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## Who Takes Care of Us?: Understanding and Managing Secondary Traumatic Stress in the NICU

By Stephen Lassen, PhD

Providing care in a Neonatal Intensive Care Unit (NICU) is a stress-filled endeavor. Not only are we charged with treating and managing the medical care of critically ill and complicated infants, but those duties necessarily extend also to the family systems within which the babies exist. Exposure to medical trauma, such as death, pain, discomfort, as well as to the emotional response of families to such events is a common experience in the NICU setting.

We are just beginning to understand how trauma, experienced indirectly in the course of one's professional duties, can affect the lives of caregivers, first responders, social service/behavioral health providers, and medical personnel. There is a growing body of literature on the impact of such potentially traumatic events in the lives of medical providers.

### Definition of Trauma

In order to understand secondary trauma, one must examine the concept of trauma. The Substance Abuse and Mental Health Services Association (SAMHSA; 2012) defines trauma as: "An event, series of events, or set of circumstances that is experienced by an individual as physically or emotionally harmful or threatening and that has lasting adverse effects on the individual's functioning and physical, social, emotional, or spiritual well-being."

The above-mentioned definition of trauma is largely similar to other definitions. However, this definition is of considerable breadth. It comprises a broad spectrum of effects at many different levels of human functioning with the frequency of such events varying widely. Second, it highlights the subjectivity of trauma. According to this definition, trauma is something that is "experienced by an individual" in a particular manner. Therefore, it is defined, not by the nature of the event, as much as by how the individual processes the event. Diagnostically, trauma-related disorders are unique in that they are predicated on an

individual having a specific experience. Lastly, and relatedly, trauma is defined, not only by one's perception of an event, but also by its impact. How an individual responds to an event or events ultimately determines if it is classified as a "trauma" or not.

### Secondary Traumatic Stress

More recently, research has been investigating the impact of vicarious or Secondary Traumatic Stress (STS). Much like the impact of second-hand cigarette smoke on the respiratory functioning of those in proximity to the smoke and smoker, experiencing the trauma of another individual can have a profound and chronic effect on the well-being of the caregiver or provider. This effect has been given different names – vicarious traumatization, compassion fatigue, secondary traumatic stress – but all convey basically the same concept.

Studies in this area have been largely descriptive in nature and assessed primarily nursing staff. Findings to date suggest that medical personnel experience high levels of trauma symptoms (See Hooper et al., 2010; Dominguez-Gomez & Rutledge, 2009; Czaja et al., 2012). Those who have been identified as being at risk for developing secondary trauma symptoms will be discussed later in this article.

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***"...trauma is defined, not only by one's perception of an event, but also by its impact. How an individual responds to an event or events ultimately determines if it is classified as a 'trauma' or not."***

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**References:** **1.** Agency for Healthcare Research and Quality. National Guideline Clearinghouse website. <http://www.guideline.gov/search/search.aspx?term=hyperoxia>. Accessed August 18, 2015. **2.** Kulkarni AC, Kuppusamy P, Parinandi N. Oxygen, the lead actor in the pathophysiologic drama: enactment of the trinity of normoxia, hypoxia, and hyperoxia in disease and therapy. *Antioxid Redox Signal*. 2007;9(10):1717-1730.

One of the only published studies on STS that included physicians found no difference in the prevalence of STS among several professional groups in a large children's hospital (Robins, Meltzer, & Zelikovsky, 2009). Other results identified number of years in direct patient care and aspects of empathy (discussed in more detail below) as significant risk factors for greater STS symptomatology. Clearly, additional research focused on how STS impacts the spectrum of clinical care providers is needed.

Secondary Traumatic Stress Has Been Defined as:

“The natural, consequent behaviors and emotions resulting from knowledge about a traumatizing event experienced by a significant other. It is the stress resulting from helping or wanting to help a traumatized or suffering person” (Figley, 1995).

Charles Figley, one of the pioneers in the field of STS has called this the “cost of caring” (1995). While we typically see empathy and “caring” for others as a positive attribute, and it truly is, it does not come without a “cost.” Seen from this perspective, empathy is a double-edged sword in many ways. That very empathy and sensitivity to the needs of others - what many of us would say makes us great at what we do - also puts them at risk for developing trauma symptoms.

Researchers have generally differentiated between two types of empathy in terms of its affective load. The first, cognitive empathy, is the ability to understand what a family may be experiencing in the NICU. This type of empathy is healthy, allows health care providers to do their job effectively, and is associated with fewer symptoms of STS. Alternatively, affective empathy is the ability to experience at a more emotional level what someone is going through. As one might expect, this form of empathy, while very important to the care we provide and the relationships we develop with families, also conveys more risk for experiencing distress and symptoms of STS.

The following two vignettes are descriptions of STS encountered in the NICU setting.

An RN in the NICU was the primary nurse for a set of triplets, one of whom died suddenly. She felt close to the family and

babies. She is now the primary nurse for another set of triplets, one of whom is not doing well. She is having flashbacks of the prior triplets and fears there will be another loss. She is distancing herself from the family, anticipating a loss.

A neonatologist was called in for an urgent delivery of a premature and medically complicated infant. The infant lived for a couple of hours before dying. The family was distraught and blamed the neonatologist for the death. The neonatologist is now experiencing anxiety when he is called in for deliveries. He avoids taking call and has difficulty focusing on other things at home when he is on call.

Both of these vignettes illustrate the chronically traumatic environment of the NICU, as well as how STS can present in providers who work in the NICU. Existing research on STS suggests that these are not uncommon experiences and responses.

STS has not yet been recognized as a formal diagnostic category in Psychiatry. Because it bears so much symptomatic resemblance to Post-Traumatic Stress Disorder (PTSD), PTSD diagnostic criteria guide the identification of STS. Table 1 presents common symptoms of PTSD found in STS.

