

# NEONATOLOGY TODAY

News and Information for BC/BE Neonatologists and Perinatologists

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First Coast Neonatal Symposium  
Apr. 17-19, 2013; Augustine, FL USA  
[www.neonatal Symposium.com](http://www.neonatal Symposium.com)

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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## Critical Complex Congenital Heart Disease (CCHD)

By Mitchell Goldstein, MD

Critical Complex Congenital Heart Disease (CCHD) refers to a number of congenital heart diseases that are characterized by anatomical variations capable of causing severe morbidity or mortality within the newborn period or beyond. These are a number of different conditions that characteristically require intervention during the first year of life for survival or have a chance for survival.<sup>1</sup> Seven-nine babies per 1,000 live births have some form of Complex Congenital Heart Disease (CHD).<sup>1,3</sup> Before the advent of modern surgical techniques, there was little possibility of intervention even if the diagnosis was clear. Regardless of the time of discovery, many of these complex congenital heart diseases were deemed fatal or associated with a markedly diminished life expectancy. Along with the ability to intervene, it has become abundantly clear that late diagnosis is associated with a worse prognosis for surgical correction, as well as increased risk for complications associated with a failing circulation prior to the intervention. The interest in achieving earlier intervention is largely mediated by wanting to assure the best possible outcomes.<sup>1,4-6</sup>

A number of studies focused on the strength of the physical exam in diagnosis of CCHD.<sup>7-11</sup> A suspicious murmur or a decreased femoral pulse were hallmarks of the "at risk" neonate or small child. Physical exam alone has failed to identify approximately 50% of the CHD cases.<sup>6,9,12-14</sup> Fetal ultrasound and associated echocardiography could readily identify lesions that were not associated with a normal four-chambered heart anatomy, but a number of lesions, especially those involving extra cardiac vessels, are still difficult to detect antenatally.<sup>5</sup> Distinguishing between the benign heart murmurs associated with

the normal closing of the Patent Ductus Arteriosus, and that associated with the unmasking of an Aortic Coarctation was not for the faint-of-heart. Increased utilization of pediatric echocardiography could help make this determination, but frequent false positives on the physical exam made this a costly proposition.<sup>14</sup> Moreover, many birthing centers and community hospitals did not have ready access to a pediatric cardiologist.<sup>15</sup> Not every baby with a heart murmur could be transported for evaluation. The referral process was not standard, and many infants left the hospital undiagnosed. As inpatient maternity length of stay declined, many more babies with duct dependent pulmonary circulation left hospitals undetected. Of babies that died from CHD, studies have shown that up to 30% of infant deaths from CHD occurred before diagnosis.<sup>1,9,13,16,17</sup>

Pulse oximetry was thought to hold promise in helping to screen for CCHD. Early pulse oximeters were not designed to read through motion and low perfusion, which are frequently present in the hours following birth. Frequent, alarming, dropping of the signal, and freezing of the waveform were frustrating at best. Repositioning of the sensor, quieting the baby, and waiting for the signal to transduce were very time-consuming.<sup>12,14</sup> These devices were not designed to be used for neonates. The potential cost of using individual disposable sensors for each screen was thought not to be cost-effective.<sup>18</sup> Although the technology to read through motion and low perfusion had been developed and validated in CCHD by the early 1990's, these devices were not readily available.<sup>12</sup>

The depth of the problems was described by Chang who looked at a series of missed diagnosis of Critical Congenital Heart Disease. In this study, close to 900 patients from the California

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1989-2004 statewide registries were investigated. There were an average of 10 patients with missed CCHD diagnosis, and 20 patients with late diagnosis per year. The overall incidence of missed CCHD diagnosis was 1.7 per 100,000 live births. "Although many screening strategies have been studied, none have proved effective in detecting newborn CCHD."<sup>9</sup>

The sentinel study was performed by Granelli and her associates using a Swedish cohort in a very large collaborative multicenter study (n=39,821). Using a newer pulse oximetry technology capable of reading through motion and low perfusion, Granelli suggested that pulse oximetry could be cost-neutral in the short-term, but with the probable prevention of long-term neurological morbidity. The reduction in pre-operative care costs of a child presenting at extremis cost analysis could favor pulse oximetry screening. Adding pulse oximetry screening (Masimo SET) before discharge increased detection of CCHD by 28% (from 72% to 92%). No babies died from undiagnosed duct-dependent lesion in the pulse oximetry group. Five babies in the control group died during the same period of time. There was an improved rate of detection of duct dependent circulation of 92% as shown in Table 1.<sup>17</sup>

Ewer (2011) performed a large accuracy study (n=20,000) in the UK studying the use of pulse oximetry in the detection of babies with CCHD. He found that pulse oximeters produce saturations that are not only accurate, but stable in active individuals with low perfusion making these instruments ideal for screening newborns in the first hours of life. The Ewer study used a saturation cutoff of less than 95% in either limb to indicate the presence of a positive screen test or a difference of more than 2% between the limb saturations versus the 3% difference used by the expert panel. The median age at testing in the Ewer study was 12.4 hours, while the expert panel and/or Granelli suggested greater than 24 hours or before discharge. In Europe, an earlier discharge is the norm.<sup>1,17,19</sup>

**Table 1**

	Physical Exam Alone	Physical Exam + Pulse Oximetry Screening
N= 39,821 babies		
Sensitivity	63%	83%
Specificity	98%	99.8%

