

2014

Indiana Perinatal Quality Improvement Collaborative Annual Report



Table of Contents

Introduction.....	3
Setting the Stage.....	4
2014 Activities.....	13
Guidelines to Reduce Early Elective Deliveries.....	13
Indiana Perinatal Transport Standards.....	14
Addressing Infant Mortality in Indiana.....	15
Coordinated Perinatal Systems of Care.....	16
Infant Mortality Maps.....	17
Finance Initiatives.....	18
Social Impact Bonds.....	18
Long-acting Reversible Contraception.....	19
Neonatal Abstinence Syndrome.....	21
Next Steps.....	22
Appendix A: IPQIC Membership.....	24
Appendix B: Guidelines to Reduce Early Elective Deliveries.....	34
Appendix C: Indiana Perinatal Transport Standards.....	51
Appendix D: Addressing Infant Mortality in Indiana.....	74
Appendix E: Coordinated Perinatal Systems of Care.....	112
Appendix F: Infant Mortality Maps.....	140
Appendix G: Finance Initiatives.....	166
Appendix H: Neonatal Abstinence Syndrome Report.....	176

Indiana Perinatal Quality Improvement Collaborative (IPQIC)

The loss of a baby remains a sad reality for many families and takes a serious toll on the health and well-being of families, as well as the nation.

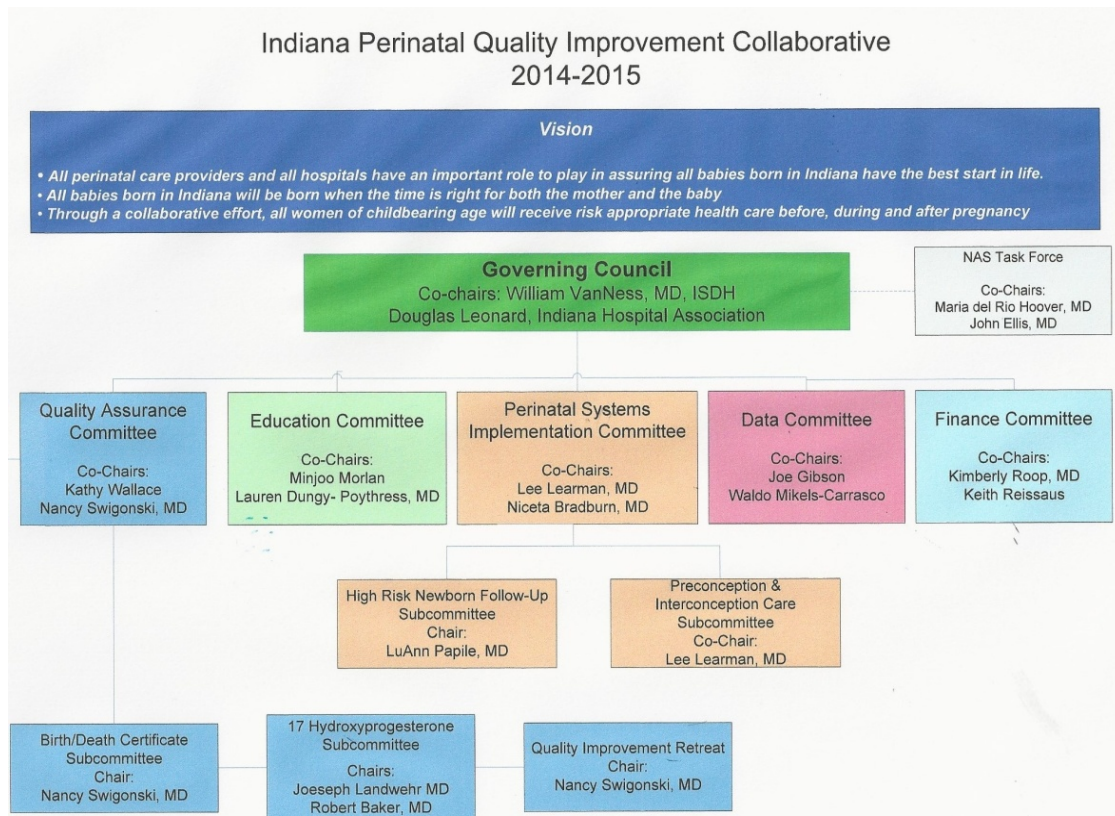
-Centers for Disease Control and Prevention

Introduction

The vision of IPQIC is threefold:

- All perinatal care providers and all hospitals have an important role to play in assuring all babies born in Indiana have the best start in life.
- All babies in Indiana will be born when the time is right for both the mother and the baby.
- Through a collaborative effort, all women of childbearing age will receive risk appropriate health care before, during and after pregnancy.

In the diagram below, the infrastructure of IPQIC was developed to support the articulated vision.



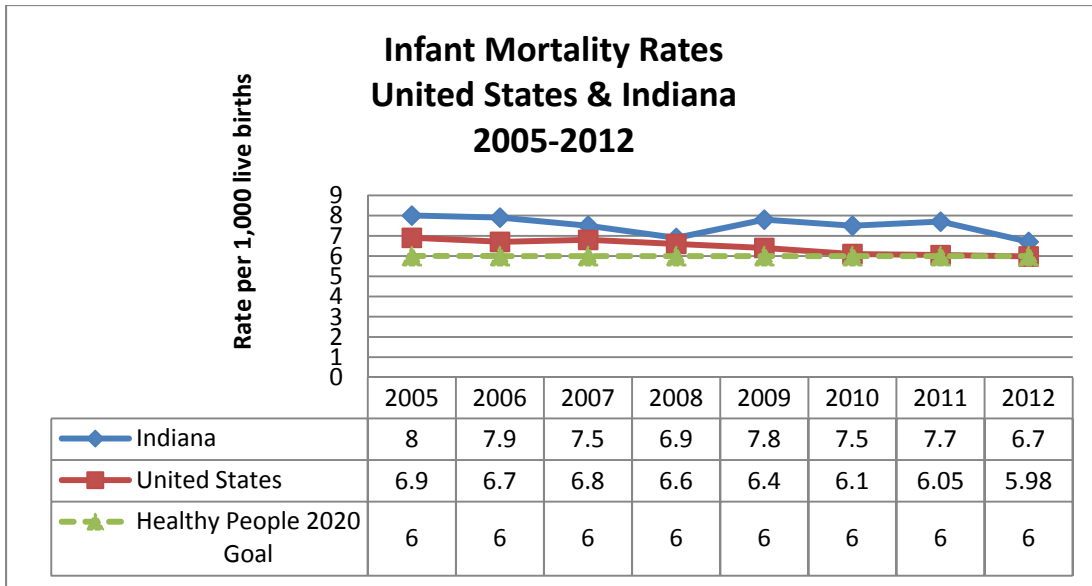
The continuation of infant mortality and morbidity as the top priority of the Indiana State Department of Health (ISDH) was affirmed in the Fall of 2014 with the appointment of a new Health Commissioner in the Fall of 2014, Dr. Jerome Adams. The ISDH sponsored the second Infant Mortality *Labor of Love* Summit on November 13, 2014, with the goal of increasing the public's awareness of the issue of infant mortality and how the public and other partners can help effect changes in individual behavior. More than 600 health care professionals, public health advocates, legislators, state agency staff, and consumers gathered to continue the important discussion of how to address this priority issue.

The report that follows will identify the 2014 activities of IPQIC's Governing Council and committees, the volunteers who have contributed their time and energy to move the agenda of mothers and babies forward, an overview of perinatal outcomes in 2012, work products that have been developed during 2014, and the activities that will become 2015 priorities.

Setting the Stage

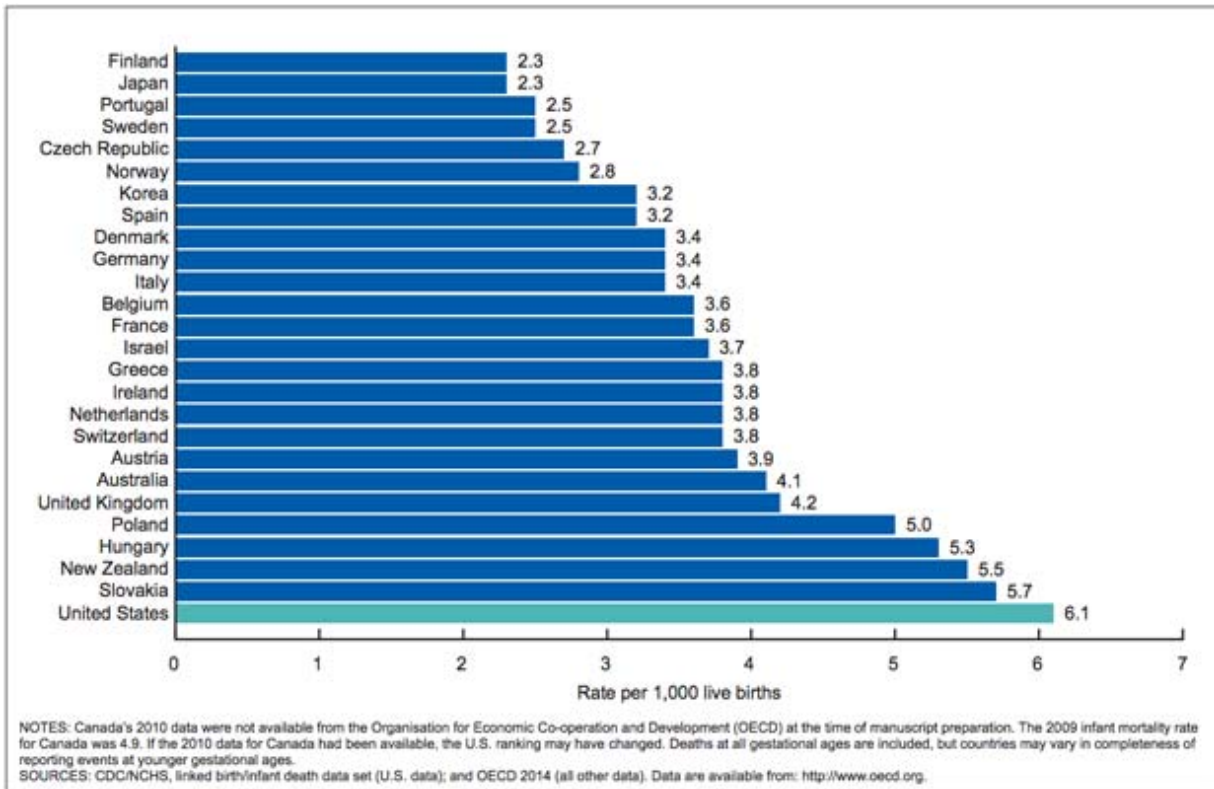
In order to fully understand the importance of the work that is occurring through the efforts of the dedicated volunteers involved in the IPQIC and the ISDH/MCH staff, it is important to have a complete understanding of the current status of infant mortality in the United States and Indiana.

The infant mortality rates in the United States have continued to fall and in 2012 fell slightly below the Healthy People 2020 goal. In 2012 for only the second time in 114 years, the infant mortality rate in Indiana fell below 7. Despite the significant reduction in the overall infant mortality rate, Indiana remains at a higher rate than the United States' rate. The 2013 provisional rate for infant mortality in Indiana is 7.1 per 1,000 live births with increases in both the white and black rates.

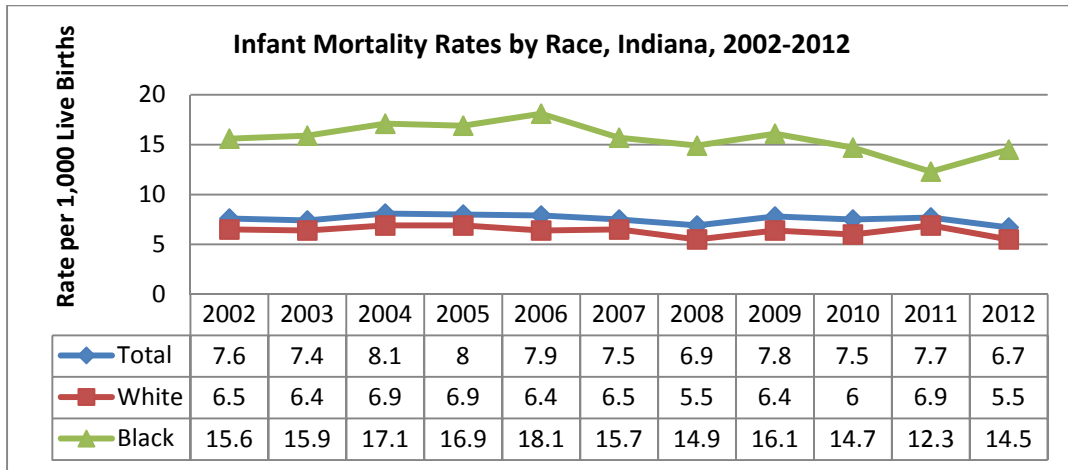


Source: Indiana State Department of Health, Maternal & Child Health Epidemiology Division (January 12, 2015)
 United States Original Source: Centers for Disease Control and Prevention National Center for Health Statistics
 Indiana Original Source: Indiana State Department of Health, PHP, ERC, Data Analysis Team

The following chart developed by the Centers for Disease Control and Prevention compares 2010 infant mortality rates of European countries to the infant mortality rate in the United States. Indiana's infant mortality rate in 2010 was 7.5 per 1,000 live births.

