraction (Figure 3 & 4). The subsequent improvement in function after birth made the diagnosis of diverticulum more obvious.

Ever since they were first described, a common association has been found between these diverticula and other congenital defects, most notably midline thoraco-abdominal defects.<sup>12</sup>

In our case, we didn’t identify any other congenital defect.

A lot of focus has been placed on the outcome. However, literature remains inconclusive about the course and prognosis of these anomalies. Reported experience have varied from a relatively benign course to a more ominous presentation and outcome.<sup>1,2,3,4,5,6,7,8,9,10,11</sup> The most common causes of death that have been reported seem to be arrhythmias or severe fetal hydrops.<sup>1,7</sup>

Our patient remained stable throughout the pregnancy and showed normal intrauterine growth. His delivery remained uneventful and he has shown progressive improvement in his left ventricular function with decrease in the size of the diverticulum and improved contractility of the involved region.



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# Medical News, Products & Information

## Standard Written Checklists Can Improve Patient Safety During Surgical Crises

Newswise — When doctors, nurses and other hospital operating room staff follow a written safety checklist to respond when a patient experiences cardiac arrest, severe allergic reaction, bleeding followed by an irregular heart beat or other crisis during surgery, they are nearly 75% less likely to miss a critical clinical step, according to a new study funded by the US Department of Health and Human Services' Agency for Healthcare Research and Quality.

While the use of checklists is rapidly becoming a standard of surgical care, the impact of using them during a surgical crisis has been largely untested, according to the study published in the January 17<sup>th</sup> online and print issue of the *New England Journal of Medicine*.

"We know that checklists work to improve safety during routine surgery," said AHRQ Director Carolyn M. Clancy, MD. "Now, we have compelling evidence that checklists also can help surgical teams perform better during surgical emergencies."

Surgical crises are high-risk events that can be life-threatening if clinical teams do not respond appropriately. Failure to rescue surgical patients who experience life-threatening complications has been recognized as the biggest source of variability in surgical death rates among hospitals, the study authors noted.

For this randomized controlled trial, investigators simulated multiple operating room crises and assessed the ability of 17 operating room teams from three Boston area hospitals – one teaching hospital and two community hospitals – to adhere to life-saving steps for each simulated crisis.

In half of the crisis scenarios, operating room teams were provided with evidence-based, written checklists. In the other half of crisis scenarios, the teams worked from memory alone. When a checklist was used during a surgical crisis, teams were able to reduce the chances of missing a life-saving step, such as calling for help within 1 minute of a patient experiencing abnormal heart rhythm, by nearly 75%, the researchers said.

Examples of simulated surgical emergencies used in the study were air embolism (gas bubbles in the bloodstream), severe allergic reaction, irregular heart rhythms associated with bleeding, or an unexplained drop in blood pressure.

Each surgical team consisted of anesthesia staff, operating room nurses, surgical technologists and a mock surgeon or practicing surgeon.

"For decades, we in surgery have believed that surgical crisis situations are too complex for simple checklists to be helpful. This work shows that assumption is wrong," said Atul Gawande, MD senior author of the paper, a surgeon at Brigham and Women's Hospital and Professor at the Harvard School of Public Health. "Four years ago, we showed that completing a routine checklist before surgery can substantially reduce the likelihood of a major complication. This new work shows that use of a set

of carefully crafted checklists during an operating room crisis also has the potential to markedly improve care and safety."

Hospital staff who participated in the study said the checklists were easy to use, helped them feel more prepared, and that they would use the checklists during actual surgical emergencies. In addition, 97% of participants said they would want checklists to be used for them if a crisis occurred during their own surgery.

The practice of using checklists is borrowed from high-risk industries such as aviation and nuclear power, where checklists have been tested in simulated settings and shown to improve performance during unpredictable crisis events.