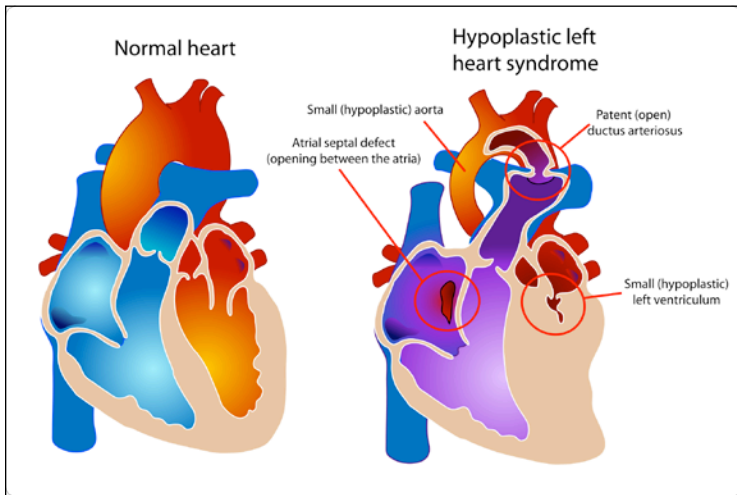
Roberts studied the issue of cost-effectiveness in the UK. Their objective was to conduct a cost-effectiveness analysis comparing pulse oximetry as an adjunct to clinical examination or examination alone in newborn screening for congenital heart defects (CHD). In a study that involved six large maternity units in the UK, the study showed that pulse oximetry as an adjunct to current routine practice of clinical examination alone is likely to be considered a cost-effective strategy in the light of currently accepted thresholds for medical needs justification. The clinical examination alone strategy detects 91.5 additional cases of clinical significant CHD per 100,000 births at an estimated cost of £614,100 (app. \$964,700) for the strategy. Using the intervention Strategy of Pulse Oximetry as an adjunct to Clinical Examination would detect 121.4 cases of CHD per 100,000 live births at a cost of £1,358,800 (app. \$2,133,900). An additional cost of £744,700 (app. \$1,169,900) would be required to detect approx. 30 additional cases of a timely diagnosis per 100,000 live births. The incremental cost-effectiveness ratio (ICER) which represents the additional cost per additional case of timely diagnosed case of CHD per 100,000 live births is approximately £24,900 (app. \$39,100). The cost-effectiveness acceptability curve presents the probability that a screening strategy is cost-effective with society's willingness to pay (WTP) for a timely diagnosis of a clinically significant CHD. The WTP threshold used by the National Institute for Health and Clinical Excellence (NICE) in the UK is £20,000 per quality-adjusted life year (QALY). QALY has been described as the only acceptable threshold used by decision making institutions or payer. Up to this threshold, a society is willing to pay £20,000 per QALY per annum of life in good health. For society to pay £100,000, a newborn with timely diagnosis of a CHD, and thereby good health, would need to gain five QALYs. If the majority of

these children reach early adulthood in good health, at £100,000 WTP threshold proposed, the probability that 'pulse oximetry as an adjunct to clinical examination' would be cost-effective is greater than 90%.<sup>18</sup>