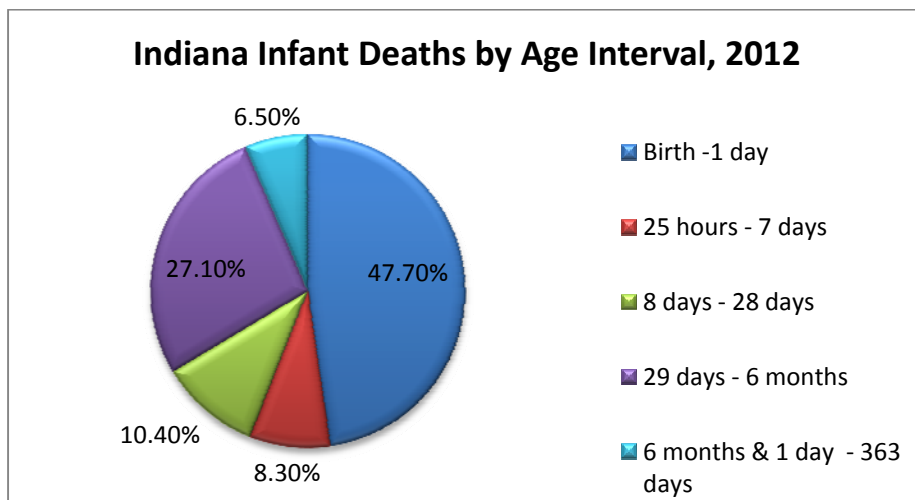


Indiana had made progress in reducing its black infant mortality rate dropping from a high of 18.1 in 2006 to a low of 12.3 in 2011. However in 2012 Indiana saw an increase in the rate of black infant mortality from 12.3 to 14.5. The provisional rate for 2013 shows an increase again to 15.3. The disparity between the white and black rates remains a significant issue for Indiana.



Source: Indiana State Department of Health, Maternal & Child Health Epidemiology Division (January 12, 2015)
 Indiana Original Source: Indiana State department of Health, PHPC, ERC, Data Analysis Team

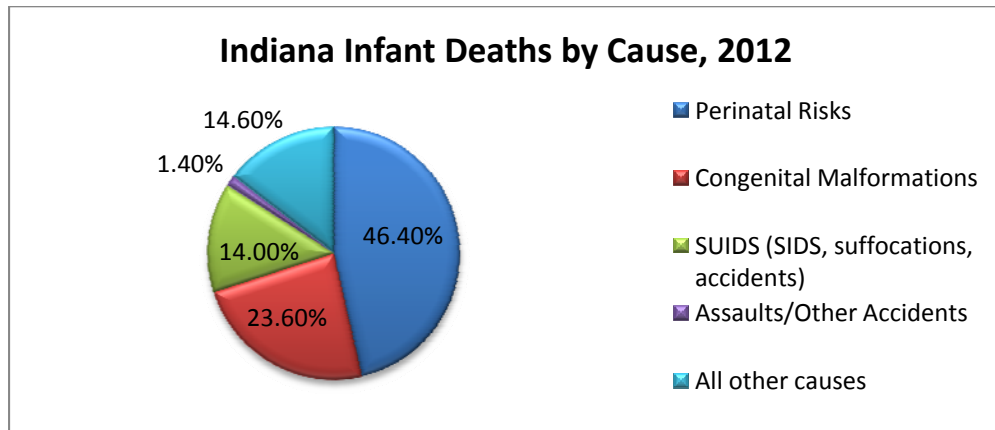
The following chart represents infant mortality in 2012 by age interval with the highest percentage of deaths occurring in the birth to one day interval.



Note: 14 records missing age or unit of age and not included in analysis
 Source: Indiana State Department of Health, Maternal & Child Health Epidemiology Division (January 12, 2015)

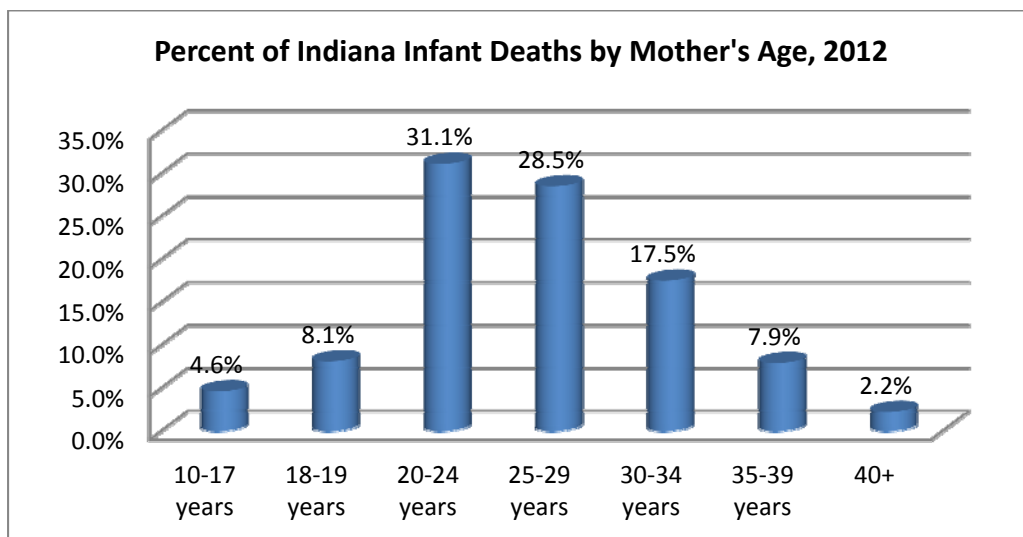
In examining the same data by cause of death, 46.4% of the deaths were as a result of perinatal risks including:

- Newborn affected by maternal factors and by complications of pregnancy, labor, and delivery;
- Slow fetal growth and fetal malnutrition;
- Disorders related to short gestation and low birthweight, not elsewhere classified;
- Disorders related to long gestation and high birthweight; and
- All other conditions specific to the perinatal period.



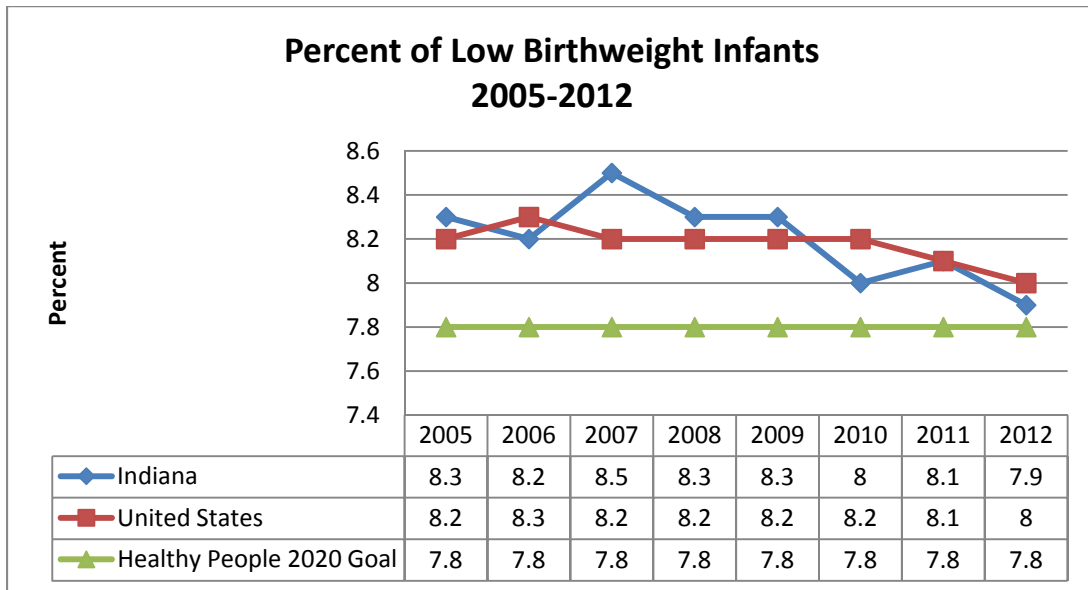
Source: Indiana State Department of Health, Maternal & Child Health Epidemiology Division (January 12, 2015)
 Indiana Original Source: Indiana State department of Health, PHPC, ERC, Data Analysis Team

Almost 60% of the infants who died were born to women between the ages of 20-29.

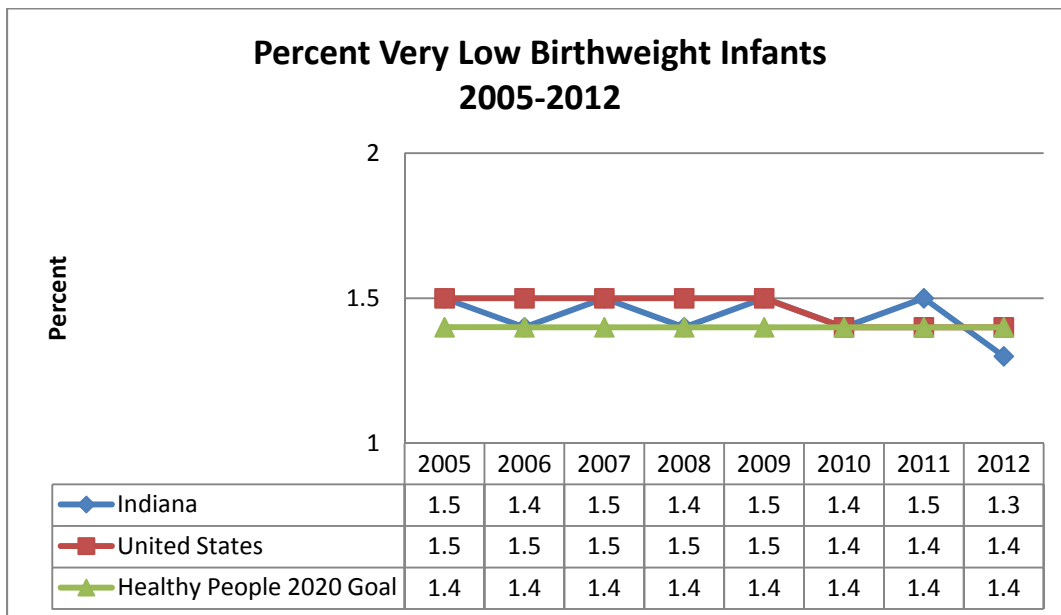


Note: Infant death data has been linked to corresponding birth certificate. 85.4% match rate
 Source: Indiana State Department of Health, Maternal & Child Health Epidemiology Division, January 2014

When examining statistics for low birthweight (<2500 grams/5.5lbs.) and very low birthweight (<1500 grams/3.4 lbs), Indiana is more closely aligned with statistics for the United States. The most frequent cause of infant death is low birthweight/prematurity. Blacks have a higher percentage (12.9%) of low birth weight infants compared to whites (7.3%).

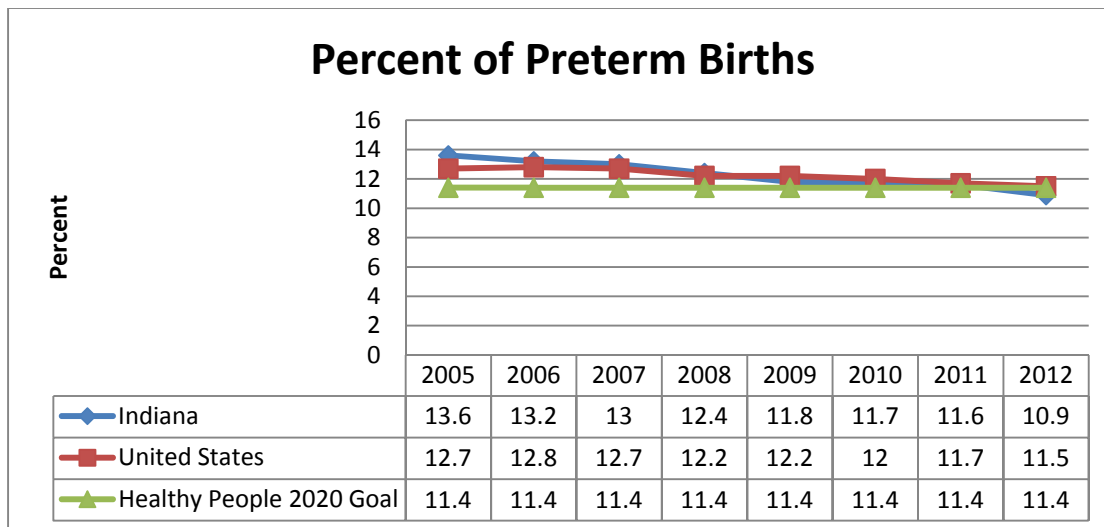


Source: Indiana State Department of Health, Maternal & Child Health Epidemiology Division (January 12, 2015)
 United States Original Source: Centers for Disease Control and Prevention National Center for Health Statistics
 Indiana Original Source: Indiana State Department of Health, PHPC, ERC, Data Analysis Team



Source: Indiana State Department of Health, Maternal & Child Health Epidemiology Division (August 12, 2013)
 United States Original Source: Centers for Disease Control and Prevention National Center for Health Statistics
 Indiana Original Source: Indiana State Department of Health, PHP, ERC, Data Analysis Team

Similar to low birthweight and very low birthweight, Indiana's statistics for preterm births are similar to those of the United States and close to the Healthy People 2020 goal. While the overall percentage is comparable, blacks have a higher percentage of preterm births (13.3%) than whites (9.1%).