## ICUs for Newborns in Nine States See Sharp Drop in Bloodstream Infections

Newswise — Central Line-Associated Bloodstream Infections (CLAB-SIs) in newborns were reduced by 58% in less than a year in hospital Neonatal Intensive Care Units (NICUs) participating in an Agency for Healthcare Research and Quality patient safety program. Frontline caregivers in 100 NICUs in nine states relied on the program's prevention practice checklists and better communication to prevent an estimated 131 infections and up to 41 deaths and to avoid more than \$2 million in health care costs.

CLABSIs are healthcare-associated infections (HAIs) that cause serious illness and death in infants as well as adults. A central line is a tube (catheter) that goes into a patient's vein or artery and ends in the central bloodstream. In newborns, especially premature infants, central lines can remain in place for weeks or months to provide nutrients and medications as babies become able to function on their own.

Healthcare teams in the project states, caring for a total of 8,400 newborns, used AHRQ's Comprehensive Unit-based Safety Program (CUSP) to improve safety culture and consistently implement catheter insertion and maintenance guidelines. CUSP is customizable and helps hospitals understand and apply the science of safety and take actions to improve teamwork and communications. This 11-month project used CUSP to help clinical teams focus on safe practices and appropriate steps when using central lines based on guidelines from the Centers for Disease Control and Prevention.

Each state-based team was led by a neonatologist who worked with the state's hospital association to implement the project. When the project began, participating NICUs had an overall infection rate of 2.043 per 1,000 central line days. At the end of the project, that rate was reduced to 0.855 per 1,000 central line days, a relative reduction of 58%. For more information on how NICUs achieved this reduction, visit [www.ahrq.gov/qual/clabsi-neonatal/](http://www.ahrq.gov/qual/clabsi-neonatal/).

"The CUSP framework brings together safety culture, teamwork and best practices—a combination that is clearly working to keep these vulnerable babies safer," says AHRQ Director Carolyn M. Clancy, MD.



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## Seeking a BE/BC Clinical Neonatologist and a Neonatal Nurse Practitioner

St. Luke's Children's Hospital in Boise, Idaho, is seeking one BE/BC clinical Neonatologist and one Neonatal Nurse Practitioner to join 7 Neonatologists and 7 NNPs in a long-established Level IIIB NICU. ADC of 37, ~800 admissions/yr. Full complement of Pediatric Subspecialty services, plus 4 MFMs. Modern 61-bed, technologically advanced unit. Level II NICU in Meridian, 12 beds. Highly skilled Maternal-Child Transport Team.

Boise has been rated as one of the top U.S. cities in which to live. Low unemployment, excellent public/private school systems, affordable housing. Greater metro area offers impressive number of cultural opportunities to its population of nearly 500,000. Boise has a mild, 4-season, high-desert climate with hot, dry summers, minimal snow in winter. But just a short drive away is an alpine wonderland with deep snow for skiing and snowmobiling in the winter, and long, sunny days for hiking, fishing, cycling, and boating in summer.

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"These remarkable results show us that, with the right tools and dedicated clinicians, hospital units can rapidly make care safer."

The nine-state project in NICUs is part of a larger AHRQ-funded effort to implement CUSP to prevent CLABSIs nationwide. Preliminary results of the larger project were announced in September 2012; final results from the national implementation project are now available and show that CLABSIs were reduced by 41% in adult ICUs. The final report is available at [www.ahrq.gov/qual/clabsi-final/](http://www.ahrq.gov/qual/clabsi-final/).

AHRQ provided funding to the Health Research & Educational Trust (HRET), the educational arm of the American Hospital Association (AHA), to conduct both projects. For the NICU project, HRET partnered with the Perinatal Quality Collaborative of North Carolina and the Missouri Center for Patient Safety to support Colorado, Florida, Hawaii, Massachusetts, Michigan, New Jersey, North Carolina, South Carolina and Wisconsin.