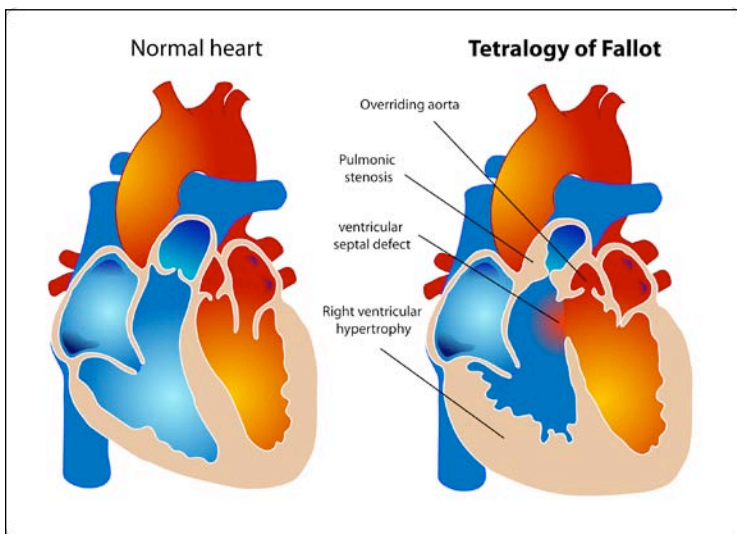
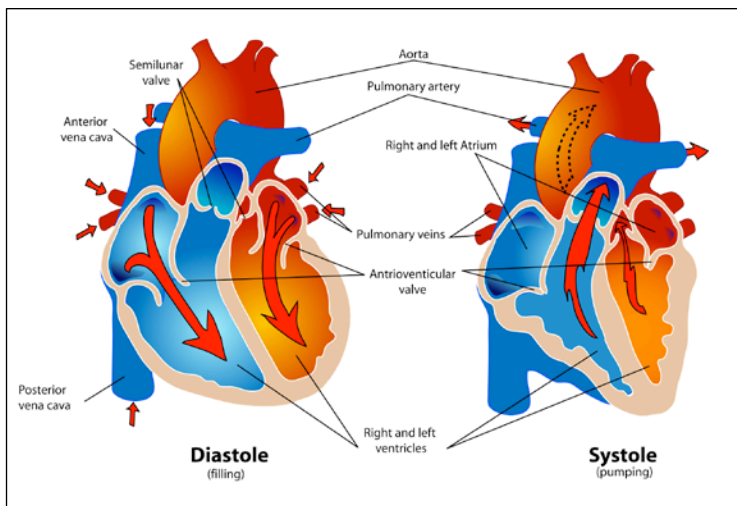
Kemper proposed a series of national standards based on the recommendation of a panel of pediatric and cardiac experts from the American Academy of Pediatrics (AAP), American College of Cardiology (ACC), and American Heart Association (AHA). They also defined CCHD as including, but not limited to: Hypoplastic Left Heart Syndrome, Pulmonary Atresia (PA), Tetralogy of Fallot (TOF), Total Anomalous Pulmonary Venous Return (TAPVR), Transposition of the Great Arteries (TGA), Tricuspid Atresia (TA), and Truncus Arteriosus. According to the algorithm, newborns are eligible for screening at 24-48 hours of age, or shortly before discharge if under 24 hours of age. If the screen identifies saturation less than 90% in the right hand or foot, the newborn has had a "positive" screen, and is referred for additional testing. A 90% to less than 95% screen in the right hand or foot or a greater than 3% difference between the right hand and foot is considered an equivocal screen and requires re-screening in an hour. Saturations greater than or equal to 95% in the right hand or foot or saturation difference of 3% or less between the right hand and foot defines a negative screen. For equivocal screens, the three-prong decision tree is repeated for a second iteration in one hour as shown in the diagram. For equivocal screens, re-screening occurs again after an hour. If the screen is equivocal a third time, it is considered a positive screen. It is essential that those newborns who have what is considered a positive screen have a complete work-up for congenital heart disease prior to discharge home. Although ready access to a pediatric cardiologist may not be available, it is mandatory to at least document a negative echocardiogram prior to discharge given the high sensitivity and specificity of the screen. Other recommendations were made as well. Chief among these were the use of disposable or reusable probes and probes with close coupling to skin (i.e., taped rather than clamped), which can improve oximetry monitoring in newborns. Because of minor differences in the calibration of the LED signals, third party sensors should not be used. Although this seems trivial on the surface, hospital buying practices can often times focus on the lowest cost, as opposed to quality of the signal. The work group noted that performing a typical physical examination alone for CCHD led to almost 10 times more false-positive results compared with using similar screening protocols in Sweden and the United Kingdom. Further, the group suggested a 5-point implementation strategy and follow-up procedures including screening, diagnostic confirmation, electronic results reporting, primary care follow-up, as well as surveillance and tracking.<sup>1,3,5,7,8,17,19,20</sup>

An earlier Granelli study published in 2007 looked at 10,000 normal Swedish infants along with 9 confirmed with CCHD. Another parameter, the perfusion index (PI), was described. The PI is the infrared component of the pulse oximetry signal. In neonates, they established reference values for PI using the right hand and foot in normal infants between 1 and 120 hours of age. Values lower than 0.70 may indicate illness. PI may indicate abnormal blood flow from the heart in babies with CCHD. In all of the babies with a confirmed left heart obstructive disease CCHD, newborns had either pre or post ductal PI values below the interquartile cut-off value of 1.18 and five of the nine had a value below the recommended cut off of 0.70. PI is not included in the Kemper recommendation, but it is reported in all stand-alone pulse oximeters that have been validated by the FDA to read through motion and low perfusion and may be beneficial to consider in evaluation for CCHD.<sup>21</sup>

In 2010, the Secretary's Advisory Committee on Heritable Disorders in Newborns and Children recommended adding Critical Congenital Heart Disease to the Recommended Uniform Screening Panel. In 2011, Health and Human Services Secretary Kathleen Sebelius agreed with the Committee and recommended that Health and Human Services agencies "proceed expeditiously" with the implementation of newborn screening for critical congenital heart disease. In a letter dated September 21, 2011, she outlined the decision to adopt expert panel recommendations for universal CCHD screening by pulse oximetry for all newborns into federal Recommended Uniform Screening Panel (RUSP) Guidelines—the national newborn screening system standards and policies.<sup>22</sup>



Normal heart vs. Hypoplastic Left Heart Syndrome - [http://en.wikipedia.org/wiki/File:Hypoplastic\\_left\\_heart\\_syndrome.svg](http://en.wikipedia.org/wiki/File:Hypoplastic_left_heart_syndrome.svg)



Normal heart vs. Tetralogy of Fallot [http://en.wikipedia.org/wiki/File:Tetralogy\\_of\\_Fallot.svg](http://en.wikipedia.org/wiki/File:Tetralogy_of_Fallot.svg)

State Laws have been passed to incorporate the federal mandate. Although HHS has defined the expectation that newborn CCHD screening be incorporated into state newborn screening as soon as possible, the

implementation process has been left to each individual state, along the lines of the original newborn screening.<sup>2, 22</sup>

New Jersey passed legislation requiring each birthing facility licensed by its Department of Health and Senior Services to perform a pulse oximetry screening for CHDs on every newborn in the state that is at least 24 hours old (P.L. 2011, Chapter 74, Assembly No. 3744). The act went into effect August 31<sup>st</sup>, 2011. New Jersey was the first state in the nation to enact legislation.<sup>23</sup>

Maryland passed legislation (Chapter 553, HB 714), in May 2011. This required the state Department of Health and Mental Hygiene to adopt the federal screening recommendations if the HHS secretary issues recommendations on critical heart disease screening of newborns.<sup>24</sup>