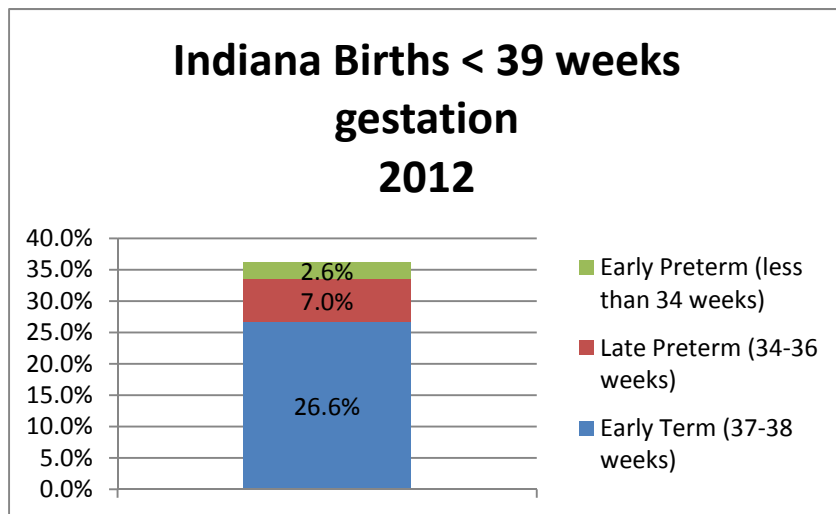
Source: Indiana State Department of Health, Maternal & Child Health Epidemiology Division (January)
 United States Original Source: Centers for Disease Control and Prevention National Center for Health Statistics
 Indiana Original Source: Indiana State Department of Health, PHP, ERC, Data Analysis Team

"In 2012, preterm birth affected more than 450,000 babies—that's 1 of every 9 infants born in the United States. Preterm birth is the birth of an infant before 37 weeks of pregnancy. Preterm-related causes of death together accounted for 35% of all infant deaths in 2010, more than any other single cause. Preterm birth is also a leading cause of long-term neurological disabilities in children. Preterm birth costs the U.S. health care system more than \$26 billion in 2005."¹

In November 2013, the American College of Obstetricians and Gynecologists (ACOG) and the Society for Maternal-Fetal Medicine endorsed and encouraged the uniform use of new gestational age designations by all clinicians, researchers, and public health officials to facilitate data reporting, delivery of quality health care, and clinical research. The label “term” should be replaced with the designations *early term* (37 0/7 weeks of gestation through 38 6/7 weeks of gestation), *full term* (39 0/7 weeks of gestation through 40 6/7

¹ <http://www.cdc.gov/reproductivehealth/MaternalInfantHealth/PretermBirth.htm>

weeks of gestation), *late term* (41 0/7 weeks of gestation through 41 6/7 weeks of gestation), and *postterm*(42 0/7 weeks of gestation and beyond) to more accurately describe deliveries.



Note: Preterm births calculated using the Obstetric Estimate

**Note: Denominator does not include those records missing gestation

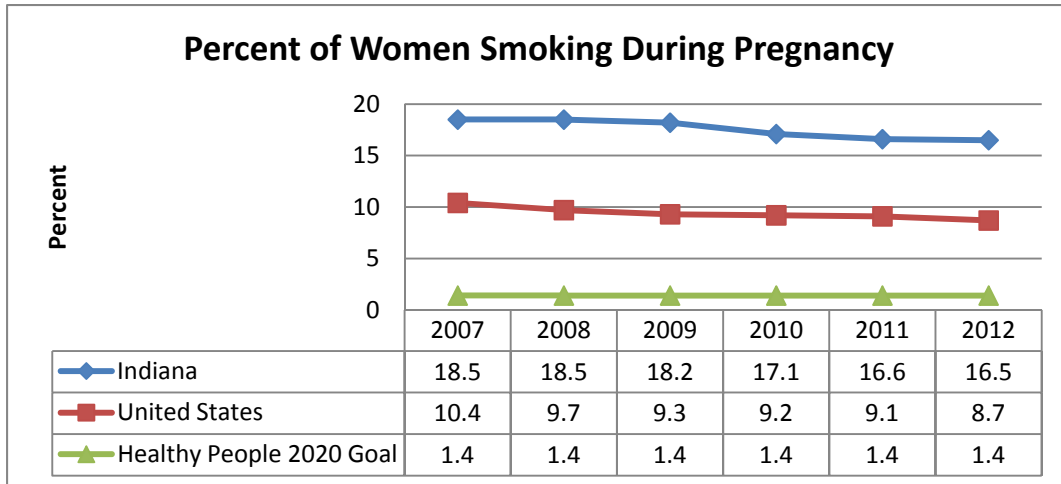
Source: Indiana State Department of Health, Maternal & Child Health Epidemiology Division (January 12, 2015)

The Healthy People 2020 goal for the percentage of women who smoke during pregnancy is 1.4%. In 2012, 16.5% of women in Indiana reported they smoked during pregnancy compared to 8.7% of pregnant women in the United States. The percentage of pregnant women smoking during pregnancy ranged from a low of 3.9% to a high of 33.9%. In Indiana, smoking while pregnant is predominantly white issue. The percentage of white women who smoked was 18.1% compared to black percentages at 13%.

According to the Centers for Disease Control:

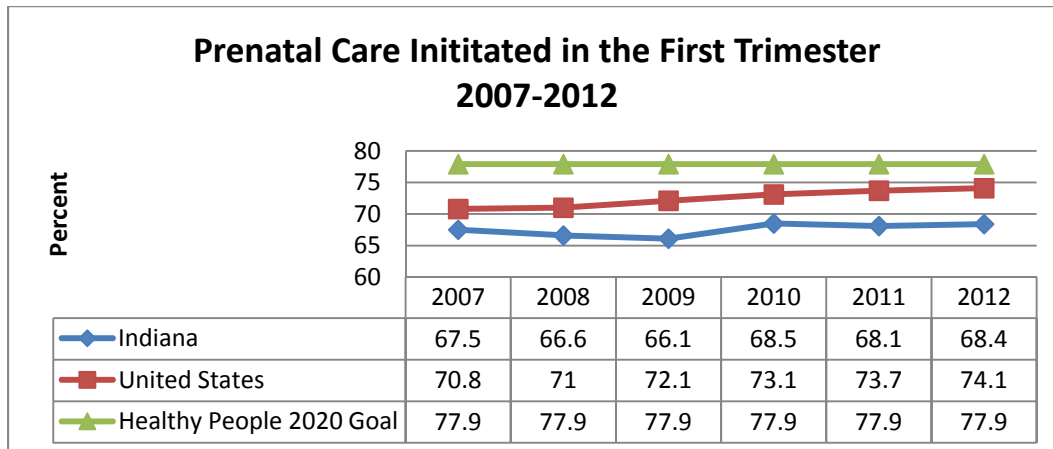
- Women who smoke during pregnancy are more likely than other women to have a miscarriage;
- Smoking can cause problems with the placenta;
- Smoking during pregnancy can cause a baby to be born prematurely or to have low birth weight—making it more likely the baby will be sick and have to stay in the hospital longer;
- Smoking during and after pregnancy is a risk factor for Sudden Infant Death Syndrome (SIDS); and

- Babies born to women who smoke are more likely to have certain birth defects, like a cleft lip or cleft palate.²



Source: Indiana State Department of Health, Maternal & Child Health Epidemiology Division (January 12, 2015)
 United States Original Source: Centers for Disease Control and Prevention National Center for Health Statistics
 Indiana Original Source: Indiana State Department of Health, PHP, ERC, Data Analysis Team

Another area that Indiana lags behind the rest of the country in is women receiving prenatal care in the first trimester. The chart that follows documents the gap between Indiana and the rest of the country compared to the Healthy People 2020 goal. The disparity gap is significant here as well. Only 57.4% of black women received early prenatal care compared to white women (70.7%).

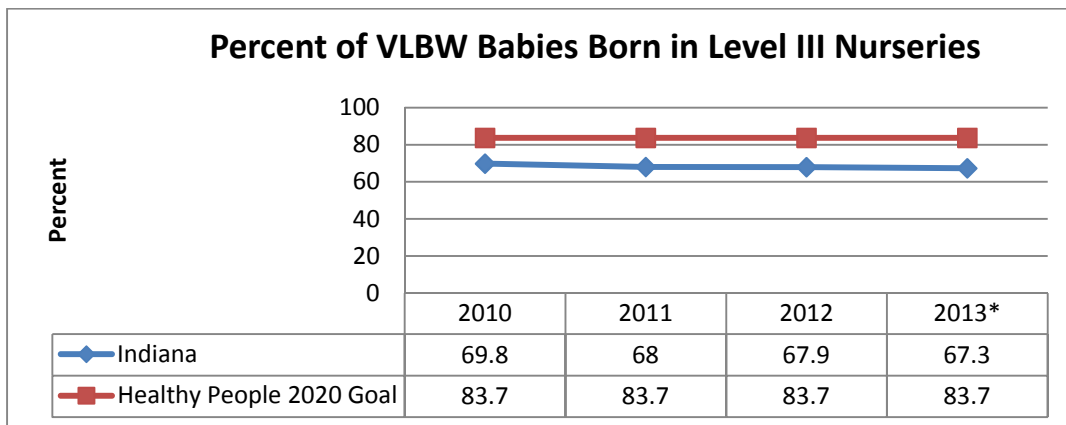


Source: Indiana State Department of Health, Maternal & Child Health Epidemiology Division (January 12, 2015)
 United States Original Source: Centers for Disease Control and Prevention National Center for Health Statistics
 Indiana Original Source: Indiana State Department of Health, PHP, ERC, Data Analysis Team

² <http://www.cdc.gov/reproductivehealth/TobaccoUsePregnancy/index.htm>

Published literature has stated that one factor in reducing infant mortality is for the highest risk babies to be born in hospitals with the appropriate level of support. "The most common modifiable factor associated with mortality was delivery at a Center without an appropriate level of support."³ The policy statement on Levels of Care developed by the American Academy of Pediatrics Committee on the Fetus and Newborn states "Facilities that provide hospital care for newborn infants should be classified on the basis of functional capabilities, and these facilities should be organized within a regionalized system of perinatal care."⁴

Indiana is developing regulations and a credentialing process for designating levels of care that are in compliance with the national recommendations. The chart below documents the percentage of Very Low Birth weight babies who were born in self-declared Level III nurseries. While it is unrealistic to think that 100% of VLBW babies would be born in Level III nurseries, Indiana is significantly below the Healthy People 2020 Goal of 83.7%.



Source: Indiana State Department of Health, Maternal & Child Health Epidemiology Division (January 12, 2015)
 United States Original Source: Centers for Disease Control and Prevention National Center for Health Statistics
 Indiana Original Source: Indiana State Department of Health, PHP, ERC, Data Analysis Team

³ Pediatrics Vol 135, number 1, January 2015

⁴ Pediatrics 2012;130:587-597

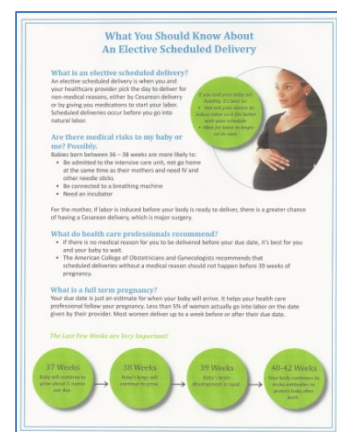
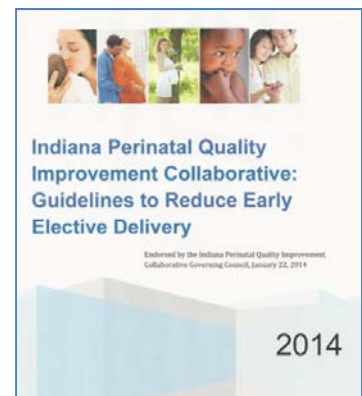
2014 Activities

In the second year of activity, the IPQIC Governing Council and its committees (Data, Finance, System Development and Quality Improvement) committed significant resources to addressing the issues of infant mortality and morbidity. Building on the activities initiated in 2013, several major products were developed to support improving perinatal practice and infrastructure.

Guidelines to Reduce Early Elective Deliveries

In January, the Governing Council unanimously endorsed *Guidelines to Reduce Early Elective Deliveries*⁵ developed by the Quality Improvement Committee, in collaboration with the Indiana Hospital Association, to address the issue of early elective deliveries. The committee was charged to develop guidelines that would support efforts to reduce non-medically necessary early term deliveries to a rate of 3% or less. National and state organizations have spoken against early elective deliveries. As stated in the document, "Research shows that early term elective deliveries without medical or obstetrical indication is linked to neonatal morbidities with no benefit to the mother or infant". The document presented the case and context for a statewide uniform policy, incorporated policy guidelines and relevant forms and documentation. In September, hospitals that were in compliance with the policy were honored at Indiana Perinatal Network Hospital Summit.

To support the implementation of this guidance document, the IPQIC Education Committee developed a companion information sheet for use by medical professionals in helping pregnant women understand elective scheduled deliveries and why it is important to wait, when medically appropriate, until labor begins naturally.