"The successes of the project are proof that a great deal of improvement can happen in a relatively short timeframe," says Maulik S. Joshi, DrPH, President of HRET and Senior VP of the AHA. "We are excited by the outcomes of the collaborative, and we look forward to applying what we've learned about leveraging existing infrastructures to spread improvement in ongoing and future projects."

AHRQ's HAI Program contributes to the U.S. Department of Health and Human Services' National Action Plan to Prevent Healthcare-Associated Infections ([www.hhs.gov/ash/initiatives/hai/index.html](http://www.hhs.gov/ash/initiatives/hai/index.html)) and the Partnership for Patients ([www.healthcare.gov/compare/partnership-for-patients](http://www.healthcare.gov/compare/partnership-for-patients)), which offer a coordinated approach to making care safer by drawing on the strengths and expertise of the HHS agencies.

Details about AHRQ's CUSP projects, including a report on the NICU project and the final report from the national implementation project, are available at [www.ahrq.gov/qual/hais.htm](http://www.ahrq.gov/qual/hais.htm). AHRQ's CUSP toolkit, which was developed from the national implementation project and used in the NICU project, is available at [www.ahrq.gov/cusptoolkit/](http://www.ahrq.gov/cusptoolkit/).

The concept of CUSP was first developed by Peter J. Pronovost, MD, PhD, Director of the Armstrong Institute and Senior VP for Patient Safety and Quality at Johns Hopkins University, with funding from AHRQ. It was first tested statewide in over 100 adult ICUs in Michigan hospitals (the Michigan Keystone ICU Project), and then expanded to other states. Now, hospitals nationwide are using CUSP as a result of the national implementation project.

### Laughing Your Way to Passing the Neonatology Boards - Taking the Boredom out of Board Review®

Neonatal fellows preparing for the boards who have "Laughing Their Way to Passing the Boards" can look forward to the release of a 2<sup>nd</sup> set of neonatal board review questions later this year.

The first set of questions, "Laughing Your Way to Passing the Neonatology Boards," written by Dr. Morarji Peesay was released in 2007 and was an immediate hit with Neonatal Fellows and Neonatal Nurse Practitioners preparing for their respective certification exams.

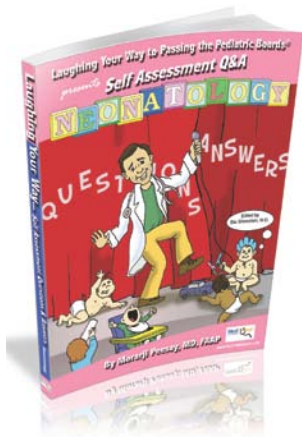
In addition to this new title, earlier this month the company started a brand new expanded website - <http://laughingyourway.com>.



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The new website is more than just a showcase and e-commerce site for their medical board review book series.

The new website also includes a board review blog that includes articles on how to study and

review more efficiently, tips on scheduling study time, and how to develop mnemonics that are not just easy to remember but impossible to forget. In addition, it contains other important topics for the busy neonatologist who must balance study with the increased demands of professional and in some cases family obligations.

The new website even allows visitors to sample actual pages from the "Laughing Your Way to Passing the Neonatology Boards" / Questions, as well as access to free neonatal board review questions found here <http://www.laughingyourway.com/resources/neonatology-q-a>.

Brian Cahn, Vice President with a background in the medical sciences, directed content development of the new website, and noted that plans are in the works for an enhanced discussion forum where neonatal board candidates can interact and form online study groups, as well as free downloadable PDF's with important study material for neonatal fellows getting ready to prepare for the exam. Mr. Cahn added that, "our goal is always to make board preparation less daunting and the release of our new title and new website is just another step in that mission."

### March of Dimes Funds New Preterm Birth Research

Five researchers from four states are investigating how genetics and infections interact to cause preterm birth as well as how proteins and hormones regulate a healthy pregnancy, all with the goal of giving more babies a healthy start in life, the *March of Dimes* announced on March 5th, 2013.