Indiana passed legislation (SB 552) requiring pulse oximetry screening of newborns for low oxygen levels beginning January 1<sup>st</sup>, 2012. This requires the Indiana State Department of Health (ISDH) to: (1) develop procedures and protocols for the testing and (2) report to the Indiana legislative council, by October 31<sup>st</sup>, 2011, certain information on the screening (SB 552).<sup>25</sup>

New York passed Assembly Bill 7941 of the 2011 New York Legislature. The bill requires the commissioner of the state health department to establish a newborn screening program using pulse oximetry screening to detect CHDs. Since May 22<sup>nd</sup>, 2012, the bill has been held for consideration in the health committee.<sup>26</sup>

Pennsylvania introduced legislation which was introduced in the Pennsylvania General Assembly on July 25<sup>th</sup>, 2011. The bill amended the state's Newborn Child Testing Act by adding a requirement that each health care provider that provides birthing and newborn care services perform a pulse oximetry screening a minimum of 24 hours after the birth of every newborn in its care (SB 1202).<sup>27</sup>

New Hampshire introduced Senate Bill 348-FN. Section 132:10-aa Newborn Screening; Pulse Oximetry Test Required. The physician, hospital, nurse midwife, midwife, or other health care provider attending a newborn child shall perform a pulse oximetry screening, according to the recommendations of the American Academy of Pediatrics, on every newborn child. This act was to take effect 60 days after its passage.<sup>28</sup>

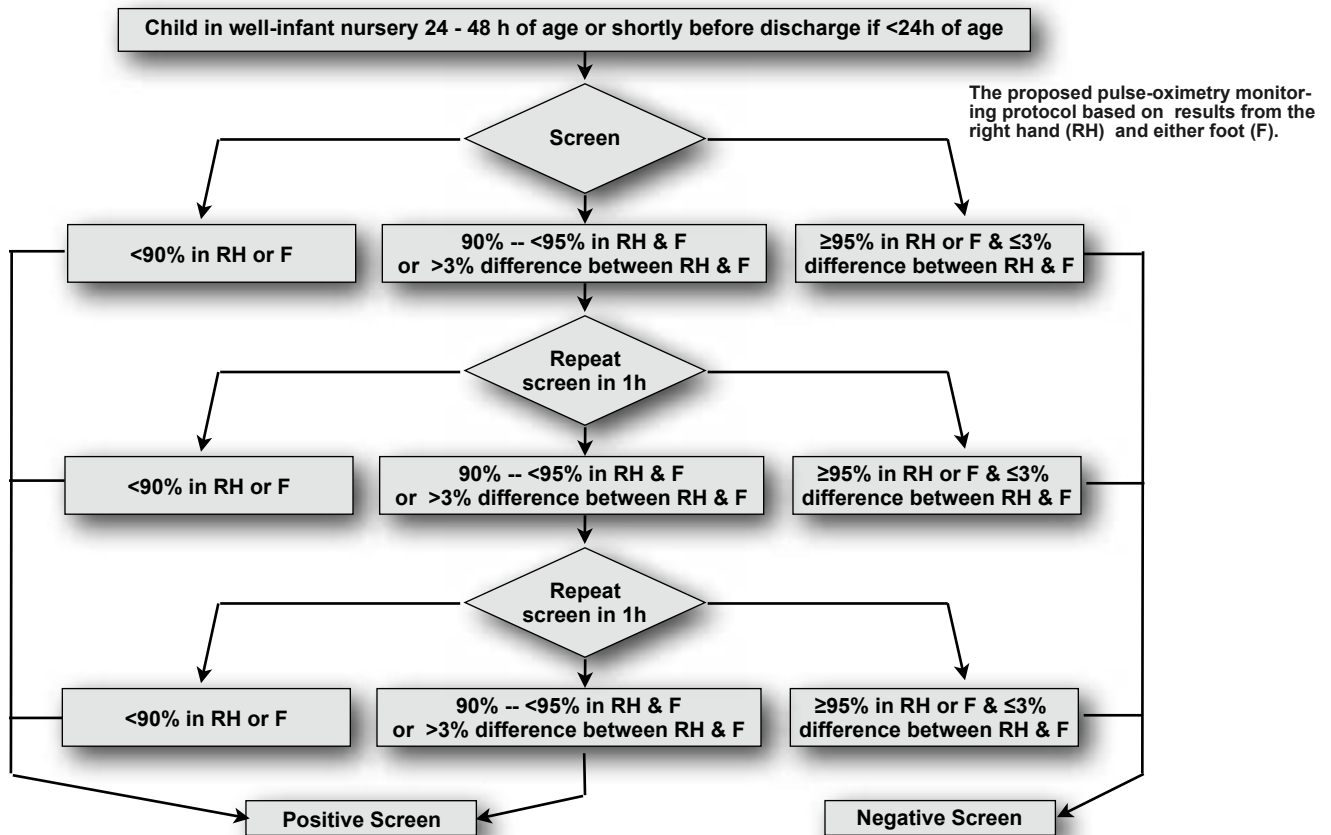
Missouri introduced House Bill No. 1058 – Newborn Screening. This bill establishes Chloe's Law which requires, subject to appropriations, the Department of Health and Senior Services to expand by January 1<sup>st</sup>, 2013, the newborn screening requirements to include a pulse oximetry screening prior to the newborn being discharged from a health care facility.<sup>29</sup>