**Who Is at Risk?**

As described earlier, the very nature of the NICU puts all those who work in that environment at risk for STS. Other aspects of one's work setting that can convey additional risk for STS include staff who are socially isolated, not well supported by management, and caring for traumatized patients and families. Beyond workplace and organizational characteristics, there are also individual factors that elevate risk for STS. Research suggests that females, those early in their careers, individuals who are highly empathic and engage in an avoidant style of coping with stress, and those with unresolved trauma in their lives are at greater risk for developing symptoms of STS (See Dominguez-Gomez et al., 2009).

**How to Manage STS**

When one considers what to do about symptoms of STS and the effect they can have in our lives, we focus on management, not elimination. By very definition, the NICU is a traumatic environment

**Table 1. Diagnostic Criteria for PTSD**

Intrusion	Avoidance	Changes in mood/cognition	Altered arousal
Recurrent, distressing memories of the event	Avoidance of or efforts to avoid thoughts and memories of the event	Inability to recall important aspects of the event	Irritable behavior/angry outbursts
Recurrent distressing dreams	Avoidance of or efforts to avoid external reminders of the event	Persistent negative emotional state	Reckless or self-destructive behavior
Re-experiencing the event		Diminished interest or participation in significant activities	Sleep disturbance
Psychological and/or physiological distress at exposure to cues of the event		Feelings of detachment from others	Difficulties concentrating
		Persistent inability to experience positive emotions	Exaggerated startle response
		Persistent negative beliefs or expectations about oneself, others, or the world	Hypervigilance
		Persistent, distorted cognitions about the event	

(American Psychiatric Association, 2013)

and this will not change as long as we serve premature infants and their families. So, the expectation that one can eliminate risk for STS is unrealistic and has the possibility of leading to additional distress and frustration.

Management of STS tends to mirror risk categories (See Beck, 2011). Organizationally, it is imperative that NICUs have formal and informal ways of supporting all staff. Formal supports may include regular staff support meetings where staff can discuss topics of interest to them. These kinds of meetings can be facilitated by a social worker, psychologist, or other staff member. One of the benefits of support meetings is creating a culture of support and openness, where staff members have an ongoing avenue for discussing things important to them. Many NICUs have debriefing meetings after difficult deaths. While these are necessary and helpful for staff, if we are not careful we can send an implicit message to staff that those are the only situations where support is needed.

Informal supports vary widely, but really can be seen as an outgrowth of the overall culture of the NICU. These supports include staff socializing when not at work, feeling free to talk with each other about things going on in their lives, sharing joys, successes, and stressors with each other, and asking questions about work-related situations. To be clear, these are not more programs to implement, but a result of a leadership style that values close, supportive relationships among NICU staff members.

Personal strategies for managing the effect of STS include many lifestyle habits that will sound familiar to all of us: adequate sleep, good nutrition, work-life balance, regular physical activity, etc. These are crucial pieces of an overall plan to maximize well-being and minimize the effects of trauma exposure in the lives of medical personnel. Meeting with a counselor can also increase self-awareness, provide additional insight into specific challenges, and assist one with creating and implementing a plan to more effectively address difficulties.

### Conclusion

Working in a NICU brings all those involved into regular contact with trauma. The emerging field of STS is beginning to

help us increase understanding of the impact of this trauma on NICU staff and, importantly, what health providers can do to minimize its effect on us. It is important health professionals normalize this aspect of their work in NICUs and act together to create a supportive environment where staff well-being is valued and seen as a critical aspect of the care they provide to infants and their families.

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***““Working in a NICU brings all those involved into regular contact with trauma...It is important health professionals normalize this aspect of their work in NICUs and act together to create a supportive environment where staff well-being is valued and seen as a critical aspect of the care they provide to infants and their families.”***

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# Is Cannabis to Blame for the Rise in Rates of Gastroschisis?

Michael Narvey, MD

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All Things Neonatal

<https://winnipegneonatal.wordpress.com>

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Gastroschisis, a condition in which the bowel herniates out of the abdomen during fetal development, is on the rise. The rising incidence which occurs about 2,000 times a year in the U.S. caught the interest of CNN in a piece on their site this week. Canada is no different with rates seeming to increase steadily over the last decade or so, and many who care for these infants are left scratching our heads as to why.



## What Causes Gastroschisis to Occur?

Interestingly, the site of herniation is almost always to the right of the umbilicus, and the most prevalent theory is that a vascular insult during fetal development leads to a weakening in the developing abdominal wall. The bowel then herniates through this insufficiency.

What then could explain the near-universal occurrence on the right? The Vascular Disruption Theory.

It is not commonly known, but the embryo begins life with two umbilical veins and two omphalomesenteric arteries. At about one month of gestation the right umbilical vein involutes leaving an embryo with only one umbilical vein. In this disruption theory, the vein involution occurs early leading to ischemia in the territory that eventually causes weakness in the abdominal wall to the right of the umbilicus.

On the arterial side the left omphalomesenteric artery also involutes, with the right one becoming the superior mesenteric artery. It could be that disruption of this process also leads to gastroschisis.

## Risk Factors for Gastroschisis

One of the first surgical truisms in Neonatology is that gastroschisis occurs most commonly among very young mothers. Broadly speaking, gastroschisis also tends to cluster among women of low socioeconomic status (SES), and all that goes with that designation. Poor diet, education and drug use are intimately linked with the condition, but in the end, the proxy may be low SES.

When it comes to drug use, it is the drugs that have vasoactive properties that are most often associated with heightened risk for the condition. Such drugs include, amphetamines, cocaine, as well as ibuprofen, acetaminophen. Finally, smoking likely secondary to nicotine and other vasoactive chemicals, which may affect placental circulation, also is closely linked with development of the condition.

In terms of quantifying the risk, Draper et al performed a case-control study to quantify the risk of such use. The interesting aspect of their study is that they confirmed drug use through analysis of maternal hair to demonstrate exposure. Previous studies relied on maternal interviews to disclose which drugs had been used in pregnancy which may be prone to omission. They found the following:

1. Any recreational drug – odds ratio (OR) 2.2, 95% confidence interval (CI): 1.2, 4.3).
2. Vasoconstrictive recreational drugs (cocaine, amphetamines & ecstasy) (OR 3.3, 95% CI: 1.0, 10.5).
3. Aspirin use (OR 20.4, 95% CI: 2.2, 191.5).
4. Cigarette smoking (OR 1.7, 95% CI: 1.1, 2.6).