The researchers will study the role that fetal fibronectin, a protein, plays in triggering premature rupture of the membranes; and how progesterone, a hormone that has been shown to prevent preterm birth in some women, helps a healthy pregnancy.

Nearly half a million babies – one out of every nine – are born too soon each year in the United States. Preterm birth is a serious

health problem that costs the nation \$26 billion annually. It is the leading cause of neonatal death, and babies who survive an early birth have increased risks of lung disease, cerebral palsy and intellectual and developmental disabilities, problems that can affect their health throughout their lives.

In 2011, the US preterm birth rate dropped to 11.7, the lowest in a decade, but still above the March of Dimes goal of lowering the national rate to 9.6%. That goal can be achieved in part by applying known strategies to prevent preterm birth, such as smoking cessation programs, progesterone treatments, and reducing early elective deliveries, the *March of Dimes* says. But the organization also believes continued research is needed to yield new medical advances to meet the goal.

The grants are awarded for three years and brings the *March of Dimes* nine-year-old Prematurity Research Initiative (PRI) Grant program's total grant to nearly \$24 million. The PRI program is one of several *March of Dimes* grant programs available to researchers.

Jeffrey C. Murray, MD, at the University of Iowa Carver College of Medicine, identified possible genes involved in preterm birth with the support of a prior *March of Dimes* PRI grant. This year, funding for his work has been renewed to allow him to build on his past discoveries with the goal of improving health care providers' ability to predict which women are at high risk of delivering their baby too soon.

Other new grant recipients are:

- Louis Ragolia, PhD, Director of Biomedical Research, Winthrop University Hospital, Mineola, New York, who is focusing on prostaglandins, specialized lipids that mediate inflammation and play an important role in triggering labor at term, to identify women at risk of infection-related preterm delivery and develop drug treatment to prevent it.
- Indira U. Mysorekar, PhD, Washington University School of Medicine; St. Louis, Missouri, who is working to identify how bacteria and other infection-causing microorganisms attack the placenta and contribute to preterm birth.
- Francesco J. DeMayo, PhD, Baylor College of Medicine, Texas, who is seeking to understand the role progesterone plays in suppressing contractions until term. The hormone has been shown to prevent premature delivery among about one-third of women with a singleton pregnancy.
- Ruth Ann Word, MD, University of Texas Southwestern Medical Center, Dallas, is investigating the role of the protein fetal fibronectin in causing preterm premature rupture of the membranes (PPROM), which is associated with 30 to 40% of preterm deliveries in the U.S.

In 2013, the March of Dimes celebrates its 75th Anniversary and its ongoing work to help

### JULY CONFERENCE FOCUS

#### The Munich International Conference Improvement of Neurodevelopmental Outcome in Neonatology

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#### Conference Program:

- How a Change in your Resuscitation Protocol & Respiratory Management Can Change Short and Long-term Outcome - Experiences in Vienna (Klebermass-Schrehof).
- Cardiovascular Determinants of Brain Perfusion & Oxygenation in Very Preterm Neonates During Postnatal Transition (Seri).
- What Can Go Wrong without Expert Brain Ultrasound Knowledge in the NICU (Govaert).
- The Intervention Trial to Raise the Level of Quality in NICU Care in Japan (Sobajima)
- Neuromonitoring with aEEG (Schettler)
- Optimal Nutrition in Preterm Infants for Long-term Health (Singhal).
- Neuro-Conscious Neonatal Care: The Next Frontier of NICU Nursing (Randall)
- Ethics in Neonatology - a Question of Survival or Long-term Outcome? (Bührer)
- Outcome after Extreme Prematurity at Age 7 to 10 Years (Herber-Jonat).
- Long-term Psychological Outcome - Implications for Routine Follow-up & Interventions (Wolke).