Georgia introduced House Bill No. 745. The Department of Public Health was to undertake a study to determine whether pulse oximetry screening should be implemented as a standard test for newborn infants in this state to aid in detecting congenital heart defects. The code section shall stand repealed on January 31<sup>st</sup>, 2013.<sup>30</sup>

Florida introduced House Bill No. 829. By October 1<sup>st</sup>, 2012, congenital heart disease screening must be conducted on all newborns in hospitals in this state with birth admission. When a newborn is delivered in a facility other than a hospital, the parents must be instructed on the importance of having the screening performed and must be given information to assist them in having the screening performed within 10 days after the child's birth.<sup>31</sup>

Virginia introduced House Bill No. 399. Congenital cyanotic heart disease, critical; Virginia Department of Health to implement program for screening infants. The bill was to require the Department of Health to convene a work group to develop a plan for implementation of a program for screening infants for critical congenital cyanotic heart disease. The bill passed

## Proposed Pulse – Oximetry Monitoring Protocol by Expert Panel<sup>1</sup>



1. Kemper AR, Mahle WT, Martin GR, et al. Strategies for Implementing Screening for Critical Congenital Heart Disease. *Pediatrics* 2011; (10.1542/peds.2011-1317)

both state house and senate assembly but was vetoed on 4/09/12 by the Governor because Virginia had already implemented a work group.<sup>32</sup>

West Virginia introduced House Bill No. 4327. A Bill to amend the Code of West Virginia, 1931, as amended, by adding thereto a new article, designated §16-44-1 and §16-44-2, all relating to requiring pulse oximetry testing for newborns. The purpose of this bill was to require each birthing facility licensed by the Department of Health and Human Resources to perform a pulse oximetry screening for congenital birth defects on every newborn in its care, a minimum of 24 hours after birth.<sup>33</sup>

Tennessee proposed legislation requiring the state's genetic advisory committee to develop a program to screen newborns for critical CHD using pulse oximetry. House Bill 373 and Senate Bill 65 were signed into law by the governor in April, 2012.<sup>34</sup>

Connecticut passed an Act Concerning Pulse Oximetry Screening for Newborn Infants, revising Section 1. Subsection (b) of Section 19a-55 of the 2012 supplement to the general statutes (repealed) and the following was substituted in lieu thereof (effective October 1<sup>st</sup>, 2012). This act established testing requirements, and directed the administrative officer or other person in charge of each institution caring for newborn infants shall have cause to administer to every such infant in its care a screening test for

cystic fibrosis, a pulse oximetry screening test and a screening test for severe combined immunodeficiency disease. Such screening tests shall be administered as soon after birth as is medically appropriate.<sup>35</sup>

Minnesota introduced H.F. No. 3008, in the - 87<sup>th</sup> Legislative Session (2011-2012) posted on Apr 20, 2012. This section was to be effective the day following final enactment. Screening shall take effect 180 days following final enactment or by December 31<sup>st</sup>, 2012, whichever was sooner. This screening must be done no sooner than 24 hours after birth, unless earlier. According to the provisions, screening is deemed clinically appropriate, but always prior to discharge from the nursery. If discharge or transport of the newborn occurs prior to 24 hours after birth, screening must occur as close as possible to the time of discharge or transport. For premature infants who are less than 36 weeks of gestation and newborns admitted to a higher level nursery, such as special care or intensive care, screening must be performed when medically appropriate prior to discharge. Any newborn that fails the screening must be referred to a licensed physician who shall arrange follow-up diagnostic testing and medically appropriate treatment prior to discharge from the hospital.<sup>36</sup>

California identified a clear need for congenital heart screening prior to HHS involvement. Many hospitals were screening using Kemper's or related study as paradigm for screening prior to 2012.<sup>1</sup> AB 1731 was introduced by



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Marty Block and amended Sections 124977 and 125001 of the Health and Safety Code, relating to public health. This modified the newborn screen to include CCHD screening. AB 1731 required the California Department of Public Health to expand statewide screening of newborns to include pulse oximetry screening for critical congenital heart disease in addition to metabolic and hearing screens. "The department shall expand statewide screening of newborns as soon as possible to include pulse oximetry screening,

when feasible between 24 and 48 hours after birth, for critical congenital heart disease." AB 1731 passed into law on September 17, 2012.<sup>37</sup>

As of the end of January, 2013, 44% or 22 states had not enacted screening laws in accordance with the national mandate ([cchdscreeningmap.com](http://cchdscreeningmap.com)). Twenty percent had passed legislation, 20% had legislation introduced and 12% had legislation pending. Twenty-four percent or 12 states had introduced some form of Multi Center Screening and/or plots.<sup>38,39</sup>

Pulse oximetry is a noninvasive, simple test that measures the functional percentage of hemoglobin in blood that is saturated with oxygen. When performed on a newborn after birth, pulse oximetry screening is often more effective at detecting critical, life-threatening congenital heart defects than other screening methods. Newborns with abnormal pulse oximetry results require immediate confirmatory testing and intervention. In a duct-dependent circulation, pulse oximetry screening performed both preductally and postductally detects nearly 100% of infants with pulmonary duct dependent circulation. Many newborn lives could potentially be saved by earlier detection and treatment of congenital heart defects if all birthing facilities in the country were performing this simple, noninvasive newborn screening.