⁵ Appendix B

As a result of the work of the Indiana Hospital Association and IPQIC, the Indiana OMPP decided that one approach to reduce prematurity is to reduce elective deliveries prior to 39 weeks of gestation. To align with ISDH's initiative, the Indiana Health Coverage Programs (IHCP) implemented a nonpayment policy for early elective deliveries (EEDs) effective July 1, 2014. Deliveries that are not medically indicated prior to 39 weeks and 0 days, known as EEDs, are now non-covered for dates of admission on or after July 1, 2014. Deliveries that meet one of the approved medical indications for a medically necessary delivery still remain covered.

Indiana Perinatal Transport Standards

In March the Governing Council received documents for endorsement from two committees: System Development and Quality Improvement. The first document, *Indiana Perinatal Transport Standards*⁶, was developed as a result of the 2013 survey of hospital transport systems conducted in 2013. The transport standards, modeled after the Indiana Perinatal Hospital Standards, are divided into two sections: maternal-fetal and neonatal. The standards address quality assurance, competencies, equipment and medication. In addition, the standards include broader perinatal safety measures, policies and protocols and personnel licensure, certification and education. The transport subcommittee worked closely with Emergency Medical Services (EMS) Commission and the Indiana Department of Homeland Security to develop standards that are certainly aspirational but recognize the need for high quality inter-facility transfers of high-risk pregnant women and newborns. Because there have been no standards specific to perinatal transfers in the past, the Governing Council and ISDH recognized the challenge that many hospitals will have related to full implementation. The transport standards, which were endorsed unanimously by the Governing Council, will be incorporated into the regulations being developed by ISDH for the Indiana Perinatal Hospital Standards.



⁶ Appendix C

Addressing Infant Mortality in Indiana

The second document endorsed by the Governing Council in March was *Addressing Infant Mortality in Indiana*⁷. The paper detailed an "analysis of the resources and gaps impacting Indiana's infant mortality rate and develop recommendations for addressing it". The paper, endorsed by the Governing Council, had three recommendations:

- Improve data timeliness, data linkages (birth certificate, death certificate, birth defects registry, immunization, etc) and analysis systems to identify the causes and contributing factors associated with infant mortality and to track outcomes over time;
- Work with the current IPQIC structure, existing champions and organizations to formalize priorities and develop strategic aims to address infant mortality; and
- Define/develop an organizational structure(s) to carry out IPQIC Quality Improvement initiatives.

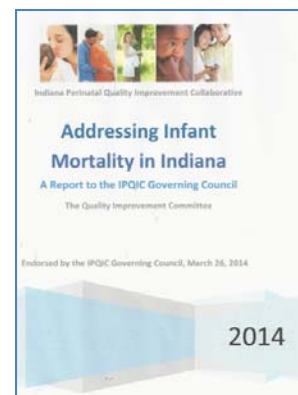
In preparing their recommendations, committee members conducted a comprehensive review of the literature and quality improvement activities in other states. There were two components that were held in common:

1. Development and operation of an quality improvement infrastructure; and
2. Implementation of Perinatal Periods of Risk (PPOR).

Implementation of the recommendations has already been initiated.

A retreat to develop the constructs for the quality improvement infrastructure was convened in February 2015. The first phase of

PPOR was initiated by the ISDH Maternal and Child Health Epidemiology Team in late 2014 and will be completed in 2015.

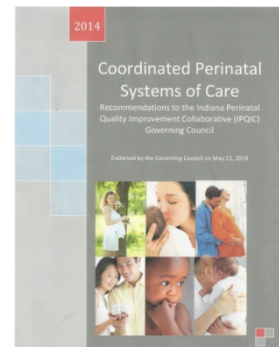


⁷ Appendix D

Coordinated Perinatal Systems of Care

In May, the Governing Council endorsed the recommendation of the System Development Committee that *Coordinated Perinatal Systems of Care*⁸ be established that will promote high quality service delivery systems and risk appropriate health care before, during and after pregnancy for all women of childbearing age. There is significant evidence that a statewide coordinated perinatal system of care will improve infant mortality and morbidity and reduce the cost of care for high risk newborns. The coordinated systems will also promote and ensure that all hospitals, regardless of level, have an important role to play in assuring that all babies born in Indiana have the best start in life.

Several study reviews support regionalization as a conduit for improving perinatal mortality and morbidity. The data suggest that states with formalized regional programs have lower infant mortality rates, better outcomes and resource utilization, and lower cost expenditures than states without such regionalization. Improving perinatal mortality and morbidity rates is the ultimate goal, yet short-term measures of quality assurance can also include: access equality, appropriate capacity and staffing, a reduction in inappropriate transfers, and networks that have robust local communication and collaboration.



The committee identified roles and responsibilities for the Perinatal Centers:

1. Perinatal Conferences;
2. Training for Affiliate Centers;
3. Quality Assurance Activities;
4. Support Services;
5. Maternal-Fetal and Neonatal Transport;
6. Transition to Postpartum and Interconception Care;
7. NICU Transition and Follow-Up; and
8. Development and Implementation of Agreements.

⁸ Appendix E

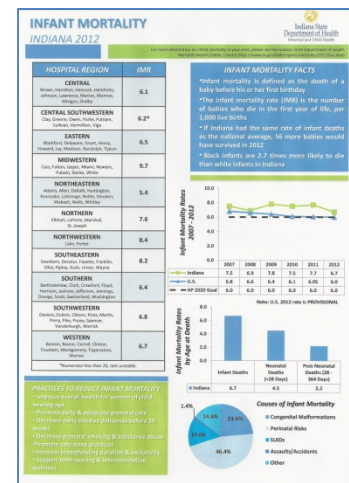
The implementation of perinatal care will not be an easy task. Hospital system alignments will dictate much of the organization. Indiana will also need to address the challenge of counties without hospitals providing perinatal services. It will take the commitment of all stakeholders to move the existing perinatal system to coordinated systems of excellence that will result in risk-appropriate care for pregnant women and newborns and improved perinatal outcomes.

Infant Mortality Maps

The Data Committee identified the need for a dashboard that would convey specific perinatal data that would be statewide but also could be organized in smaller geographic units. The smaller dashboard units would provide region specific information to support the different issues and challenges. The MCH Epidemiology Team worked in collaboration with the Data Committee to develop a two-sided, one-page document that captures key perinatal data points, quick infant mortality facts and causes of infant mortality at both the state and regional levels, and practices that can be employed to reduce infant mortality.

The decision was made to utilize the Indiana Hospital Association' districts as the geographic unit for the dashboards. The dashboards were developed initially utilizing 2011 data and have been updated with 2012 data.⁹ The dashboards will be updated annually.

The maps have been distributed broadly and have been well received. Getting specific information to the local level allows stakeholders to know specific issues that are affecting their infant mortality rates.



⁹ Appendix F

Finance Initiatives

The Finance Committee was launched in 2014. The goal of the Financial Committee is to support state and local efforts to improve perinatal outcomes in Indiana by enhancing delivery of and decreasing financial barriers to quality perinatal care. In its first year the committee members were charged with developing recommendations regarding:

1. Reimbursement innovations which promise to reduce costs while improving perinatal outcomes;
2. Clarification of existing payment policies (e.g., back transport of growing premature infants, Medicaid payments to hospitals in surrounding states for care of high risk pregnant women and high risk newborns.);
3. Funding possibilities for increased responsibilities of designated Regional Perinatal Centers (E.g., Title V, Medicaid, Managed Care entities);
4. Potential for increased Length of Stay Payment for hospitalization of infant with Neonatal Abstinence Syndrome to monitor baby and decrease readmissions; and
5. Explore the viability of social impact bonds to support infant mortality and morbidity initiatives.

As a result of input from committee members and concerns raised by hospitals, a new provider bulletin was issued by the Office of Medicaid Policy and Planning (OMPP) regarding payment for back transport and services provided to the high-risk infant in both sending and receiving hospitals.

Social Impact Bonds

"Social Impact Bonds (SIB) are an arrangement between one or more government agencies and an external service organization where the government specifies an outcome(s) and promises to pay the external organization a pre-agreed sum(s) if it is able to accomplish the outcome(s). In addition, SIBs require government to place few, if any, controls on the way that the external organization accomplishes the outcome, to cooperate with the service organization so that it is able to take the actions necessary to achieve the outcome, and provide a clearly defined population and clarity on what a "successful outcome" would be.

All payments are contingent on the outcome being achieved. If outcomes are not achieved, the government pays nothing. Therefore, risk is transferred from the government to the

external organization and/or its investors. The relationship is between government and the external service organization committed to accomplishing the outcome. While there may be other players present to monitor and measure outcomes independently, they are not essential to the concept, and they generally do not have a direct relationship with government. While SIBs are likely to be particularly useful in areas where accomplishing outcomes results in direct savings for government, not all SIBs have to result in government savings."¹⁰

Due to the novelty of social impact bonds in the U.S. and the only recently developed interest by public and private sector leaders in Indiana, the IPQIC Finance Committee recommended that state government take a more coordinated approach on SIB development as a financing option. It would be prudent to first understand the level of interest by various government agencies, the legislature and private sector leaders in the community. Therefore, a low-cost approach to increase this understanding and generate useful information on SIBs as a viable financing opportunity for Indiana would be for the Indiana Office of Management and Budget to release a Request for Information (RFI). This RFI approach would help state government gain a more complete perspective on the current landscape in Indiana with regards to service provider and potential investor interest in SIB financing.

Long-acting Reversible Contraception

The Finance Committee also addressed the issue of long-acting reversible contraception (LARC). LARC, intrauterine devices (IUD) or implants are a reliable form of contraception clinically appropriate for placement in the immediate postpartum period. Providing women with easy access to LARC methods greatly reduces the risk of unplanned pregnancies, and improves the health of newborns by facilitating healthy spacing between pregnancies. This is particularly important for adolescents where rapid repeat pregnancies occur too often. The adolescent birth rate for the state of Indiana is estimated to be 37.3 births per 1,000. For all 15-19 year-old women who have had an adolescent pregnancy,

¹⁰ Appendix G

17.1% have a second pregnancy within 12 months and 22.5% percent have another pregnancy within 18 months.

Currently, a significant barrier to providing post-partum LARC is related to facility reimbursement. In the Diagnosis Related Group (DRG) reimbursement system, which is widely used for inpatient payments, it is believed there is no additional reimbursement for the LARC as it is bundled into the facility payment for the admission in certain cases, and in other cases the reimbursement may be insufficient to cover the cost of the device. Given the cost of a device, it is seldom, if ever, used in the immediate postpartum period and the patient often leaves the hospital unprotected. This is a missed opportunity to provide reliable family planning while extending the inter-pregnancy interval, decreasing the risk of subsequent preterm birth. Although insertion may occur at a later post-partum visit, the likelihood of a new mother receiving this service falls dramatically if she leaves the hospital without it.

Based on an extensive literature review, the Finance Committee recommended¹¹ that:

- 1) Sufficient reimbursement be provided to the professional for LARC (IUD or implant) insertion that encourages providers to perform the procedure in the hospital setting immediately post-delivery;
- 2) Adequate reimbursement be supported to facilities for the implant device when provided in the inpatient setting in the immediate postpartum period.
- 3) Educational efforts should be directed toward providers regarding the provision, coverage, and reimbursement of LARC in the immediate postpartum period.
- 4) LARC insertion is recognized as a decision between the patient and her physician only; and
- 5) Provider and Consumer Education should be developed that addresses clinical guidelines and options.

¹¹ Appendix G

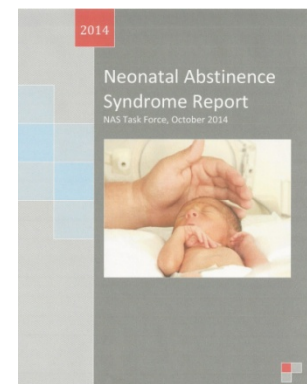
Neonatal Abstinence Syndrome

In 2014, the 118th Indiana General Assembly passed Senate Bill 408 which added Section 244.8 to Indiana Code 16-18-2 stating:

"Neonatal abstinence syndrome" and "NAS", for purposes of IC 16-19-16, refer to the various adverse effects that occur in a newborn infant who was exposed to addictive illegal or prescription drugs while in the mother's womb.

The legislation added IC 16-19-16 which required that the State Department of Health establish a task force that included, at a minimum, representatives from the Indiana Hospital Association, the Indiana Perinatal Network, the Indiana State Medical Association, the Indiana Chapter of the American Academy of Pediatrics, the Indiana Section of the American Congress of Obstetricians and Gynecologists, and the Indiana Chapter of the March of Dimes. The task force was charged with five deliverables:

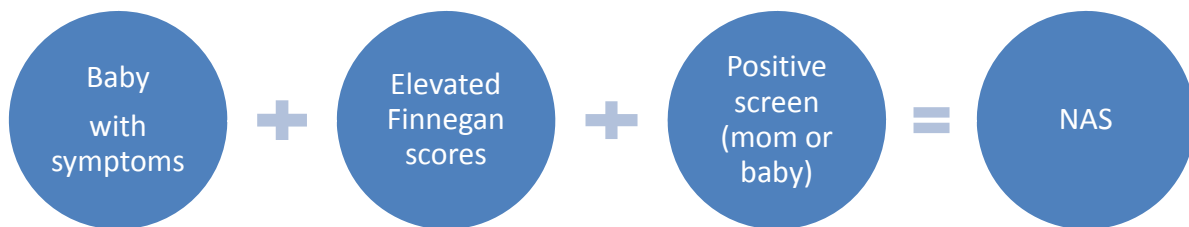
- (1) The appropriate standard clinical definition of "Neonatal Abstinence Syndrome";*
- (2) The development of a uniform process of identifying Neonatal Abstinence Syndrome;*
- (3) The estimated time and resources needed to educate hospital personnel in implementing an appropriate and uniform process for identifying Neonatal Abstinence Syndrome;*
- (4) The identification and review of appropriate data reporting options available for the reporting of Neonatal Abstinence Syndrome data to the state department, including recommendations for reporting of Neonatal Abstinence Syndrome using existing data reporting options or new data reporting options; and*
- (5) The identification of whether payment methodologies for identifying Neonatal Abstinence Syndrome and the reporting of Neonatal Abstinence Syndrome data are currently available or needed.*



The Task Force was convened in May 2014 with approximately 50 members who met monthly to accomplish the deliverables. The committee reviewed national guidelines, relevant literature and practices related to NAS developed by other states in order to fully

inform the decision-making process. After completion of the review process and substantive discussion of the issues related to NAS, the Task Force recommended that the diagnosis of NAS should be applied to babies who meet the following criteria:

- Symptomatic;
- Have two or three consecutive Modified Finnegan scores equal to or greater than a total of 24; and
- Have one of the following:
 - A positive toxicology test, or
 - A maternal history with a positive verbal screen or toxicology test.