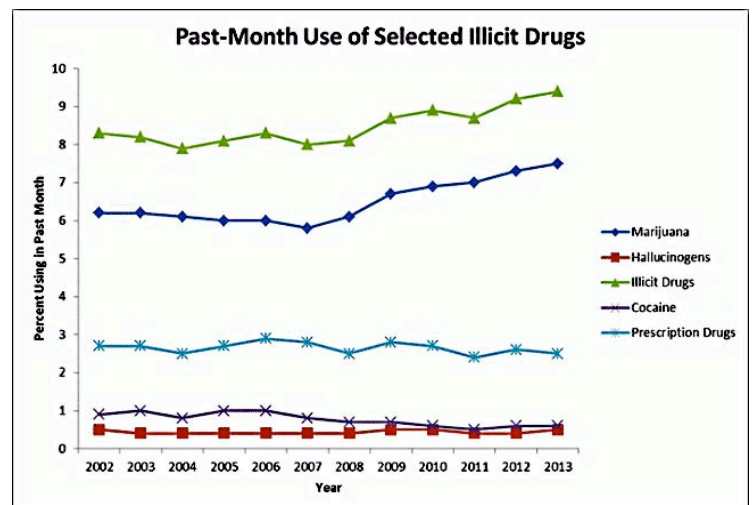
So drugs from a variety of classes seem to increase risk for the condition. Could a rise in drug use in young women account for the increase then?

## Trends in Drug Use

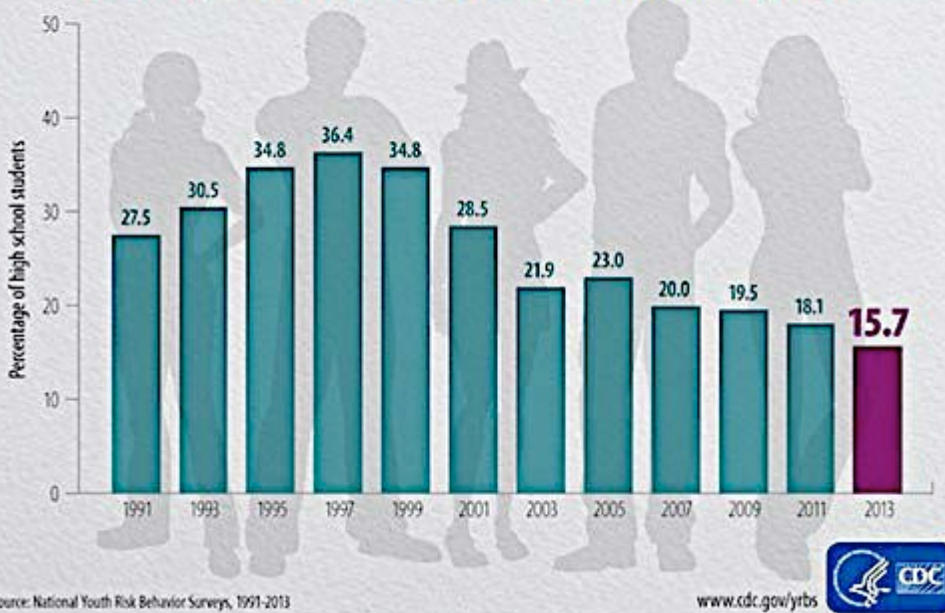
The National Institute of Drug Abuse provides some interesting data in this regard. The following curve demonstrates the trend in drug use in the U.S. over a period that has seen the incidence of gastroschisis rise almost two-fold. The data collected on this site is obtained from surveys and as such, is prone to the same errors that any survey has, namely how sure are we that what is disclosed is the reality? Having said that, it is clear that in terms of illicit drug use, cannabis accounts for the majority of the rise in use over the last decade.

Furthermore, it is well-known that cannabis is a “gateway drug,” and the same site indicates that over 50% of new users are under the age of 18 and of these new users, the drug of choice is marijuana.

Looking at pain relievers such as Tylenol and ibuprofen, there is no data to suggest, at least in the very young group of mothers, consumption of these medications has been on the rise.



## Current cigarette smoking among U.S. high school students lowest in 22 years



Clearly, there is a problem with over-prescription of opioid analgesics in pregnancy, but to the author's knowledge, opioid analgesics have not been associated with the development of gastroschisis.

### What about Smoking in Teens?

As the graph from the CDC demonstrates above, smoking is at an all time low among U.S. high school students. These same students are the ones having babies with gastroschisis so at first glance, this doesn't seem to be a probable cause. Are rates among low SES students showing the same decline? In an article by the Population Reference Bureau, "Not All Americans are Smoking Less" (<http://www.prb.org/Publications/Articles/2011/us-smoking-trends.aspx>) rates, even among these groups, seem to be declining as well, even though level of education shows correlations with higher prevalence of smokers.

### Could Increased Cannabis Use Be the Culprit?

Almost twenty years ago a surgeon mentioned to the author on a rotation during my residency that he had noted an association between marijuana use and gastroschisis.



While, it does not appear that this theory was every published, it stuck with the author "as if it were gospel." Some years later in another conversation about a patient with gastroschisis he said with a smile that after all these years he believes the link is an association. Young mothers use more marijuana and they also have more babies with gastroschisis. What we have here now though is something a little different. The question at hand is why is gastroschisis on the rise in the same group?