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### Conference Program:

- Varicella - Nizar Maraqa, MD.
- Regional Anesthesia and a Neonatal Patient - Robert Bryskin, MD.
- The Impact of Anesthesia on the Developing Brain - Robert Bryskin, MD
- Now I Lay Me Down to Sleep - A SIDS Update - Julie Bacon, RNC-LRN, BA, CPEN, CPN, C-NPT.
- Non-Invasive Ventilation - John Broddle, RRT
- I'm Okay - You're Tolerable - Julie Bacon, RNC-LRN, BA, CPEN, CPN, C-NPT
- Effects of Maternal Drugs (non-narcotic) on the Fetus - Mark L. Hudak, MD.
- Cardiology for the Neonate - Sharon Ashe, PAC, Univ. of Florida College of Medicine.
- Assessment of the Neonate - Craig Sussman, MD.
- Surgical Considerations of Abdominal Wall Defects - Julie Bacon, RNC-LRN, BA, CPEN, CPN, C-NPT.
- The Late Preterm Neonate - William Driscoll, DO.
- The First 30 Seconds - Essential Transition from Fetus to Newborn - Julie Bacon, RNC-LRN, BA, CPEN, CPN, C-NPT.
- Optimizing Human Milk in the NICU - Christina Valentine, MD, MS, RD.
- Functional Feeding in the NICU: A Cue-Based Approach - Holly Knight, OTR/L, IMI, CLC.
- DHA - Fishing around for answers! - Christina Valentine, MD, MS, RD.
- Genetic Disorders in the Newborn: Twenty Newborn Findings that Every Nurse Should Know - Anthony Perszyk, MD.

# Study Analyzes Staff Perceptions of Single Family Rooms in the NICU

By Sheila J. Bosch, PhD and  
Tamara Bledsoe, ARNPC, MSN

## Acknowledgement

The authors would like to thank Dr. Ali Jenzari, Associate Professor, Information and Technology Management, John Sykes College of Business at the University of Tampa (Florida) for conducting the statistical analyses necessary for this study.

Dim lighting, beeping alarms, and mothers breastfeeding behind privacy screens typify Neonatal Intensive Care Unit (NICU) environments across the country. More often than not, several frail infants (and their families) share a large room in what is known as an “open-bay.” Though used for decades, this type of unit design is far from perfect, and poses several challenges. Open bays can be noisy, parents may experience little privacy, and lighting levels may be difficult to control. Additionally, housing several infants in the same room has the potential to increase the likelihood of infection (although this has not been conclusively demonstrated in the NICU environment). To combat these problems, Single Family Room (SFR) NICU designs have become widely popular in the U.S. When hospital leaders choose to renovate, expand, or build a brand new NICU, they must decide whether or not to embrace the SFR model partially, fully, or not at all. The study described in this article analyzes staff perceptions of their work environment and patient care quality where an SFR design solution was implemented, adding to a growing body of knowledge exploring the value of SFRs for patients, families and staff.

Purported benefits of SFRs include greater control over unwanted environmental stimuli to support developmentally appropriate care, enhanced family privacy (both visual and auditory), and increased parental satisfaction,<sup>1</sup> both with the physical hospital environment and the quality of care provided. The SFRs also support staff in complying with Health Insurance Portability and Accountability Act (HIPAA) requirements<sup>2,3</sup> and have been associated with an increase in nurses’ job satisfaction.<sup>4,5</sup> Although offering considerable advantages, SFRs usually require more square footage, are somewhat more expensive to build and operate, can increase nurse travel distances, and may cause nurses to feel isolated from the rest of their team.

When Gresham, Smith & Partners was contracted to renovate the existing open bay NICU and add single family rooms in the Wasie Neonatal ICU at Joe DiMaggio Children’s Hospital

(JDCH) in Hollywood, Florida, staff members voiced concerns about potential adverse impacts of SFRs on their work environment and their ability to provide high-quality care. To assess those concerns and the effects of SFRs on NICU staff, we conducted pre- and post-occupancy surveys to monitor staff perceptions of the quality of their work environment and perceived safety and quality of patient care before and after the addition of SFRs. The results were encouraging, and support the decision to add single family rooms in the NICU.

The JDCH renovation, completed in May 2009, features a 23-room SFR addition to the renovated open-bay unit, increasing the hospital’s level III NICU to a total of 64 beds. The new SFRs and the updated ICUs use rubber flooring, noise reduction ceiling tiles, and a fully integrated digital communications system to quiet the environment. Other features of the new SFRs include task lighting, individual refrigerators and computers, sofa-beds and personal storage cabinets for families, and soft lighting design to create a warm and relaxing environment.

The surveys conducted were intended to evaluate the validity of nurses’ worries as they moved into and began working in the new combination open-bay/SFR environment. The staff received two surveys, one before completion and another nine months after occu-

pancy in the new unit. With the surveys, researchers aimed to answer two questions:

- How do staff members’ perceptions of the work environment differ regarding the older, open-bay NICU as compared to the newer, combination NICU that includes both open-bay and SFR environments?
- How do staff members’ perceptions of the safety and quality of the NICU environment for infants and their families differ regarding the older, open-bay NICU as compared to the newer, combination NICU?

The pre-occupancy survey demonstrated that staff members’ fears before moving into the new unit principally focused on adverse changes to the quality of their work environment, including reduced teamwork, increased isolation, and a decline in staff support. Perceived benefits were principally focused on the quality of the environment for patients and family members, with respondents citing factors like reduced noise, increased privacy, and enhanced family involvement.