#### Pre-Conference Program:

- The aEEG - Basics, Recording, Patterns and Pitfalls (Richter).
- Asphyxia - Assessment & Predictive Value of the aEEG (Schettler).
- Neonatal Seizures & the NICU aEEG Monitoring (Sobajima).
- aEEG in Premature Infants (Klebermass-Schrehof).
- NICU Nursing & aEEG (Randall)
- Workshop Rounds 1-4:
  - Case Reports, Examples & Quiz Part 1 (Sobajima)
  - Case Reports, Examples & Quiz Part 2 (Klebermass-Schrehof).
  - Attachment & different type of electrodes (Schettler / Randall).
  - Different devices, features & how to document (Richter).

babies get a healthy start in life. Early research led to the Salk and Sabin polio vaccines that all babies still receive. Other breakthroughs include new treatments for premature infants and children with birth defects. About 4 million babies are born each year in the United States, and all have benefitted from the March of Dimes life saving research and education.

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## A Vaccine That Works in Newborns?

The underdeveloped immune systems of newborns don't respond to most vaccines, leaving them at high risk for infections like rotavirus, pertussis (whooping cough) and pneumococcus. Researchers at Boston Children's Hospital have identified a potent compound that activates immune responses in newborns' white blood cells substantially better than anything previously tested, and that could potentially make vaccines effective right at birth.

The ability to immunize babies at birth—rather than two months of age, when most current vaccination series begin—would be a triumph for global health. Worldwide, each year, infections kill more than 2 million infants under 6 months old. In resource-poor countries, birth may be the only time a child has contact with a health care provider.

While newborns lack most aspects of the immune response, researchers led by Ofer Levy, MD, PhD, of the Division of Infectious Disease at Boston Children's have shown that their white blood cells do have one receptor that responds strongly to stimulation, known as Toll-like receptor 8 (TLR 8). In their new work, published March 4th by the online open-access journal *PLoS ONE*, they tested a panel of synthetic small-molecule compounds that specifically target TLR8, known chemically as benzazepines.

The compounds, provided by VentiRx Pharmaceuticals (Seattle, WA), potentially stimulate the human immune system and are in clinical trials in patients with certain cancers.

Tested in Levy's lab, one benzazepine, VTX-294, produced a strong immune response in white blood cells from newborns (taken from cord blood samples) as well as whole blood from adults. It induced robust production of cytokines—chemicals that rally the immune response—and proved at least 10 times more potent than the best activator of TLR8 known previously.

"The response was not only equal to that in adults, but VTX 294 was sometimes actually more effective in newborns than adults," notes Levy, the study's senior investigator.

The compound also triggered production of so-called co-stimulatory molecules that enhance immune responses. Moreover, even very low concentrations of VTX-294 strongly activated antigen-presenting cells, a type of white blood cell whose activation induces immune memory—key to effective responses to vaccines.

Toll-like receptors (TLRs), first identified in humans about two decades ago, are part of the innate (rapid) immune response that provides our first defense against infections. Ten types of TLRs are known, and TLR

stimulators have begun to be added to vaccines as adjuvants. The main one, monophosphoryl lipid A (MPLA), stimulates TLR4 and is used in the human papillomavirus vaccine Cervarix. However, in a recent clinical trial published in *The New England Journal of Medicine*, a malaria vaccine with MPLA failed to elicit a sufficient immune response in infants.

With encouraging results in cells from human newborns, Levy and colleagues now hope to formulate VTX 294 or a similar TLR8 stimulator for testing as a vaccine adjuvant in newborn primates, a model in which the lab has expertise, and whose responses to TLR8 closely resemble humans.

"This one receptor seems to lead to more adult-like responses—immediate, short-term responses that are more appropriate for fighting infections," says David Dowling, PhD, co-first author on the study. "We're excited about the benzazepines because they are already in the clinical pipeline. That advances the potential for using them in a clinical study in human newborns, once they have been proven safe in animal studies."