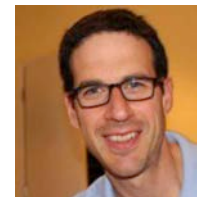
Is it cannabis? It just might be, but this will need some further work to tease out. If gastroschisis is caused by a vascular phenomenon and the only real rise in drug use affecting perfusion is that associated with cannabis, it might be. On the other hand, this could just be another

*"Is it cannabis? It just might be, but this will need some further work to tease out. If gastroschisis is caused by a vascular phenomenon and the only real rise in drug use affecting perfusion is that associated with cannabis, it might be. On the other hand this could just be another association that will not stand the test of time."*

association that will not stand the test of time. This author does not have it in for cannabis, and in fact, believes it could one day be quite useful in Neonatology, as I have written before in "Marijuana Coming Soon To A NICU Near You!"

What goes around, comes around as the saying goes, and as my colleague nears the end of his long and storied career, that in the end, his original observation would be proven true. Stay tuned!

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# The Congenital Heart Collaborative - Two Academic Children's Hospitals Working as One

By Timothy F. Feltes, MD

In June 2016, The Congenital Heart Collaborative celebrated its' first anniversary, in what will be a multi-year agreement between Nationwide Children's Hospital in Columbus, Ohio, and University Hospitals Rainbow Babies & Children's Hospital in Cleveland, Ohio, to form a co-managed cardiac service. These two hospitals have faculty on both campuses actively engaged in parallel missions to provide value-based clinical care excellence and innovation, education, and research. In all aspects of the collaborative, from the governance structure to the sharing of recruitment and case management duties, the overarching premise has been one of mutual respect between institutions, physicians, nurses, administrators, and support personnel leading to a culture of one program on two campuses.

## The Congenital Heart Collaborative Organizational Structure

In 2014, senior representatives of both institutions engaged in discussions to formulate a common congenital heart program with the goal of expanding patient access to high quality quaternary pediatric cardiac and cardiothoracic surgery services



Nationwide Children's Hospital in Columbus, Ohio



University Hospitals Rainbow Babies & Children's Hospital in Cleveland, Ohio

in their respective communities. In addition, the "Collaborative," as it became known, would support the academic mission of their respective organizations to: preserve the highest quality medical education, grow clinical research activities, recruit and retain talented qualified physicians, trainees, and an agreement for a pediatric heart services program was drafted and signed by both organizations.

## TCHC Service-Line Organizational Structure

The collaborative administrative infrastructure has been modeled after the Heart Center service line at Nationwide Children's Hospital. This service line is overseen by a medical and surgical physician leader (Co-Directors) with a senior program administrator (Vice President level) and local program director. The collaborative's senior leadership is further supported by a local business manager, nursing director, quality manager and clinical area managers. The collaborative senior administration has solid-line accountability to the executive committee of the collaborative. All nursing, medical, surgical, allied health and support personnel have a straight-line matrix to the Co-Directors and service-line administrator. Dual (dotted line) matrices to traditional administrative accountability still apply for hospital employees of the collaborative.

An in-depth and thorough programmatic assessment of the cardiac services was conducted prior to the execution of the master affiliation agreement in order to generate the short-, medium-range, and long-term operational goals (Milestones) for the collaborative. Short-term goals focused on such things as: the cohorting of cardiac patients either in the cardiac intensive care or step-down units, defining and recruiting for physicians and cardiac nursing, and immediate capital needs. Longer-term milestones included business planning for the expansion of medical and surgical services, design of a new cardiac catheterization and intervention suite, and dedicated cardiac intensive care and step-down units. With all milestones, members of the collaborative from both campuses were and will continue to be engaged in the process.

## Provision of Clinical Services

In the very early phase of the collaborative, as we were developing the service line at UH Rainbow Babies & Children's Hospital, we engaged in extensive education and preparation of the in-patient services. Medical services at Rainbow Babies and

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***"In June 2016, The Congenital Heart Collaborative celebrated its' first anniversary, in what will be a multi-year agreement between Nationwide Children's Hospital in Columbus, Ohio, and University Hospitals Rainbow Babies & Children's Hospital in Cleveland, Ohio, to form a co-managed cardiac service."***

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Children's Hospital were never interrupted. Temporarily, high acuity complex surgical and interventional procedures were performed at Nationwide Children's Hospital, but surgical and interventional services were likewise provided on-campus in Cleveland. Despite the recruitment of surgical and interventional personnel to UH Rainbow Babies & Children's Hospital, the plan has all along been to continue to work as a common team with specialty services credentialed on both campuses.

### Provision of Administrative Services

The physician and administrative leadership of the collaborative were committed to a continued presence on both campuses. Regularly scheduled face-to-face meetings supplemented by teleconferences were put into place to keep pace with our ambitious milestones and to address all clinical and non-clinical aspects on an ongoing basis. This commitment continues today and will remain long-term.

### Building One Team

From the very beginning, our goal was to develop one team that worked in a collaborative spirit with mutual respect. This involved a significant level of nursing and physician interactions and sharing of knowledge. A variety of venues were utilized to achieve this goal. Regular site visits between campuses were conducted that included credentialing of nursing staff on both campuses in order to give hands-on experience to the bedside practitioner.

Communication was and continues to be pivotal in the success of the collaborative. We utilize regular town hall meetings to remind employees of the collaborative's mission, goals and progress including quality committee and financials reports as well as ongoing strategic planning. The culture of these meetings is one of transparency and the staff is encouraged to ask or submit (anonymously) questions or concerns and to share positive feedback. The town hall meetings are attended by the collaborative medical and administrative leadership.

Case Management Conferences occur twice weekly. In these secure teleconferences, teams from both campuses present cases for surgical or interventional consideration along with dialogue related to medical management and quality care.