## An Overwhelming Preference

The post-occupancy survey revealed an overwhelming preference for the renovated and expanded NICU with SFRs over the older open-bay unit, and staff members’ reservations about moving into the SFRs went mostly unrealized. When asked if their biggest fear regarding the new units had become a reality, only 9

## Primary Staff Fears Pre-move





staffers, out of over 150 surveyed, answered "Yes."

Staff members' perceptions of the quality of their work environment showed statistically significant ( $p < 0.05$ ) improvement in the post-occupancy survey, suggesting that earlier fears were largely allayed and that the new unit actually increased staff satisfaction. Staff reported positively on job satisfaction, quality of the work environment, staff privacy, and ease of communication, all categories that had been concerns before the unit was occupied. Staff members' also reported that the new environment was less hectic, allowed for better concentration, and encouraged parents to take a more active role in providing care for their infants. Perhaps most significant of all, not a single item or category was perceived to be worse in the new unit.

Staff perceptions regarding the quality and safety of the environment provided for patients and their families also improved significantly ( $p < 0.05$ ), with staff members citing more space, enhanced family involvement, more privacy, better acoustic quality, and improved quality of patient care as benefits that they had both anticipated and realized. Overall, staff members reported that the new NICU provided a better

quality environment for patients and families and that parents seemed to appreciate the private rooms, and sometimes demand them.

The results of this study, though based only in one hospital, strengthen the evidence that SFR concepts merit consideration in NICU layouts and offer staff, patients and families many positive benefits. The space and privacy that SFRs offer make them a desirable amenity, and the potential improvements in staff satisfaction and patient well-being can go a long way towards justifying the slight additional cost.

To view the latest Recommended Standards for Newborn ICU Design, go to [www3.nd.edu/~nicudes/](http://www3.nd.edu/~nicudes/).

### Ponder This

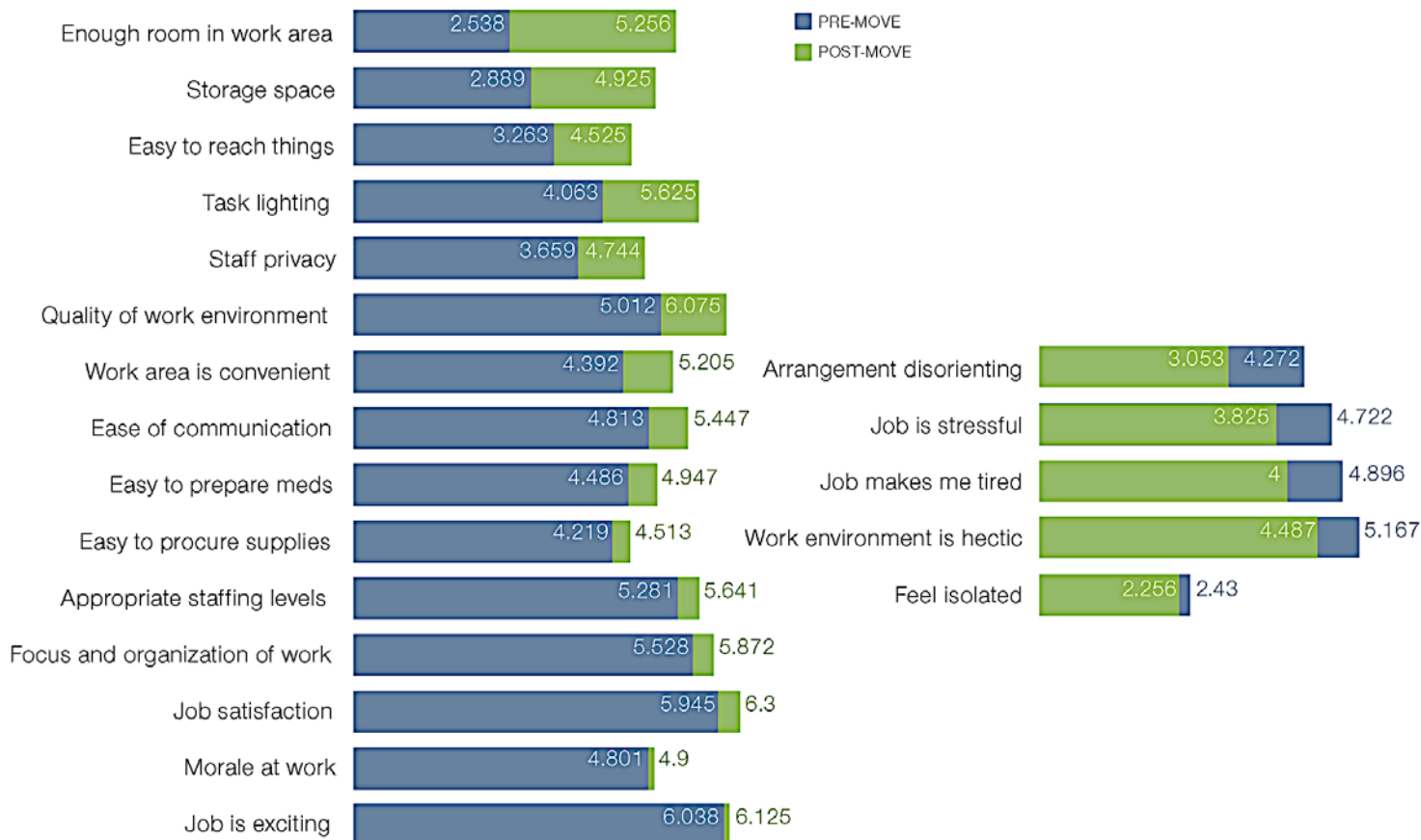
Although this research demonstrated a clear staff preference for the combination NICU (that includes both open bays and single family rooms) over the older, exclusively open bay configuration, anecdotal evidence indicates that some nurses believe that the open bay design is actually safer for infants. In the open bay configuration, there are often several staff members in the room at any given time, so nurses can perhaps more easily assist one