The current study was supported by VentiRx Pharmaceuticals and grants from the National Institutes of Health (R01 18AI100135-01). Dowling and Zhen Tan, MD of the Division of Infectious Diseases at Boston Children's Hospital share first authorship on the paper. Coauthors were Zofia Prokopowicz, PhD, and Christine Palmer, PhD, of Boston Children's, and Maura-Ann Matthews, PhD, Gregory Dietsch, PhD, DABT, and Robert Hershberg, MD, PhD, of VentiRx.

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## Prenatal DHA Reduces Early Preterm Birth and Low Birth Weight

Newswise — University of Kansas researchers have found that the infants of mothers who were given 600 milligrams of the omega-3 fatty acid DHA during pregnancy weighed more at birth and were less likely to be very low birth weight and born before 34 weeks gestation than infants of mothers who were given a placebo. This result greatly strengthens the case for using the dietary supplement during pregnancy.

The results are from the first five years of a 10-year, double-blind randomized controlled trial was published in the April issue of the *American Journal of Clinical Nutrition* and online, <http://ajcn.nutrition.org/content/early/2013/02/18/ajcn.112.050021.abstract>, on February 20th. A follow-up of this sample of infants is ongoing to determine whether prenatal DHA nutritional supplementation will benefit children's intelligence and school readiness.

"A reduction in early preterm and very low birth weight delivery could have clear clinical and public health significance," said Susan Carlson, A.J. Rice Professor of Dietetics and Nutrition at the University of Kansas Medical Center, who directed the study with John Colombo, University of Kansas Professor of Psychology and Director of the Life Span Institute.

"We believe that supplementing US women with DHA could safely increase mean birth weight and gestational age to numbers that are closer to other developed countries such as Norway and Australia," she said.

DHA (docosahexaenoic acid) occurs naturally in cell membranes with the highest levels in brain cells, but levels can be increased by diet or supplements. An infant obtains DHA from his or her mother in utero and



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postnatally from human milk, but the amount received depends upon the mother's DHA status.

"US women typically consume less DHA than women in most of the developed world," said Carlson.

During the first five years of the study, children of women enrolled in the study received multiple developmental assessments at regular intervals throughout infancy and at 18 months of age. In the next phase of the study, the children will receive twice-yearly assessments until they are six years of age. The researchers will measure developmental milestones that occur in later childhood and are linked to lifelong health and welfare.

Previous research has established the effects of postnatal feeding of DHA on infant cognitive and intellectual development, but DHA is accumulated most rapidly in the fetal brain during pregnancy, said Colombo. "That's why we are so interested in the effects of DHA taken prenatally, because we will really be able to see how this nutrient affects development over the long term."

The study was funded by the Eunice Kennedy Shriver National Institute of Child Health and Human Development.

### Nurse Understaffing Increases Infection Risk in VLBW Babies

Newswise — Very low birth weight infants, those weighing less than 3.25 pounds, account for half of infant deaths in the United States each year, yet a new study released in a March 18<sup>th</sup> issue of *JAMA-Pediatrics* documents that these critically ill infants do not receive optimal nursing care, which can lead to hospital-acquired infections that double their death rate and may result in long-term developmental issues affecting the quality of their lives as adults.

These vulnerable infants are the highest risk pediatric patients in hospitals and account for half of all infant deaths in the country each year. These hospital-acquired infections afflicted 13.9% of these frail infants in 2009, the last year reported in the study.

The lead authors, based at the University of Medicine and Dentistry of New Jersey- School of Public Health and the University of Pennsylvania School of Nursing, studied very low birth weight infants cared for in 67 Neonatal Intensive Care Units (NICU).

"One-third of NICU infants were understaffed, according to current guidelines. Understaffing varies further across acuity levels with the greatest fraction of understaffed infants (92%) requiring the most complex critical care, translating into a needed 25% increase in the numbers of nurses," wrote co-principal investigators Jeannette A. Rogowski, PhD, the University Professor in Health Economics at the UMDNJ-School of Public Health and Eileen T. Lake, PHD, RN, FAAN, Associate Director of the Center for Health Outcomes and Policy Research at the University of Pennsylvania School of Nursing.