Additional recommendations¹² included an identification process for the pregnant woman and her newborn along with a discussion of screening tools, an educational agenda for hospital and other medical personnel, and data elements that need to be collected to document the prevalence of this diagnosis. Five hospitals are currently working with ISDH to pilot the identification and data collection process.

Next Steps

In its second year, the Indiana Perinatal Quality Improvement Collaborative expanded to more than 200 volunteers working with ISDH/MCH staff to improve the health care infrastructure serving the pregnant women and infants of Indiana. While the IPQIC project recognized the critical issues related to social determinants and health disparities and their influence on perinatal outcomes, the primary focus in Year One was on infrastructure issues. In Year Two, the shift began to move from a singular focus on infrastructure to

¹² Appendix H

broadening the work to look at Quality Improvement initiatives, public awareness and education for consumers and health care providers as well as pay-for-performance opportunities.

In 2015 IPQIC has formed a new committee with specific focus on perinatal health disparities. The committee will be charged to look at both racial disparity as well as urban-rural disparity.

Indiana has a unique opportunity in 2015 and beyond to build on the work of those who have fought this good fight for many years. Marshalling the available resources and focusing on the identified outcome, Indiana can look forward to improved perinatal outcomes and "making mothers and babies count in Indiana".

Appendix A: IPQIC Membership

Governing Council Membership		
William Jerome	VanNess, MD* Adams, MD*	ISDH Commissioner
Douglas	Leonard*	Indiana Hospital Association
Ann	Alley	ISDH - Office of Primary Care
Bob	Bowman	ISDH - Maternal and Child Health
Deckard	Amber	March of Dimes
Mark	Gentry, MD	IN Chapter American College of Obstetrics and Gynecology
Paul	Halvorson	IU School of Public Health
Tanya	Hand	Consumer, At-Large
Kitty	Herndon	IN AWHONN
Larry Julia	Humbert Tipton Hogan	Indiana Perinatal Network
Nancy	Jewell	Indiana Minority Health Coalition
Don	Kelso	Indiana Rural Health Association
Carolyn	Lytle, MD	IN Chapter American Academy of Pediatrics
James	McIntire	IN State Medical Association
Minjoo	Morlan	IN March of Dimes
Phil	Morphew	IN Primary Health Care Association
Joe	Moser	FSSA Office of Medicaid Policy and Planning
Risheet	Patel, MD	IN Academy of Family Physicians
Stephen	Robertson	IN Department of Insurance
Kimberly	Roop, MD	Anthem Medicaid
Nancy	Swigonski, MD	IN Academy of Pediatrics
Gregory	Wilson, MD	IU School of Public Health
	* Co-Chair	

System Development/Implementation Committee

Mary	Abernathy, MD	St. Vincent Hospital
Regina	Adair, MD	Community North Hospital
Kristin	Adams, Ph.D., CHES	Indiana Family Health Council
Mary	Alexander	Indianapolis Healthy Start
Allen	Farrah	St. Mary's Medical Center
Julie	Alvarez	Indiana University
Harold	Bivins, MD	St. Vincent Hospital
Mary	Blackburn, CNM,MSN	HealthNet Women's Services & Midwifery
Niceta	Bradburn, MD *	St. Vincent Hospital
Patti	Brahe	Parkview Hospital
Jeffrey	Brookes, MD	Parkview Hospital
Mindy	Brown	Lutheran Hospital
James	Cameron, MD	Northern IN Neonatal Associates
Michelle	Cherry, RN, MSN	Community Hospital Munster
Sarah	Curry, MD	Community Hospital
Jenny	Davis	St. Mary's Hospital
Maria	Del Rio Hoover, MD	St. Mary's Neonatal Clinic
Lauren	Dungy-Poythress, MD	IU Health
Luis	Escobar, MD	St. Vincent Hospital
J Dennis	Fortenberry, MD	IU School of Medicine
Diane	Freel	South Bend Memorial Hospital
Birdie	Gunyon Meyer, RN, MA	IU Health
Heidi	Harmon, MD	Riley Hospital for Children
Elicia	Harris, MD	Women's Health Advantage
Meagan	Hostetter	Lutheran Hospital
Erica	Huddleston, MD	Community Health Network
Mozetta	Jackson	March of Dimes

System Development/Implementation Committee

Richard	Krueger, MD	Community Hospital Munster
Lee A.	Learman, MD, PH.D. *	IU School of Medicine, Center for Women's Health
Janet	Leezer, MD	Northern IN Neonatal Associates
MaryBeth	Lodato, CNM	Deaconess Hospital
Elizabeth	McIntire, MSN, WHNP	St. Vincent
Teresa	Meece	Community Hospital Munster
Carla	Meyer, MS, BSN, RN	Community Hospital Munster
Stephen	Morse, DO	Lutheran Health Network
Michelle	Musgrave	St. Mary's Hospital
Lori	Norton	Parkview Hospital
Mary Jo	Paladino	IU Medical Home Project
Lu-Ann	Papile, MD	Indiana University
Krista	Peak	Lutheran Children's Hospital
Ron	Pyle, MD	The Women's Hospital
Christine	Riley, MD	St. Mary's Hospital
Carolyn	Runge	ISDH
Chris	Ryan	The Women's Hospital
Renata	Sawyer, MD	Memorial Hospital, South Bend
Michael	Trautman, MD	Indiana University
Mary Ann	West	Department of Child Services
Thomas	Wheeler, MD	Ft. Wayne Perinatal Center
Robert	White, MD	Pediatrix Medical Group
Sharon	Worden	St. Vincent Women's Hospital
	* Co-Chair	

Quality Improvement Committee

Robert	Baker, MD	MHS Indiana
Sue	Beecher	FSSA-Office of Medicaid Policy and Planning
Georg'ann	Cattelona	Bloomington Area Birth Services
John	Ellis, MD	MHS Indiana
Bill	Engle, MD	Riley Hospital
Brennan	Fitzpatrick, MD	Women's Hospital
Kathleen	Frogge	ISDH- Vital Records
Lori	Grimm	Deaconess Hospital
Kendra	Ham	ISDH - MCH Epidemiology
Cindy	Hoess, MD	Community Health Net
Mozetta	Jackson	March of Dimes
Dawn	Kackley, MSN, WHNP, RNC	Terre Haute Regional Hospital
Julie	Kathman	Bloomington Hospital
Joseph	Landwehr, MD	IU Health Ball Memorial
Joanne	Martin, RN, DrPH	Goodwill of Central Indiana
Beth	McIntire, MSN, WHNP	St. Vincent Women's Hospital
Phil	Morpheus	IN Primary Health Care Association
Erica Kimberly	Park	Children's Health Services Research
Ann	Reynolds	ISDH - Vital Records
Michelle	Sandoval	ISDH -
Daniel	Sunkel, MD	Women's Clinic
Nancy	Swigonski, MD *	Children's Health Services Research
Donald	Trainor, MD	Health Net
Kathy	Wallace *	Indiana Hospital Association
Erin	Walsh	FSSA - Office of Medicaid Policy and Planning
Kristi	Williams, Pharm.D., BCPS	Reid Hospital
*	Co-Chair	

Data Committee		
Brian	Carnes	ISDH - Vital Records
Jessica	Craig	Marion County Public Health Dept
Katie	Gatz	ISDH -
Joe	Gibson *	Marion County Public Health Dept
Susan	Goldsmith	C-Spring/Office of Medicaid Policy and Planning
Joe	Haddix	ISDH - MCH Epidemiology
Nancy	Jewell	Indiana Minority Health Coalition
Waldo	Mikels-Carrasco*	MHIN
Sheryl	Mourey	St. Joseph Hospital
Michelle	Sandoval	ISDH
Kathy	Sullender	Daviess Co Health Department
Bernie	Ulrich	Indiana Hospital Association
Becky	Weber	Daviess Co Hospital
Paul	Winchester, MD	St Francis Pediatric Clinic
	* Co-Chair	

Education Committee		
Mary	Alexander	Indianapolis Healthy Start
Ivy	Antonian, RN	Franciscan St. Elizabeth East
Barb	Beaulieu	Purdue University
Linda	Bundick	Promoting Smoke Free Pregnancy
Carol	Dinger	Lutheran Hospital
Lauren	Dungy-Poythress, MD *	Indiana University Health
Carl	Ellison	Indiana Minority Health Coalition
Laura	Green	Lutheran Hospital
Tanya	Hand	Consumer Representative
Mozetta	Jackson	March of Dimes
Joanne	Martin, RN, DrPH	Goodwill of Central Indiana
Minjoo	Morlan, MSW *	March of Dimes
Rise	Ross Ratney	Healthy Start
Daniel	Sunkel, MD	Women's Clinic
Laurie	Weinzapfel	MDWise
	* Co-chair	

Finance Committee		
Charles	Allen, MD	Action Health Center
Tiffany	Berry	Lutheran Health Network
Bob	Bowman	ISDH, Maternal and Child Health
Tina	Cady	The Women's Hospital
Carolyn	Carney-Doebbeling, MD	MDWise
Lauren	Dungy-Poythress, MD	IU Health
Penny	Dunning	Indiana Primary Health Care Assoc.
John	Ellis, MD	MHS Indiana
Bill	Engle, MD	Riley Hospital for Children
Spencer	Grover	Indiana Hospital Association
Richard	Hug	IU Northwest
Don	Kelso	Indiana Rural Health Association
Debra	Kirkpatrick, MD	IU Women's Healthcare
Joseph	Landwehr, MD	IU Health Ball Memorial
James	Lemons, MD	Riley Hospital for Children
Ed	Leichty, MD	Riley Hospital for Children
Diane	Lorant, MD	IU School of Medicine
Laurie	O'Riley, RRT-NPS, EMT-P	IU Health
Karen	Porter	Strategic Solutions
Ryan	Randall	Anthem Medicaid
Keith	Reissaus*	Early Learning Indiana
Steve	Reynolds	St. Vincent
Kimberly	Roop, MD*	Anthem Blue Cross & Blue Shield
Michael	Thralls	IU Health
Erin	Walsh	FSSA-Office of Medicaid Policy and Planning
	* Co-chairs	

Neonatal Abstinence Syndrome (NAS) Committee		
Jonell	Allen, DNP, MSN, CNS-BC, RNC-OB	Community Health Network
Ivy	Antonian, RN	Franciscan St Elizabeth East
Deb	Beynon	St Vincent Women & Children's
Sirrilla	Blackmon	DMHA
Bob	Bowman	ISDH
James	Cameron, MD	Northern IN Neonatal Associates
Kathryn	Carboneau, MD	
Amelia	Clark	Meridian Health Services
Teri	Conard	Marion Co Health Dept
Ted	Danielson, MD	ISDH
Mary	Degeneffe, MD	Pediatrics Medical Group
Stan	DeKemper	ICAADA
Maria	Del Rio Hoover, MD**	St. Mary's Neonatal Clinic
Netta	Doughty	
Joan	Duwve, MD	ISDH / IU
Lisa	Eagans, RNC, MSN	Schneck Medical Center
John	Ellis, MD**	MHS Indiana
Toni	Elzy	DCS
Nancy	Fitzgerald, MSN	Nancy Fitzgerald
Donetta	Gee-Weiler, RN, BSN	Community Health Network
Mark	Gentry, MD	IN ACOG
Beth	Gephart, RN, BSN	Hendricks Regional Hospital
Dawn	Goodman-Martin, MA, LMHC, LCAC, NCC	Schneck Medical Center
Don	Granger, MD, MPH	St. Mary's Neonatal Clinic
Annette	Handy, RN CDE BSN	Indiana Hospital Assoc
Laura	Haneline, MD	IU Dept of Pediatrics
Julia	Hogan	Indiana Perinatal Network
Letitia	Jackson, MS, EdS, LMHC	Wellpoint
Julie	Kathman, MSN, RN, CNS-BC, CPN	Bloomington Hospital
Julie	Keck, MD	Anthem