### Speculation

Health care delivery in the United States is evolving. Redundancies of high-cost medical and surgical care such as that seen in the management of patients with Congenital Heart Disease increases inefficiencies and negatively impacts societal costs. The Pediatric Cardiology Quality Improvement Collaborative and National Cardiovascular Data Registry IMPACTM (IMproving Pediatric and Adult Congenital Treatments) are just two examples of cooperative efforts in our field focused on improving patient outcome. Although the collaborative between the heart programs at UH Rainbow Babies & Children's Hospital and Nationwide Children's Hospital is just in its' infancy and proof-of-cost containment has yet to be validated, the potential for such seems apparent. Likewise, the collaboration between centers focused on common missions of expanding medical knowledge and innovation, delivery of high-quality cost-effective care, and education of the future medical workforce is a refreshing change to the competitive

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***“Although the collaborative between the heart programs at University Hospitals Rainbow Babies & Children's Hospital and Nationwide Children's Hospital is just in its' infancy and proof-of-cost containment has yet to be validated, the potential for such seems apparent.”***

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climate that exists in our medical community.

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*Timothy F. Feltes, MD, FACC, FAHA  
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### Upcoming Medical Meetings

**6<sup>th</sup> International Arab Neonatal Care Conference (ANCC 2016)**

*Sep. 29-Oct 1; Dubai  
www.ancc2016.com*

**2016 Neonatal-Perinatal Medicine**

*Oct. 1, 2016; Cleveland, OH USA  
www.metrohealth.org/npmreviews2016*

**6<sup>th</sup> Annuanl Fetal Echocardiography Symposium at UCLA**

*Oct. 15, 2016;  
www.cme.ucla.edu/courses/*

**40<sup>th</sup> Anniversary Miami Neonatology 2016**

*Nov. 5-8, 2016; Miami, FL USA  
pediatrics.med.miami.edu/neonatology/international-neonatal-conference*

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# Social & Mobile Media for the Neonatologist

By Clara H. Song, MD

“Social & Mobile Media for the Neonatologist” by Dr. Song, is a periodic column in *Neonatology Today*. Dr. Song created and moderates the social media outlets for the American Academy of Pediatrics, Section on Neonatal-Perinatal Pediatrics, as well as the NICU at the Children’s Hospital at OU Medical Center. She holds workshops and speaks regionally and nationally on the topic of social communication for the healthcare professional, including: the AAP Perinatal Section Spring meeting, yearly, and the 2011 *NEO: The Conference for Neonatology*.

Twitter started out as a text-to-world service whose old homepage asked “What are you doing?” Twitter’s new homepage says “See what’s happening right now.” That tagline may sound vague and broad, but it is true. Twitter delivers all news- no matter how groundbreaking or inconsequential, you can literally see and read about “what’s happening right now.” Amid both seemingly random thoughts and witty chatter, various sorts of news information find its way from around the world to Twitter in virtual real-time. We can find out, faster than ever, about the epidemic viral outbreaks, like the Zika virus. We can also simply banter about #WhyVax to grow awareness for importance of immunizations. Twitter is an open forum of immediate communication for the world- a genius invention that started as a message board for people to text what they are doing and seeing, out to friends, family and anyone else willing to listen and respond. What organically developed was a community of possibility and sharing, a community where members elevate themselves without limitation. Members can become reporters, educators, philosophers, entertainers, safety officers.

Seven years ago, a few years after Twitter’s inception, registered nurse Phil Baumann compiled a list of 140 potential ways for Twitter to impact healthcare. A number of these have become reality. How can we apply these in our daily practice? Let’s dissect a few (numbers 30, 35 and 70) and translate them into reality.

## “30. Daily Health Tips from Authoritative Sources”

Twitter’s platform is uniquely setup to spread short bursts of text and media to a substantial audience at once. In essence, anyone, in the world that is on the web, who is willing to listen can receive your message at the same time. This sets up a virtual podium for public education. In my experience, vetted information on social web platforms makes communication easier when talking with new families. Whether families have

already searched the Internet or plan to learn more on their own after a face-to-face talk with you, there isn’t much of a downside to having the online health information match the facts in your conversation. As experts in our field, we can easily reinforce each other by free texting “daily tips” or sharing medical news items. For our families, we are aiming to elucidate the confusing terms that we use everyday like “sepsis,” and share the uncontroversial, well-established evidence that is ‘old news’ to us, but breaking news to a first-time mother of a 24-weeker. The Twitter account @TiniestSooners is a NICU community created for the families and loved ones of the babies here in Oklahoma. This is a way to reach out and inform our families by tweeting neonatal knowledge and educational links, anyone can access the information that was gathered from various web sources. For the Twitter-phobic, the account also connects to Facebook and Pinterest.

## “35. Clinical Case Education (for Residents Following Attendings)”

If you are itching to post more updated material to engage a higher level of discussion, you can tweet to a different audience. Whether case presentations, journal articles or board review material, soundbites of information can be sent out for trainees, colleagues, or frankly, anyone who is eager to learn and discuss. #FOAMed is a hashtag that stands for Free Open Access Medication. It represents an idea that medical education should be available for “anyone, anywhere, anytime” that is free and universally available. Twitter is an obvious choice of venue for its accessibility - it’s mobile and immediate. @PedsTwears is the official tweeter for the medical students that rotate through our pediatric clerkship here at OU. Tweets are scheduled twice a day, question in the morning and the corresponding answer in afternoon. The intended audience is the 3<sup>rd</sup> year medical student class, but the interactive learners have come from all over the globe. In what other ways can we

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**“Seven years ago, a few years after Twitter’s inception, registered nurse Phil Baumann compiled a list of 140 potential ways for Twitter to impact healthcare. A number of these have become reality. How can we apply these in our daily practice? Let’s dissect a few and translate them into reality.”**

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turn #FOAMed into a reality? Think small or big - post your last resident lecture or maybe just the take-home key slide, link an important new study, remind us how to be better and do better each day for our families.