The researchers noted that infection caused four to seven days of longer hospitalization with associated increased costs, notably to Medicaid. "Under recent changes in Medicaid policy, hospitals will no longer be reimbursed for the costs associated with these infections," said Lake. "Sadly, because Medicaid is the largest payer for premature newborns, the additional costs may lead hospitals to further cut the nursing staff,

leading to a cycle of infection and mortality that could impact even more of these fragile infants."

"These are the first data that demonstrate the extent of adherence to national staffing guidelines and the shortfall is dramatic," said Rogowski. "Fewer nursing hours could lead to less time devoted to cleaning and maintaining intravenous catheters used to deliver medications thus leading to the higher rates of infection."

The researchers examined data from 67 NICUs involving 4,046 nurses and 10,394 infants in 2008 and 3,645 nurses and 8,804 infants in 2009-10. The research was funded by the National Institute for Nursing Research and the Robert Wood Johnson Foundation.

### Drug-Resistant MRSA Bacteria -- Here to Stay

The drug-resistant bacteria known as MRSA, (Methicillin-Resistant *Staphylococcus Aureus*) once confined to hospitals, but now widespread in communities, will likely continue to exist in both settings as separate strains, according to a new study.

The prediction that both strains will coexist is reassuring because previous projections indicated that the more invasive and fast-growing community strains would overtake and eliminate hospital strains, possibly posing a threat to public health.

Researchers at Princeton University used mathematical models to explore what will happen to community and hospital MRSA strains, which differ genetically. Originally MRSA, which is short for methicillin-resistant *Staphylococcus aureus*, was confined to hospitals. However, community-associated strains emerged in the past decade and can spread widely from person to person in schools, athletic facilities and homes.

Both community and hospital strains cause diseases ranging from skin and soft-tissue infections to pneumonia and septicemia. Hospital MRSA is resistant to numerous antibiotics and is very difficult to treat, while community MRSA is resistant to fewer antibiotics.

The new study found that these differences in antibiotic resistance, combined with more aggressive antibiotic usage patterns in hospitals versus the community setting, over time will permit hospital strains to survive despite the competition from community strains. Hospital-based antibiotic usage is likely to successfully treat patients infected with community strains, preventing the newcomer strains from spreading to new patients and gaining the foothold they need to out-compete the hospital strains.

The researchers made their predictions by using mathematical models of MRSA transmission that take into account data on drug-usage, resistance profiles, person-to-person contact, and patient age.

Published February 28<sup>th</sup> in the journal *PLOS Pathogens*, the study was conducted by postdoctoral researcher Roger Kouyos, now a scholar at the University of Zurich, and Eili Klein, a graduate student who is now an assistant professor in the Johns Hopkins School of Medicine. They conducted the work under the advisement of Bryan Grenfell, Princeton's Kathryn Briger and Sarah Fenton Professor of Ecology and Evolutionary Biology and Public Affairs at Princeton's Woodrow Wilson School of International and Public Affairs.



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# Global Neonatology Today Monthly Column - Millennium Developments Goals and China: MDG 4

By Dharmapuri Vidyasagar, MD, FAAP, FCCM

In the previous column we talked about the progress China made toward accomplishing U.N. Millennium Development Goal (MDG) #1, to eradicate extreme poverty and hunger. This month we will summarize the status of progress China has made toward achieving MDG #4, to reduce child mortality.

To improve the health of women and children, the Chinese government introduced several pieces of legislation over the last two decades to strengthen Maternal and Child Health (MCH). In 1994, it introduced its Law on Maternal and Infant Healthcare to protect women and children's healthcare rights and interests, establishing the foundations for China's MCH services.

In 2001, two more laws, the "National Programs for Women's Development" and the "National Programs for Children's Development" were passed. These laws provided a legal and regulatory system to protect women's and children's health, and have strengthened the management and implementation of MCH projects. This legislation brought about additional improvements in the health status of women and children.