Neonatal Abstinence Syndrome (NAS) Committee		
Kristen	Kelley	Attorney General's Office
Mary Beth	Koch, NNP-BC, C-NPT	IU Health Riley
Abigail	Kuzma	Attorney General's Office
Joseph	Landwehr, MD	IU Health Ball Memorial
Bethany	Littrell, LMHC, LCAC	St. Vincent Hospital
Art	Logsdon	ISDH
Joanne	Martin, RN DrPH	Goodwill of Central Indiana
JoAnn	Matory, MD	Eskinazi Hospital - March of Dimes
Christina	McCaul	Community Health Network
Deborah	McCullough, MD	North Shore Community Health Center
Debra	McDaniel, MD	Southern Indiana Physicians
Ann	Morrow, MSN, RN	Columbus Regional Hospital
Cara	Nichols, RN	Schneck Medical Center
Olufemi	Okanlami, MD	Memorial Hospital
David	Orentlicher, MD JD	
Lu-Ann	Papile, MD	Indiana University
Dheeraj	Raina, MD	Wellpoint
Anna	Schwartz	
Emily	Scott, MD	Methodist Hospital
Kimberly	Shimer, MD	The Women's Hospital
Andy	Shull, MD	IN Academy of Family Physicians
Kelly	Smith, RN	
Anne Lise	Sullivan, RN, BSN, MA	Marion Co Public Health
Dan	Sunkel, MD	Franciscan St. Elizabeth East
Drew	Trobridge, MD	Interventional Spine/Pain Management
Brownsyne	Tucker-Edmonds, MD, MPH	IU School of Medicine
Holly	Walpole	IN Professional Licensing Agency
John	Wareham, MD	St Vincent Women & Children's
Eric	Yancy, MD	MHS Indiana



Appendix B: Guidelines to Reduce Early Elective Deliveries



Indiana Perinatal Quality Improvement Collaborative: Guidelines to Reduce Early Elective Delivery

Endorsed by the Indiana Perinatal Quality Improvement Collaborative Governing Council, January 22, 2014

2014

Table of Contents

OVERVIEW 3

 WHY? 3

INDIANA HISTORY 3

COMMITTEE PARTICIPANTS..... 5

POLICY GUIDELINES 6

DELIVERY ANALYSIS AND SCHEDULING FORM 13

CONSENT FOR INDUCTION OF LABOR 16

Guidelines to Reduce Early Elective Deliveries

Overview

The Quality Improvement Committee of the Indiana Perinatal Quality Improvement Collaborative (IPQIC) was charged to develop guidelines that would support efforts in Indiana to reduce the number of non-medically indicated early term deliveries (37 07 through 38 6/7 weeks of gestation) to a rate of 3% or less. The following documents reflect the efforts of the dedicated medical professionals, state health officials and public insurance representatives that contributed to the final guidelines.

Why?

Research shows that early term elective deliveries without medical or obstetrical indication is linked to neonatal morbidities with no benefit to the mother or infant. Neonatal morbidities include increased adverse outcomes and death, NICU admissions, adverse respiratory outcome, transient tachypnea of the newborn, newborn sepsis, treated hypoglycemia, CPR or ventilation and extended length of stay.

The American Congress of Obstetricians and Gynecologists (ACOG) publications, (1979, 1999, 2009), the Indiana Hospital Association, The Joint Commission, the Center for Medicare & Medicaid Services (CMS), the March of Dimes, the Indiana Perinatal Network, the Indiana State Department of Health (ISDH), and the Indiana Office of Medicaid Policy and Planning (OMPP) have advised against non-medically indicated elective early term deliveries.

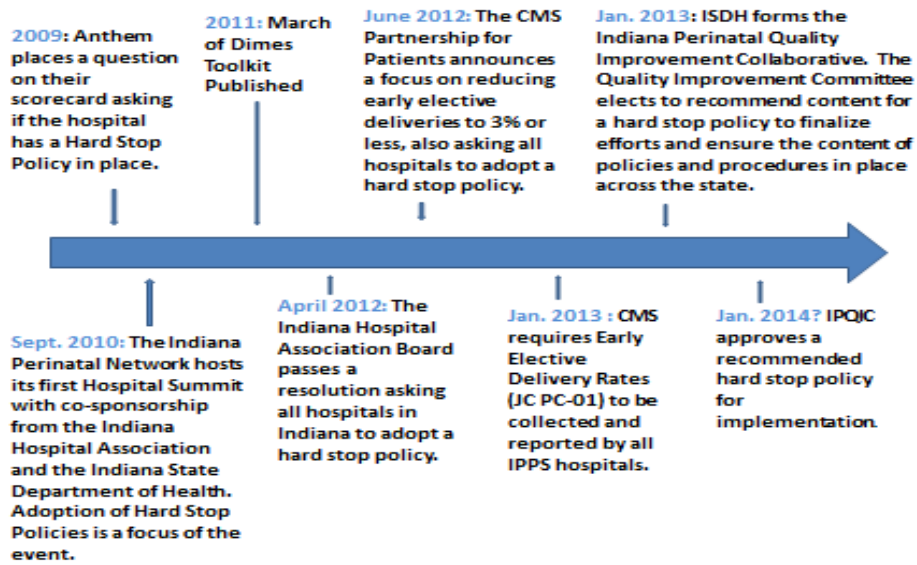
Quality improvement initiatives are known to be effective in reducing early term elective deliveries and successful initiatives are data-driven, involve multidisciplinary teams, and reference specific guidelines. The IPQIC guidelines for early term elective deliveries should be adopted by medical staff in Indiana hospitals. The guidelines include indications such as those identified by both ACOG and The Joint Commission.

Best practice is a hard stop policy enforced by strong medical staff leadership for all early term elective deliveries which does not allow medical staff to schedule an early term elective delivery without meeting criteria or receiving approval from medical staff leadership. Hospitals that have implemented a hard stop policy have virtually eliminated early term elective deliveries.

Indiana History

The following is a timeline of activities impacting early elective delivery (EED) rates in Indiana:

Guidelines to Reduce Early Elective Deliveries



As of Nov. 20, 2013, 93% (86 of 93) of delivering hospitals in Indiana report that they have adopted hard stop policies. (See Figure 1) Seven hospitals have not elected to implement a hard stop policy with varied results. Two of those seven hospitals report an early elective delivery rates less than 3%.

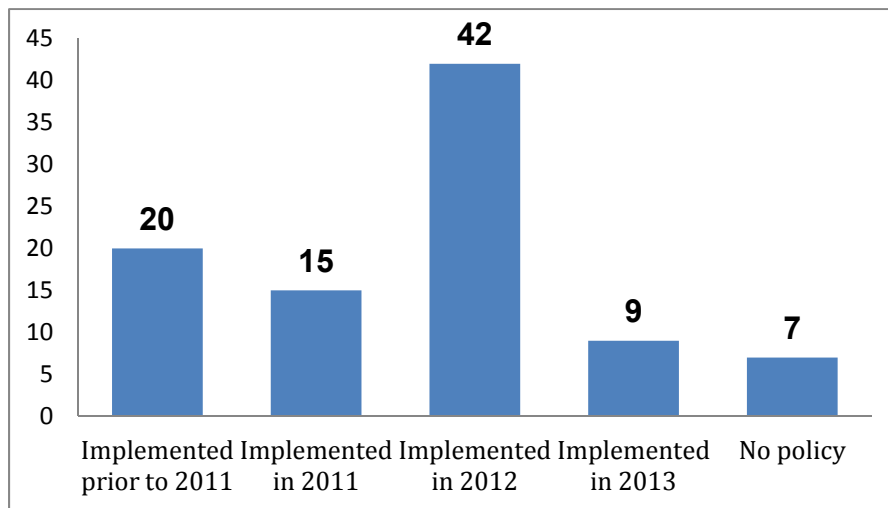


Figure 1: Adoption of Hard Stop Policies in Indiana

The advantages of a uniform policy are to assist hospitals whose policies and procedures are weaker and are currently allowing early elective deliveries. Several Indiana hospitals reporting adoption of hard stop policies also report current rates of early elective delivery over 10% in 2013.

Guidelines to Reduce Early Elective Deliveries

In Dec. 2013, CMS released the first national data on JC PC-01, early elective delivery rates to hospital compare. This public release included data for all inpatient prospective payment system hospitals.

Committee Participants

The following individuals were involved in the development of the documents:

Name	Agency	Role
Michele Bierman, MSN, BSN, RNC-OB	Union Hospital	Labor Room Manager
Carol Briley	Family and Social Services Administration	Office of Medicaid Policy and Planning
Kathy Detweiler, RN	Dupont Hospital	Birthplace Team Specialist
Joan Duwve, MD	IN State Department of Health	Chief Medical Officer
John Ellis, MD	MHS Indiana	Pediatrician
Brennan Fitzpatrick, MD	The Women's Hospital	Director, High Risk Obstetric Services
Lori Grimm, RN	Deaconess Hospital	Manager, Quality and Patient Safety
Larry Humbert, MSW	Indiana Perinatal Network	Executive Director
Deb Kirkpatrick, MD	IU School of Medicine	Obstetrician-Gynecologist
Joseph Landwehr, MD	IU Health Ball Memorial	Perinatologist
Pam Lowe, MSN, RN	IU Health North Hospital	Director, Women's Services
Minjoo Morlan, MSW	IN March of Dimes	Associate Director, Program Services
Donna Neufelder, RN	St. Mary's Medical Center	Executive Director, Quality Management
Risheet Patel, MD	IN Academy of Family Physicians	President
Sue Ann Pflum, RN	Wellpoint	Clinical Program Manager
Frank Schubert, MD	IU Women's Healthcare	Maternal Fetal Medicine
Laura Sparks, RN	Clark Memorial Hospital	Director, Maternal Health
Daniel Sunkel, MD	Women's Clinic	Obstetrician-Gynecologist
Kathy Wallace, RHIA (Committee Chair)	Indiana Hospital Association	Director, Performance Improvement
Erin Walsh	Family and Social Services Administration	Office of Medicaid Policy and Planning

POLICY GUIDELINES

Indiana Perinatal Quality Improvement Committee

SUBJECT: GUIDELINES FOR EARLY DELIVERIES	PAGE: 1 of 5
DISTRIBUTION: OBSTETRICS	DATE:

I. **PURPOSE:**

To establish guidelines to allow for safe delivery of obstetric care and prevent iatrogenic early elective and preterm birth. **The following guidelines are intended only as a general resource for hospitals and are not intended to reflect or establish a standard of care or to replace individual clinician judgments and medical decision making for specific healthcare organization and patient situations.**

II. **POLICY STATEMENT:**

- A. Early induction of labor or cesarean section should occur when there is medical benefit to mother or child for delivery at that point in time compared with continuation of pregnancy.
- B. Non-medically indicated cesarean section or induction of labor prior to full term (39 0/7 weeks of gestation) requires approval of the Obstetrics and Gynecology Medical Director or Department chair.
- C. Elective deliveries that are performed early term (37 0/7 through 38 6/7 weeks of gestation) without an approved medical indication will be reviewed by the department in the quality review process. Cases that are unjustified based upon documentation will be forwarded for Peer Review.
- D. Elective deliveries are discouraged after 39 weeks if a medical indication to induce is not present.

III. **DEFINITIONS:**

- A. **Elective Cesarean Section:** Refers to a primary or repeat Cesarean Section (CS) that is performed on a pregnant woman per request of the physician on behalf of the patient.
- B. **Elective Induction:** An elective induction is defined as a pharmacological or mechanical initiation of labor in a woman who has no known medical conditions or complications.

Indiana Perinatal Quality Improvement Committee

SUBJECT: GUIDELINES FOR EARLY DELIVERIES	PAGE: 2 of 5
DISTRIBUTION: OBSTETRICS	DATE:

IV. REQUIREMENTS:

- A. Patients who are electively delivered early term (37 0/7 through 38 6/7 weeks of gestation) should meet one of the following medical indications:

Category I		
Approved medical indications for early term (37 0/7 through 38 6/7 weeks of gestation) delivery		
Maternal Indications	Fetal Indications	Obstetric Indications
Antiphospholipid Syndrome (649.3)	ABO Isoimmunization (656.21)	Abruptio Placenta (641.20)
Chronic Hypertension (642.2)	Chorioamnionitis (658.40)	Antepartum Hemorrhage/Bleeding(641.8)
Chronic Pulmonary Disease	Fetal Abnormality(655.81)	Chronic Hypertension with super imposed preeclampsia (642.7)
Coagulopathy Defect (641.30)	Fetal Chromosomal Anomaly (655.11)	Gestational Hypertension (642.30)
Coagulopathy Disorders (649.3)	Fetal CNS anomaly (655.01)	Maternal /Fetal Hemorrhage (656.0)
Congenital Heart Defect (658.41) Heart Disease (648.61)	Fetal Damage due to Disease (655.41)	Mild Preeclampsia (642.4) Severe Preeclampsia/HELLP (642.5) / Eclampsia (642.6)
Current Cancer	Fetal Damage due to Drugs (655.51)	Multiple gestation (651.5) Multiple gestation with loss (651.6)
Diabetes Mellitus (648.01)	Fetal Damage due to Radiation (655.61)	Oligohydramnios (658.01)
Epilepsy/ Seizure Disorder (649.4)	Fetal Damage due to Virus (655.31)	Placenta Previa (641.01)
Gastroenteric Diseases/ Disorders	Fetal Demise-Singleton (656.41)	Placental Previa Hemorrhage (641.11)
Hematological disorder	Fetal Distress (656.3)	Premature Rupture of Membranes (658.10)
HIV (042) Asymptomatic HIV infection status (V08)	Intrauterine Growth Restriction(656.51)	Prolonged Rupture of Membranes (658.21)
Hypertension Non-Specified (642.9)	Non-Reassuring fetal antepartum testing (659.73)	Polyhydramnios (657.00)
Liver Disease(646.71)	RH Isoimmunization (656.11)	Quadruplets (651.2) Quadruplets with loss (651.5)
Previous Stillborn (V23.5)		Triplets (651.1) Triplets with fetal loss (651.41)
Prior Classical Cesarean Delivery (654.81)		Twins (651.01) Twins with fetal loss (651.3)
Prior Myomectomy Entering Endometrial Cavity		Uncontrolled Gestational Diabetes (648.80)
Renal Disease (646.21)		Unstable lie (652.01) Multiple gestation with malpresentation (652.61)
		Vasa Previa (663.51)

Indiana Perinatal Quality Improvement Committee

SUBJECT: GUIDELINES FOR EARLY DELIVERIES	PAGE: 3 of 5
DISTRIBUTION: OBSTETRICS	DATE:

- B. Patients who are electively delivered at full term (39 0/7 weeks of gestation through 40 6/7 weeks of gestation), should meet one of the following medical indications:

Category II		
Approved medical indications for full term delivery.		
Fetal Malpresentation/Unstable Lie	History of Herpes Simplex Virus or Active Infection	

- C. The following are non-medical indications for delivery and should only be used at full term (39 0/7 weeks of gestation through 40 6/7 weeks of gestation).