#### “70. Live-tweeting Medical Conferences”

You can Twitter-report your perspective at your next meeting. Like note-taking, tweeting summaries of lectures, workshops, research abstracts keeps you engaged and encourages conversation. Be it a huge international event or an intimate local gathering, a live conference sparks dialogue among like-minded learners sitting in the same room or scattered among different halls. It shares the information as well your thoughts to countless others who may not have even know about the meeting. @AAPneonatal is the official handle for the American Academy of Pediatrics Section of Neonatal-Perinatal Medicine (SONPM). Every April, SONPM hosts its annual Workshop on Perinatal Practice Strategies. This year's meeting was tweeted again, #2016WPPS, to showcase speakers as Drs. Jeffrey Whittsett, Saroj Saigal, and Mathew Davis. The twitter feed highlights presentations on Choosing Wisely, QI strategies, the latest report from the Committee on Fetus and Newborn, and more. Linking a word to a # (hashtag) can create a searchable web-based diary lush with media and links for any event. It's interactive learning and notetaking in the digital generation.

If you need a little nudge into the world of tweets and hashtags, I invite you to float around Twitter see all the social good being spread by the NICHD, CDC and American Academy of Pediatrics. Then, search

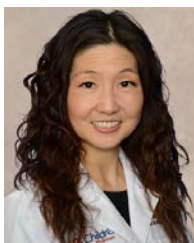
**“If you need a little nudge into the world of tweets and hashtags, I invite you to float around Twitter and see all the social good being spread by the NICHD, CDC and American Academy of Pediatrics.”**

#WhyIdontVax. Some have lost faith in the healthcare community about its ethical practices regarding vaccinations, and continue to vocalize concerns about adverse reactions and hidden agendas from “Big Pharma.” Despite the plethora of evidence that legitimately refutes so much of the dissension, the controversy runs strong. Everyone has a voice. Feel free to use it, ... or tweet it. Someone will listen.

#### References

- Baumann, P. 140 Health Care Uses for Twitter, Jan 2009.
- Free Open Access Medication. #FOAMed. <http://foameducation.org>.

NT



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- Optionally, a picture of the author(s) may be submitted.
- No abstract should be submitted.
- The main text of the article should be written in informal style using grammatically correct English. The final manuscript may be between 400-4,000 words, and contain pictures, graphs, charts and tables. Accepted manuscripts will be published within 1-3 months of receipt. Abbreviations which are commonplace in pediatric cardiology or in the lay literature may be used.
- Comprehensive references are not required. We recommend that you provide only the most important and relevant references using the standard format.
- Figures should be submitted separately as individual separate electronic files. Numbered figure captions should be included in the main Word file after the references. Captions should be brief.
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# Medical News, Products & Information

Compiled and Reviewed by Tony Carlson, Senior Editor

## Extreme Premies Disadvantaged in Employment, Income, Self-Esteem, Marriage and More by Their 30s

Newswise — Extremely Low Birth Weight (ELBW) babies who survive are more likely to be disadvantaged in employment, income, self-esteem, marriage and more by the time they reach their 30s, according to new research from McMaster University.

Published in the scientific journal *JAMA Pediatrics* (CitationsJAMA Pediatr.doi:10.1001/jamapediatrics.2016.0289) the findings come from a longitudinal study that has followed a cohort of ELBW survivors since their birth between 1977 and 1982.

Dr. Saroj Saigal is the principal author of the study and Professor of Pediatrics for McMaster's Michael G. DeGroot School of Medicine, with collaborators from the departments of psychology, and psychiatry and behavioural neurosciences. She is also a pediatrician with Hamilton Health Sciences.

Her study compared 100 ELBW survivors – born at less than 2.2 pounds (1000 grams) -- to 89 control subjects of normal birth weight (NBW) – born at more than 5.5 pounds (2500 grams) and more than 38 weeks of gestation. The participants, now aged between 29 and 36, answered a series of questions on a broad range of medical, social and psychiatric outcomes tailored to young adulthood.

On the positive side, the results of the survey showed that in their early 30s, the ELBW survivors have the same levels of education, family and partner relationships and report fewer risky behaviours compared to their normal birth weight peers.

Otherwise, the ELBW group is less likely than NBW peers to be employed (80% versus 92% of NBW), less likely to have a full-time job (62% versus 77%), and they have an average of \$20,000 less in personal income. More of the ELBW survivors are single (51% versus 35%), more have never had sexual intercourse (21% versus 2%), and fewer have children (20% versus 33%).

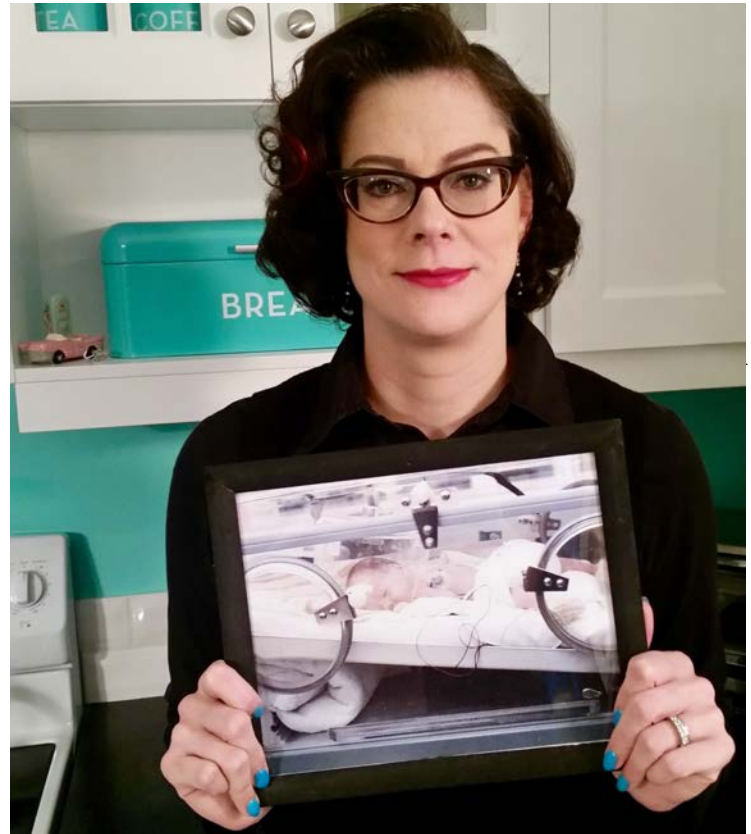
One in five ELBW survivors suffer from neurosensory impairments such as blindness and cerebral palsy, and when these individuals were taken out of the survey's results, the differences in employment, marital status and children are no longer significant.