Meanwhile, on the implementation side, the Chinese government established over 3,000 MCH centers nationwide, employing 500,000 healthcare workers across a three-level network of county, township and village-level MCH services. The services were strengthened and streamlined. The results show that:

1. Since 1990, there has been a steady reduction of the under-five years of age mortality in children. This rate dropped from 61 per 1,000 live births in 1991 to 17.2 in 2009.
2. Infant mortality rates also decreased from 50.2 per 1,000 live births in 1991 to 13.8 in 2009.
3. In 2009, over 80% of child deaths were attributed to Infant Mortality Rate (IMR), with 60% of this due to NMR (Neonatal Mortality Rate), chiefly due to neonatal asphyxia, premature delivery or low birth weight, severe infection, and congenital malformations.
4. Beyond infancy, the main causes of child mortality are - in rural areas: pneumonia, injury and diarrhea; and, in urban areas: injury and pneumonia.

Although there are several problems that still need to be resolved, the data indicates that China has achieved the goal of MDG #4 ahead of schedule.

***"Although the national monitoring system for maternal and child mortality has been improved markedly in recent years in accounting for child mortality rates and immunization coverage, a monitoring challenge remains when it comes to unregistered and floating populations.."***

The child and infant mortality rates vary according to socio-economic status, urban-rural residency and geographic location. For example, mortality rates are higher in the poor Western provinces and regions compared to the wealthy Eastern provinces.

Nutrition remains a significant contributing factor for child mortality, particularly in poverty-stricken areas. Micronutrient deficiency is common in these areas.

Great emphasis has been placed on the issue of immunization coverage. China is aiming to rid itself of polio and measles, contain hepatitis B, and tighten the control of diseases that can be prevented through vaccination. According to the Communicable Diseases Targeted Vaccination Report in 2009, there was a noticeable decrease in the incidence of vaccine preventable-diseases (measles, meningococcal meningitis and hepatitis A) when compared to 2008.

## Challenges Ahead

According to the 2008 report on MDGs by China's Ministry of Health, there are several challenges in providing healthcare to children in China, particularly in rural areas. These shortcomings include:

1. Insufficient funding in public health has resulted in incomplete preventive health services and incomplete coverage.
2. The NCMS (New Cooperative Medical Scheme) and urban health insurance plans need to be further strengthened so that children, in particular newborns and migrant children, can be covered by health insurance.
3. There are differences in the quality of accessible healthcare services to rural and

4. poor populations, the floating population, and children of ethnic minority families.
4. It is recognized that there is a traditional preference for males over females in China. This problem, along with the socio-economic ones, contributes in part to the higher female infant mortality rate. The government is cognizant of this problem, and plans to increase its attention towards solving this issue.

Although the national monitoring system for maternal and child mortality has improved markedly in recent years in accounting for child mortality rates and immunization coverage, a monitoring challenge remains when it comes to unregistered and floating populations.

**The Clock is Ticking !!!**

**NT**

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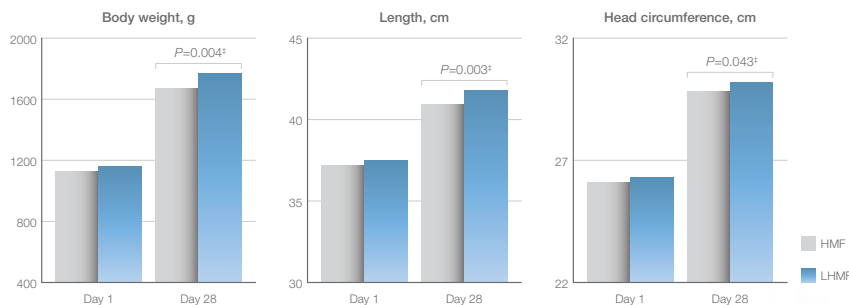


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