Category III		
Non-medical indications for delivery.		
Maternal Request	Favorable Cervix	History of Rapid Labor
Distance From Hospital	Psychosocial Factors	Repeat Cesarean Delivery

V. RECOMMENDED CRITERIA FOR INITIATING ELECTIVE INDUCTION

- A. Prior to elective delivery, full term (39 0/7 weeks of gestation through 40 6/7 weeks of gestation) gestational age will be confirmed and documented by one of the following:
1. Based on Assisted reproductive technologies dating
 2. It has been 36 weeks since a positive serum or urine human chorionic gonadotropin pregnancy test result.
 3. Fetal heart tones have been documented as present for 30 weeks by Doppler ultrasonography.
 4. Ultrasound measurement at less than 20 weeks of gestation supports full term (39 0/7 weeks of gestation through 40 6/7 weeks of gestation).
 5. If LMP is known, an ultrasound obtained before 13 weeks and 6 days with a crown rump length corresponding to a gestational age within 5 days confirms the established due date based on menstrual dates. Conversely, the estimated due date should be based on the ultrasound if the difference between menstrual and ultrasound dates is greater than 6 days. For ultrasounds between 16 and 22 weeks, composite gestational age based on biometry should be within 10 days to confirm LMP dating, and the estimated due date should be changed only if calculated gestational age difference is 11 days or greater. If the LMP is unknown, dating should be based on ultrasound, preferably in the first trimester. The first ultrasound is the most accurate, and the pregnancy should not be re-dated based on subsequent ultrasounds.
- B. A mature fetal lung maturity test result before full term (39 0/7 weeks of gestation through 40 6/7 weeks of gestation), in the absence of appropriate clinical circumstances, is not an indication for early elective delivery.

Indiana Perinatal Quality Improvement Committee

SUBJECT: GUIDELINES FOR EARLY DELIVERIES	PAGE: 4 of 5
DISTRIBUTION: OBSTETRICS	DATE:

- C. Prior to elective induction, a Bishop score should be calculated.
 - 1. A high bishop score (defined as greater than 5 for multiparous patients or greater than or equal to 8 for nulliparous patients) indicates a similar likelihood of vaginal birth whether labor is spontaneous or induced. A bishop score less than 6 is associated with a higher rate of failed induction of labor, particularly in nulliparous women.
 - 2. The increased risk of cesarean delivery secondary to labor induction is almost entirely confined to nulliparous women with an unfavorable cervix. For nulliparous women with a Bishop score of less than 6, the cesarean section rate approaches 50%.

VI. SCHEDULING PROCEDURE:

The delivering physician will utilize the scheduling form to request delivery scheduling.

A. Provider Responsibility:

- 1. The delivering physician or designee will contact the OB Department to schedule the induction or cesarean section. The following will be provided:
 - a. Indication for the procedure.
 - b. Gestational age on the day of the scheduled procedure.
- 2. Complete the scheduling form, consent for induction of labor form and appropriate order sheet.
- 3. Fax the scheduling form, consent for induction of labor form, updated prenatal records and copy of first ultrasound report to the OB Department.

B. Nursing Responsibility:

- 1. The Charge Nurse will review the information provided and compare it with the approved, predetermined list of medical and obstetrical indications for induction of labor and / or cesarean delivery on the "Delivery Analysis and Scheduling" form.
 - a. Category I Indications - Approved medical indications for delivery at less than 39 weeks gestation or greater.
 - b. Category II Indications - Approved medical indication for delivery at 39 weeks gestation.
 - c. Category III Indications - Non-medical indication for delivery.
- 2. The Charge Nurse or designee will review the department calendar for scheduled inductions and cesarean sections daily.
 - a. Scheduling priority will be given to the patients with a Category 1 medical indication for delivery.
 - b. Elective non-medically indicated induction and /or cesarean section will be scheduled on a first come, first serve basis.
- 3. Any request that does not meet category criteria as defined above will be referred to the OB Department Nurse Manager or designee for review at that time. The OB Department Nurse Manager or designee will initiate the chain of command.

Indiana Perinatal Quality Improvement Committee

SUBJECT: GUIDELINES FOR EARLY DELIVERIES	PAGE: 5 of 5
DISTRIBUTION: OBSTETRICS	DATE:

C. Special Considerations:

During times of high acuity or high census, patient prioritization will be determined by utilizing the following guidelines:

1. Priority will be given to patients in active labor.
2. Scheduled deliveries will be prioritized according to their indication for delivery.
3. Medically indicated deliveries will take priority over elective non-medically indicated inductions and / or cesarean sections.
4. Elective non-medically indicated inductions and / or cesarean sections may be delayed or rescheduled.
 - a. Delays will be communicated to the patient by the Charge Nurse or designee.
 - b. Decision to reschedule will be communicated to the patient by the delivering physician on call. The patient will be rescheduled for delivery prior to departure.

ATTACHMENTS:

- Delivery Analysis and Scheduling Form
- Patient Consent Form for Induction of Labor

REFERENCES:

American College of Obstetricians and Gynecologists, Society of Maternal-Fetal Medicine. (2013). Definition of Term Pregnancy (Committee Opinion No. 579). Washington, DC: Author

American College of Obstetricians and Gynecologists. (2009). Induction of Labor (Practice Bulletin No. 107). Washington, DC: Author

American College of Obstetricians and Gynecologists. (2008). Fetal Lung Maturity (Practice Bulletin No. 97). Washington, DC: Author

American Academy of Pediatrics & American College of Obstetricians and Gynecologists. (2012). Guidelines for Perinatal Care (7th Ed, pp 180-181,193.). Elk Grove, IL; Washington, DC: Authors

Northern New England Perinatal Quality Improvement Network. (2011). Guidelines for Medically Indicated Induction of Labor.

Simpson, K.R., (2009) Association of Women's Health, Obstetric and Neonatal Nurses (AWHONN) Cervical Ripening and Induction and Augmentation of Labor, 3rd Edition. Washington, DC.

Spong, C. (2013). Defining "Term" Pregnancy Recommendations from the Defining "Term" Pregnancy Workgroup. *JAMA* published online May 3, 2013. Retrieved from <http://jama.jamanetwork.com>.

DELIVERY ANALYSIS AND SCHEDULING FORM

(Patient Sticker)

Delivery Analysis and Scheduling Form

Patient Name: _____ DOB: _____ G ___ P ___ EDC: _____

Requested Date of Procedure: _____ Gestational Age on Date of Procedure: _____

Desired Method of Delivery: Induction of Labor Cesarean

(Circle all indications that apply below)

Category I		
Approved medical indications for early term (37 0/7 through 38 6/7 weeks of gestation) delivery		
Maternal Indications	Fetal Indications	Obstetric Indications
Antiphospholipid Syndrome (649.3)	ABO Isoimmunization (656.21)	Abruption Placenta (641.20)
Chronic Hypertension (642.2)	Chorioamnionitis (658.40)	Antepartum Hemorrhage/Bleeding(641.8)
Chronic Pulmonary Disease	Fetal Abnormality(655.81)	Chronic Hypertension with super imposed preeclampsia (642.7)
Coagulopathy Defect (641.30)	Fetal Chromosomal Anomaly (655.11)	Gestational Hypertension (642.30)
Coagulopathy Disorders (649.3)	Fetal CNS anomaly (655.01)	Maternal /Fetal Hemorrhage (656.0)
Congenital Heart Defect (658.41) Heart Disease (648.61)	Fetal Damage due to Disease (655.41)	Mild Preeclampsia (642.4) Severe Preeclampsia/HELLP (642.5) / Eclampsia (642.6)
Current Cancer	Fetal Damage due to Drugs (655.51)	Multiple gestation (651.5) Multiple gestation with loss (651.6)
Diabetes Mellitus (648.01)	Fetal Damage due to Radiation (655.61)	Oligohydramnios (658.01)
Epilepsy/ Seizure Disorder (649.4)	Fetal Damage due to Virus (655.31)	Placenta Previa (641.01)
Gastroenteric Diseases/ Disorders	Fetal Demise-Singleton (656.41)	Placental Previa Hemorrhage (641.11)
Hematological disorder	Fetal Distress (656.3)	Premature Rupture of Membranes (658.10)
HIV (042) Asymptomatic HIV infection status (V08)	Intrauterine Growth Restriction(656.51)	Prolonged Rupture of Membranes (658.21)
Hypertension Non-Specified (642.9)	Non-Reassuring fetal antepartum testing (659.73)	Polyhydramnios (657.00)
Liver Disease(646.71)	RH Isoimmunization (656.11)	Quadruplets (651.2) Quadruplets with loss (651.5)
Previous Stillborn (V23.5)		Triples (651.1) Triples with fetal loss (651.41)
Prior Classical Cesarean Delivery (654.81)		Twins (651.01) Twins with fetal loss (651.3)
Prior Myomectomy Entering Endometrial Cavity		Uncontrolled Gestational Diabetes (648.80)
Renal Disease (646.21)		Unstable lie (652.01) Multiple gestation with malpresentation (652.61)
		Vasa Previa (663.51)
Category II		
Approved medical indications for full term delivery (39 0/7 weeks of gestation through 40 6/7 weeks of gestation)		
Fetal Malpresentation/ Unstable Lie	History of Herpes Simplex Virus or Active Infection	
Category III		
Non-medical indications for delivery.		
Maternal Request	Favorable Cervix	History of Rapid Labor
Distance From Hospital	Psychosocial Factors (Specify Below)	Repeat Cesarean Delivery

Clinical/Other Indications/Supporting Data: _____

******Include first ultrasound report and Updated H&P which includes documentation of indication for delivery**

(Patient Sticker)

Delivery Analysis and Scheduling Form, page 2

Fetal maturity confirmation was confirmed by the following method:

- Based on assisted reproductive technologies dating
- Ultrasound measurement at less than 20 weeks of gestation supports full term (39 0/7 weeks of gestation through 40 6/7 weeks of gestation)
- Fetal heart tones have been documented as present for 30 weeks by Doppler ultrasonography.
- It has been 36 weeks since a positive serum or urine human chorionic gonadotropin pregnancy test result.

Bishop Score: Circle factors that are present at start of induction.

Non-applicable (Scheduled C-section, medically indicated delivery)

Factor	0	1	2	3
Dilation (cm)	Closed	1 - 2	3 - 4	Greater Than or Equal to 5
Effacement (%)	0 - 30%	40 - 50%	60 - 70%	Greater Than or Equal to 80%
Station	-3	-2	-1 / 0	+1 / +2
Consistency	Firm	Medium	Soft	-----
Cervical Position	Posterior	Mid-Position	Anterior	-----

Bishop Score Total: _____

- A high bishop score (defined as greater than 5 for multiparous patients or greater than or equal to 8 for nulliparous patients) indicates a similar likelihood of vaginal birth whether labor is spontaneous or induced.
- A bishop score less than 6 is associated with a higher rate of failed induction of labor, particularly in nulliparous women. The increased risk of cesarean delivery secondary to labor induction is almost entirely confined to nulliparous women with an unfavorable cervix. For nulliparous women with a Bishop score of less than 6, the cesarean section rate approaches 50%.

Other Factors: Yes/No Adequate Pelvis _____ EFW < 4500 grams _____ EFW > 4500 grams

Patient Education: Patient reviewed risk and benefits Patient signed Consent for Induction of Labor Form

Physician Signature _____

Time _____

Date _____

CONSENT FOR INDUCTION OF LABOR

Insert Hospital Name
CONSENT FOR INDUCTION OF LABOR

If you are considering an elective induction of labor, please read the information provided. The risks associated with an elective induction may outweigh the possible benefits, especially if this is a first time labor. You should also discuss this with your physician.

YOUR LABOR INDUCTION

Labor induction is usually done with a medication called Oxytocin or Pitocin. With your practitioner's order, our staff will start the medication at a standard dose and increase it over time to achieve labor progress. While you are getting the medication we will closely monitor the baby's heart rate and your contractions. The length of labor depends on how dilated or "ripe" your cervix is at the start of the induction. In general the more dilated you are, the quicker your labor will progress. Also, if this not your first birth, labor may progress faster.