However, excluding ELBW survivors with impairments, there remain significant differences in personal income, lower self-esteem, alcohol abuse over their lifetime, learning disabilities, ever having sexual intercourse, mental illness, vision problems and chronic illness between the ELBW survivors and their NBW peers.

Saigal said the findings are departures from the survey results a decade ago of the ELBWs in their early-to-mid 20s, but the results are not entirely unexpected.

"We didn't see any major differences between the ELBWs and NBWs then, but they were still very young and just transitioning into adulthood," said Saigal. "But now, they are older and are facing a competitive labour market where jobs are scarce. Also, the high proportion with neurosensory impairments accounted for many of the differences between the groups."

Nevertheless a significant proportion of ELBW adults are employed and living independently and contributing well to society, Saigal said,



Amanda McInnes, who is an extremely low birth weight baby involved in Dr. Saroj Saigal's study, poses with a picture of herself as an infant.

adding that her team plans to continue to track the outcomes of the ELBW survivors.

"To our knowledge, this is the first longitudinal study of ELBW infants followed from birth into their fourth decade of life, and this is going to have wide-reaching application moving forward. We've learned a lot since then, and as a result of better nutrition and technological advances, survival of ELBW infants has now nearly doubled."

She added: "It is difficult to predict what the future will hold for these ELBW adults as they reach middle age. We also need similar studies on newer ELBW survivors to obtain a better understanding of the most pressing issues and to develop effective intervention strategies."

This study was funded by a Canadian Institutes of Health Research (CIHR) team grant.

## Premature Babies May Grow Up to Have Weaker Bones: Low Birth Weight Plays a Big Role in Osteoporosis Risk

Among the many important processes that happen during a woman's last few weeks of pregnancy is the transfer of calcium to the growing foetus to boost bone development. But what happens if this transfer is interrupted when a baby is born prematurely?



The answer, it seems, is lower peak bone mass as an adult, compared to adults who were born full term. Adults who were born full-term but were small for their gestational age also had lower bone mass. These findings are important since peak bone mass is a major determinant of future osteoporosis.

"Few studies to date have addressed bone mass in adults who were born with low birth weight, and there are conflicting findings," said Chandima Balasuriya, the first author of the study. Balasuriya is a medical doctor and PhD candidate at the Norwegian University of Science and Technology (NTNU) and St Olavs University Hospital. "Our study shows that both those born prematurely with a very low birth weight and those who were born full term, but small for their gestational age, had lower bone mass than the control group, who were born full term with normal weights."

The study was conducted by the Endocrinology and Bone Group, headed by NTNU Professor Unni Syversen, and looked at 186 adults who were 26-28 years old.

Fifty-two of the participants were Ver-Low-Birth-Weight babies, with a mean birth weight of 1.2 kg, and a mean gestational age of 29 weeks. Another 59 participants had been born to term, but were considered "small for gestational age", with a mean birth weight of just under 3 kg. The researchers also had a control group of 77 adults who were born at term with normal weight.

For all three groups, researchers measured bone mineral content and density in the spine, neck, hip and the whole body, and looked at current height and weight, smoking, level of physical activity and a variety of other measures.

When the researchers looked at the data from adults who were born small for their gestational age at term, they found that this group had lower bone mass than adults who were born with normal weight at term.

But when the researchers corrected the bone mass measurement for the heights of this group, who tended to be shorter, they found that the low bone mass was partly due to their smaller body size. In contrast, body size alone did not account for the lower bone mass the researchers found in adults who had been pre-term babies.

The good news is that parents and doctors can put this information to use, by helping low-birth weight children build as much bone mass as possible as they grow and develop, through diet and exercise.

"Ensuring that children with low birth weights have a diet rich in calcium, vitamin D and protein, in combination with exercise that involves weight-bearing physical activities may help reduce risk of bone fractures later in life," Balasuriya said.

**Reference:** Influence of Prematurity and Low Birthweight on Peak Bone Mass. Chandima Balasuriya, Mats P Mosti, Kari Anne I Evensen, Ann-Mari Brubakk, Marit S Indredavik, Berit Schei, Astrid Kamilla Stunes & Unni Syversen. Poster presentation, 2016 European Congress of Endocrinology, Munich, Germany.

## New Technology Is Life-Saving Voice for Premature or Critically Ill Infants



Melissa Renteria holds her newborn baby, Arthur, while he's monitored by the HeRO technology.

**Newswise —** A new technology in the Neonatal Intensive Care Unit (NICU) at UC San Diego Health is able to predict the risk of life-threatening infections up to 24 hours before they appear in severely premature or critically ill infants. Infection is the leading cause of death in this fragile patient population.

The Heart Rate Observation system, or HeRO, is an innovative monitoring technology that uses an algorithm to detect slight changes in a baby's heartbeat that could be an early sign of a major infection, like sepsis — a bacterial infection that is highly dangerous to babies born three pounds or less.

"The challenge with diagnosing sepsis is a lot of symptoms for the early stages of the infection are subtle and nonspecific," said Erika Fernandez, MD, Director of the NICU at UC San Diego Health. "With the HeRO technology, we can detect symptoms of sepsis up to 24 hours before the infection actually happens. This allows us to begin an investigation and intervene with treatment before a baby becomes critically ill."

UC San Diego Health is the first health care provider in San Diego County to use the technology, which can detect infections in the blood stream and intestines. Historically, physicians and nurses have relied upon their own observations to detect signs of infection. The new system reports vital sign trends much earlier than the human eye or traditional equipment and requires no additional wiring to the baby.

"This state-of-the-art technology lets babies be babies, and mothers can breastfeed without worrying about tangling up or unplugging wires," said Lawrence Prince, MD, PhD, Neonatology Division Chief at UC San Diego Health. "It makes for a much less intimidating experience for families and a highly improved monitoring approach for medical staff."