another in caring for their assigned babies, particularly during crisis situations. In some hospitals with combination NICUs, the sicker babies are placed in the open bay portion of the unit for this reason. However, given the importance of providing an environment that supports developmentally appropriate care, there are many good reasons to place the sickest infants in private rooms. More research is needed to determine whether single family rooms are associated with improved health outcomes for infants.

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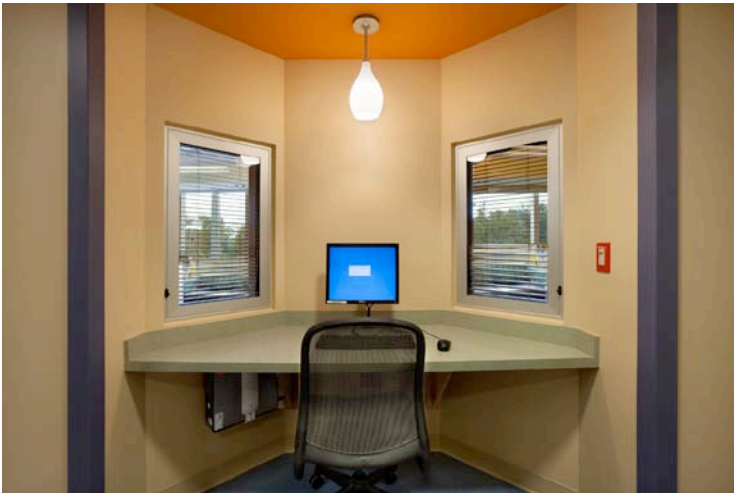
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## Pre- and Post-Move Perceptions of Work Environment Quality





Left: Using a survey method, we analyzed nurse perceptions before and after the addition of 23 single family rooms in the NICU. Nurses overwhelmingly agreed that the combination NICU (new single family rooms plus existing open bays) significantly improved the care environment experienced by patients and their families. Right: Single family NICU rooms at the Wasie Neonatal ICU at Joe DiMaggio Children's Hospital offer families more privacy and include amenities like sleeper sofas, individual computer monitors, task lighting, and storage cabinets for the family's belongings.



Decentralized nursing stations in the renovated NICU allow nurses to keep watch over their patients occupying single family rooms. Though some nurses were concerned about feeling isolated in the SFR environment, post-occupancy surveys showed that most of those concerns were allayed and that the majority of staff preferred the new unit.

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# Medical News, Products & Information

## Most Physicians Don't Meet Quality Reporting Requirements

Newswise — Washington, DC — A new Harvey L. Neiman Health Policy Institute study shows that fewer than one-in-five healthcare providers meet Medicare Physician Quality Reporting System (PQRS) requirements. Those that meet PQRS thresholds now receive a 0.5% Medicare bonus payment. In 2015, bonuses will be replaced by penalties for providers who do not meet PQRS requirements. As it stands, more than 80% of providers nationwide would face these penalties.

Researchers analyzed 2007-2010 PQRS program data and found that nearly 24% of eligible radiologists qualified for PQRS incentives in 2010 — compared to 16% for other providers. The Neiman Institute study is published online in the *Journal of the American College of Radiology*.

"Near term improvements in documentation and reporting are necessary to avert widespread physician penalties. As it stands, in 2016, radiologists collectively may face penalties totaling more than \$100 million. Although not a specific part of this analysis, penalties for non-radiologists could total well over \$1 billion," said Richard Duszak, MD, Chief Executive Officer and Senior Research Fellow of the Harvey L. Neiman Health Policy Institute. "Compliance with PQRS requirements has improved each year, but more physicians need to act now: their performance in 2013 will dictate penalties for 2015."

To read the study, visit: <http://bit.ly/UmqO3o>

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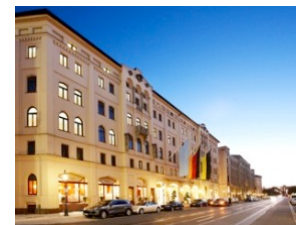
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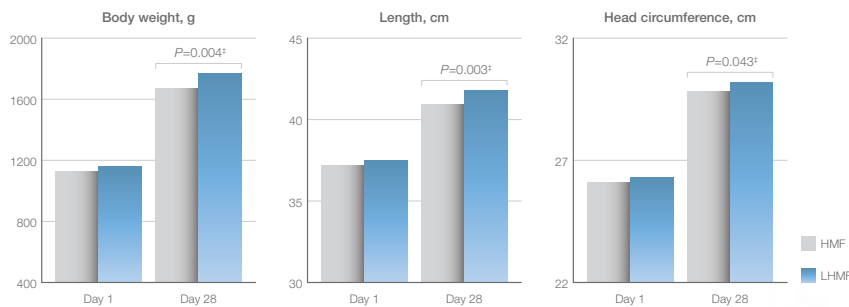


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 NICU = neonatal intensive care unit

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