The HeRO system uses a zero-to-seven surveillance score generated after a heart rate is analyzed, with anything higher than a two considered an alert for possible infection. Prince says the



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technology is expected to reduce mortality rates in the NICU by 20%.

"Physicians and nurses can evaluate a situation much more thoroughly," said Prince. "When I look at the data on the monitor, I can ask myself, 'is there something more going on with the patient and do we need to do further testing?'"

Fernandez added that the monitoring system represents part of the next generation of technology to save lives and help achieve the ultimate goal in the NICU: "To provide the highest quality of comprehensive and compassionate care to NICU babies so they can thrive and go home with their families as soon as possible."

### **Dr. Betty Vohr Inducted into Rhode Island Heritage Hall of Fame - Recognized for Her Contributions in Pediatric and Neonatal Care**



*Dr. Betty Vohr has been inducted into the Rhode Island Heritage Hall of Fame*

*CREDIT: Women & Infants Hospital of Rhode Island*

Neonatologist Betty R. Vohr, MD, Medical Director of the Neonatal Follow-Up Program in the Department of Pediatrics at Women & Infants Hospital of Rhode Island and Professor of Pediatrics at The Warren Alpert Medical School of Brown University, was recently inducted into the Rhode Island Heritage Hall of Fame.

Dr. Vohr has been the Director of Women & Infants' Neonatal Follow-Up Program since 1974, Medical Director of the Rhode Island Hearing Assessment Program (RIHAP) since 1990, and the National Coordinator of the National Institute of Child Health and Human Development's Neonatal Research Network follow-up studies since 1990.

Dr. Vohr's primary clinical and research interests focus on improving the long-term outcomes of high-risk premature infants and infants with hearing loss.

"I have been fortunate to have had a rewarding career in pediatrics and neonatology at Women & Infants, and I have had the privilege of witnessing the remarkable changes in the care of high-risk infants over the past 40 years," said Dr. Vohr. "There have been amazing strides in the care of low birthweight babies. In 1974, we had one survivor of less than 1,000 grams (2 lbs. 3 oz.); in 2014, we had 108. One of the greatest rewards of doing follow-up for the past 40 years has been witnessing the continued improved outcomes of premature infants."

In 2015, Dr. Vohr was presented the Stan and Mavis Graven's Leadership Award for Outstanding Contributions to Enhancing the

Physical and Developmental Environment for High-Risk Infants and Their Families. This award is presented annually to an individual who has made a substantial contribution to the health and care of newborns in intensive care facilities.

One of her greatest professional achievements was in bringing forward the issue of universal newborn hearing screening. "Near and dear to my heart is the study that we conducted at Women & Infants that showed the feasibility of newborn hearing screening, resulting in the National Institutes of Health and the American Academy of Pediatrics recommending universal newborn hearing screening in the U.S., with Rhode Island being the first state to comply with these recommendations. Today, more than 98% of infants in the U.S. have their hearing screened at birth, and infants with hearing loss now have significantly improved outcomes."

Dr. Vohr continued, "All of this would not have been possible without a supportive hospital environment, great mentors, and fantastic colleagues."

The Rhode Island Heritage Hall of Fame was founded in March 1965 "to honor the contributions of those whose efforts, in any line of endeavor, have added significantly to the heritage of the State of Rhode Island." The Hall of Fame now includes 747 illustrious Rhode Islanders, from Roger Williams and the chief sachems of the Narragansett and Wampanoag tribes to the present.

Women & Infants Hospital of Rhode Island, a Care New England hospital, is one of the nation's leading specialty hospitals for women and newborns. A major teaching affiliate of The Warren Alpert Medical School of Brown University for Obstetrics, Gynecology and Newborn Pediatrics, as well as a number of specialized programs in Women's Medicine, Women & Infants is the 12<sup>th</sup> largest stand-alone obstetrical service in the country and the largest in New England with approximately 8,500 deliveries per year. A Designated Baby-Friendly<sup>®</sup> USA hospital, U.S. News & World Report 2014-15 Best Children's Hospital in Neonatology and a 2014 Leapfrog Top Hospital, in 2009 Women & Infants opened what was at the time the country's largest, single-family room Neonatal Intensive Care Unit.

### **What Does Zika Virus Mean for the Children of the Americas?**

A special communication article published online by JAMA Pediatrics explores whether new paradigms in child health may emerge because of Zika virus.

Peter J. Hotez, MD, PhD, of the Baylor College of Medicine, Houston, Texas, suggests pediatricians and pediatric subspecialists will need to mobilize quickly "to get ahead of this fast-moving train. According to the World Health Organization, up to 4 million people could be infected with Zika virus by the end of 2016." The article suggests revisiting how the specialty of Pediatrics responded to the HIV/AIDS crisis 30 years ago as a possible road map for addressing this new virus infection.

"We are just now waking up to a new normal as we learn more about the complete mental health effects of Zika virus infection. We will likely need to educate and train a new generation of primary

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care providers, including pediatricians and pediatric nurse practitioners. We will need to assemble interdisciplinary teams of pediatric specialists in Neonatology, Neurology, Psychiatry, Rehabilitation Medicine and Infectious Diseases to organize diagnostic, clinical management, and treatment approaches and algorithms for this new illness. We will need new programs of child advocacy. Because Zika virus may equally affect North America, Central America and South America, we will need to expand how we work together across international boundaries. Zika virus will require us to dissolve any existing north-south divisions across Pediatrics in the Americas. The next few years will be a challenging period as the number of congenital and pediatric Zika virus infections continues to increase from the current epidemic that first exploded in the western hemisphere in 2013," the article concludes.

(JAMA Pediatr. Published online June 20, 2016. doi:10.1001/jamapediatrics.2016.1465).

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# NEONATOLOGY TODAY

News and Information for BC/BE Neonatologists and Perinatologists

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