If your cervix is already fairly dilated, your practitioner may start your induction by breaking the bag of water. We may schedule a cervical ripening the day before your induction, if your cervix is closed and not shortening. This procedure may soften your cervix and cause it to begin to dilate. Ripening your cervix may make the Oxytocin more effective when it is begun. Additionally, ripening your cervix may trigger the onset of your labor.

WHY ARE LABOR INDUCTIONS PERFORMED?

Labor inductions are performed for many reasons. Clearly, some reasons are more urgent than others. Here are just a few examples:

- A woman is past her due date.
- A woman is experiencing medical problems that place her or her baby at risk, such as high blood pressure, diabetes, rupture of the bag of water, etc.
- The baby or babies may be small or the amniotic fluid too low.

WHAT ARE THE POTENTIAL RISKS AND BENEFITS OF LABOR INDUCTION?

It is always important to consider the potential benefits and risks of any procedure. The risks include, but are not limited to the following:

- A greater risk of cesarean birth delivery, especially with an "unripe" cervix.
- Longer labors
- Higher chance of a vacuum or forceps delivery.
- Side effects associated with medications or unintended adverse reactions. For example, it is possible to cause contractions that are too frequent and may affect the baby's heart rate. This is why careful monitoring of your baby's heart rate is necessary during labor induction.

If you are considering an elective induction, the risks may outweigh the possible benefits, especially if this is a first time labor.

CONSENT FOR INDUCTIONS OF LABOR

Indications for Induction: _____

I have read the above information and I have had the chance to ask my practitioner questions. All of my questions have been answered to my satisfaction. I wish to proceed with the induction.

Patient Signature

Date

Provider Signature

Date



Appendix C: Indiana Perinatal Transport Standards



Indiana Perinatal Transport Standards

Developed by the Indiana Perinatal Quality Improvement Collaborative, System Development Committee

Endorsed by the Indiana Perinatal Quality Improvement Collaborative Governing Council March 26, 2014

Indiana Perinatal Transport Standards

STANDARD	TITLE
I.	Certification
II	Maternal-Fetal Quality Assurance
III	Maternal-Fetal Competencies
IV	Maternal Fetal Transport Equipment
V	Maternal-Fetal Medication
VI	Neonatal Quality Assurance
VII	Neonatal Competencies
VIII	Neonatal Transport Equipment
IX	Neonatal Medication
X	Perinatal Transport Personnel Licensure, Certification, and Education
XI	Perinatal Safety Measures
XII	Perinatal Policies and Protocols

Indiana Perinatal Transport Standards

DEFINITIONS

- A **debrief** is a discussion among all coordinated responders, medical directors and physicians to conduct a root cause analysis.
- The **dispatch time** is defined as the time from acceptance of the transport to notification of the transport service.
- The **enroute time** is defined as the time from notification of transport service to the time when entire crew is on board the vehicle and starting to travel.
- **Just Culture** is defined as an error analysis tool that recognizes that individual practitioners should not be held accountable for system failings over which they have no control. A just culture also recognizes many individual or “[active](#)” errors represent predictable interactions between human operators and the systems in which they work. However, in contrast to a culture that touts “no blame” as its governing principle, a just culture does not tolerate conscious disregard of clear risks to patients or gross misconduct . (From the AHRQ Glossary)
- A **perinatal transport team** may take three forms:
 - Hospital-based: the vehicle (air or ground) is owned by the hospital and all staffing is provided by the hospital;
 - Contracted: the vehicle (air or ground) and staffing are external to the hospital
 - Combination: the vehicle (air or ground) is contracted and staff inside the passenger compartment are hospital based.
- A **pre-transport briefing** is a discussion of the status of the patient and all issues identified on the pre-transport checklist provided by the state prior to the departure.
- A **sentinel event** is an unexpected occurrence involving death or serious physical or psychological injury, or the risk thereof. Serious injury specifically includes loss of limb or function. The phrase, ‘or the risk thereof’ includes any process variation for which a recurrence would carry a significant chance of a serious adverse outcome.
- **Root Cause Analysis** is defined as an error analysis tool in health care. A central tenet of Root Cause Analysis is to identify underlying problems that increase the likelihood of errors while avoiding the trap of focusing on mistakes by individuals. (From the AHRQ Glossary)

Indiana Perinatal Transport Standards

Standard I: Certification

All contracted or center-based perinatal transport teams that conduct inter-facility transfers of high risk maternal-fetal or neonatal patients shall be certified by the commission as an ambulance provider organization. ("commission" means the Indiana Emergency Medical Services Commission (836 IAC 1-1-1 (15))). The following standards reflect the additional standards necessary for Maternal-Fetal and Neonatal Transport.

Standard II: Maternal-Fetal Quality Assurance

2.1 In addition to complying with all reports and records rules in 836 IAC 1-1-5, the certified provider of the Maternal Fetal Transport Program shall track the following benchmarks:

- a. Delivery \leq 30 minutes from arrival at receiving hospital;
- b. Diversion of transport due to maternal and or fetal status change in route;
- c. Incidence of loss of communication with medical control for anything longer than 5 minutes;
- d. Change in transport asset (ground to air or vice versa);
- e. Delivery in route;
- f. Incidence of sentinel events;
- g. Transport crew member injury during transport;
- h. Any reason for transport delay:
 - i. Accident—Motor Vehicle Ambulance, flight;
 - ii. Delay in unscheduled transport dispatch time is \geq 15 minutes;
 - iii. Delay in unscheduled transport enroute time is \geq 15 minutes;
 - iv. Mechanical failure of ambulance or aircraft that leads to a transport delay;
 - v. Equipment failure;
 - vi. Weather or road related (constructions, accidents) issues;
 - vii. Crew member;
- h. Maternal fetal injury during transport; and
- i. Maternal and or fetal status deemed unstable for transport at sending facility.

2.2 When a sentinel event occurs, the perinatal transport team, medical director, and medical control physician must have a

Indiana Perinatal Transport Standards

Standard II: Maternal-Fetal Quality Assurance
debrief. The debrief must be initiated with 72 hours and the root cause analysis completed within 5 working days.
2.3 Teams are required to have a pre-transport briefing regarding the patient(s) condition prior to assuming care of the patient(s).
2.4 Each perinatal transport team shall have written internal quality review procedures/protocols.
2.5 Each hospital with an perinatal transport team shall implement a routine schedule of Quality Improvement meetings and a record of minutes maintained.
2.6 Transport teams must conduct quarterly reviews of the following elements and maintain documentation of the reviews in compliance with 836 IAC 1-1-5(c): <ul style="list-style-type: none">a) Transport indication(s);b) Medical and/or nursing intervention performed or maintained;c) Time of intervention:<ul style="list-style-type: none">a. patient response to interventions; andb. appropriateness of intervention performed or omission of needed interventiond) Patient outcome at arrival of destination;e) Patient's change in condition during transport;f) Timeliness and coordination of the transport from reception of request to lift off or ambulance enroute time;g) Review of Pre-transport inspection documentationh) Safety practices documented;i) Operational criteria:<ul style="list-style-type: none">a. number of completed transports;b. number of aborted or canceled flights/transports due to weather;c. number of aborted or canceled flights/transports due to maintenance;d. number of aborted or canceled flights/transports due to patient condition and alternative modes of transportation; ande. number of aborted or canceled flights/transports due to unavailable team.j) Communications center or organization must monitor and track:<ul style="list-style-type: none">a. Instrument Flight Rules (IFR)/Visual Flight Rules (VFR);

Indiana Perinatal Transport Standards

Standard II: Maternal-Fetal Quality Assurance

- b. Weather at time of request of the referring and accepting facility and during transport if changes occur;
- c. Transport acceptance to lift off times or the road times; and
- d. All aborted and cancelled transport requests - times, reasons and disposition of patients as applicable.

Standard III: Maternal-Fetal Competencies

3.1 Nursing: In addition to compliance with IC 25-23 and IAC 848, Maternal-Fetal transport nurses shall adhere to the Association of Women's Health, Obstetric and Neonatal Nurses (AWHONN) *Basic, High Risk and Critical Care Intrapartum Nursing: Clinical Competencies and Education Guide*. The documentation of compliance with the standards must be maintained in the employee personnel files.

3.2 Emergency Medical technician/Paramedic: Must meet and/or exceeds the requirements established in 836 IAC Article 4.

3.3 Maternal-Fetal Transport Medical Director:

- a) Must be Board-certified or be an active candidate for Board certification in Obstetrics or Maternal-Fetal Medicine and is responsible and accountable for supervising and evaluating the quality of medical care provided during a MF transport.
- b) Must be licensed and authorized to practice in the location in which the medical transport service is based and have educational experience in the area of high risk obstetrics or utilize a maternal-fetal medicine specialist as a consultant when appropriate.
- c) Must have knowledge of current concepts of appropriate use of transport assets - annually must include but is not limited to the following:
 - a. "Just Culture" : Highly reliable standards of patient safety;
 - b. Patient care capabilities and limitations;
 - c. Continuing education in transport;
 - d. Crew resources management;
 - e. Stress recognition and management; and
 - f. Infection control;
- d) Must have expertise in risk management and safety training.

Indiana Perinatal Transport Standards

Standard III: Maternal-Fetal Competencies

3.4 Clinical Care Supervisor:

- a) Responsible for supervision of patient care provided by the members of the team directly employed by the transport program and works collaboratively with the medical director;
- b) Oversees quality initiatives of the program;
- c) Must hire, train, and provide continuing education for the service;
- d) Responsible for the evaluation of the crew members
- e) Must maintain documentation of competencies in each employee's personnel file.

3.5 Program Manager:

- a) The program manager will be responsible for the management and oversight of the maternal-fetal transport program.
- b) Competencies:
 - a. Human factors;
 - b. Just culture: Highly reliable standards of patient safety;
 - c. Sleep deprivation;
 - d. Stress recognition and management;
 - e. Safety and risk management;
 - f. Quality management; and
 - g. Knowledge of national, regional and local standards of clinical practice, aviation and ground regulations as appropriate.
- c) Documentation of competencies must be maintained in the employee's personnel file.

Standard IV: Maternal Fetal Transport Equipment

4.1 The ambulance used for maternal-fetal transport must have emergency care equipment as identified in 836 IAC 1 and/or 2. Which level of transport is used depends on patient acuity as determined by ISDH established algorithms . In addition, each hospital with a maternal-fetal transport team must have the following equipment or its equivalent:

- a) Filter needles;
- b) Blue port caps;

Indiana Perinatal Transport Standards

Standard IV: Maternal Fetal Transport Equipment

- c) Syringes;
- d) Pump tubing;
- e) Piggyback tubing;
- f) Stopcocks;
- g) Stopcock extension set ;
- h) Y ports with blue locks;
- i) IV start kits;
- j) 18 g angiocaths;
- k) Blue luerlocks;
- l) Sterile Water flushes;
- m) Integrative Therapies (optional):
 - a. Music device;
 - b. Ear buds;
 - c. Essential oils;
- n) Minifan (optional);
- o) Activated chemical infant thermal mattress;
- p) Adult Stethoscope;
- q) Sterile gloves (variety of sizes);
- r) Neonatal Resuscitation Program pouch:
 - a. Baby stethoscope;
 - b. Self-inflating bag;
 - c. Regular newborn mask;
 - d. Preemie mask;
 - e. Infant pulse ox;
 - f. Polyethylene or plastic barrier;
 - g. Blankets;
 - h. Syringe;

Indiana Perinatal Transport Standards

Standard IV: Maternal Fetal Transport Equipment

- i. Cord clamps;
- j. Hat;
- k. Diaper;
- s) Vaginal exam pouch:
 - a. Sterile exam gloves;
 - b. Peri-pads;
 - c. Lubricating gel;
- t) Fetal monitor:
 - a. Monitor paper;
 - b. Power cables;
 - c. Tocodynamometer;
 - d. Fetal heartrate ultrasound monitor;
 - e. Transducer Gel;
 - f. Fetal monitor belts;
 - g. Hand held Doppler device for detection of fetal heart rate; and
 - h. IV pump;

Standard V: Maternal-Fetal Medication

5.1 The ambulance used for maternal-fetal transport must have medication as identified in 836 IAC 1 and/or 2 depending on patient acuity as determined by ISDH established algorithms. In addition, the following medications, or an alternative as determined by the maternal-fetal medical director, must be carried by the maternal-fetal transport team:

- a) Calcium Gluconate;
- b) Tums calcium carbonate;
- c) Furosemide;
- d) Hydralazine;
- e) Indomethacin;

Indiana Perinatal Transport Standards

Standard V: Maternal-Fetal Medication

- f) Labetolol;
- g) Misoprostol;
- h) Morphine;
- i) Nifedipine;
- j) Ondansetron;
- k) Oxytocin;
- l) Terbutaline;
- m) Magnesium;
- n) Oxytocin pre-mix; and
- o) Lactated Ringers.

Standard VI: Neonatal Quality Assurance

6.1 In addition to complying with all reports and records rules in 836 IAC 1-1-5, the Certified Provider of the Neonatal Transport Program shall track the following benchmarks:

- a) Unplanned dislodgement of therapeutic devices;
- b) Radiograph verification of tracheal tube placement;
- c) Average mobilization time of transport team;
- d) First attempt tracheal tube placement success:
 - a. visualizations;
 - b. attempts at placement;
- e) Rate of transport-related patient injuries;
- f) Rate of medication administration errors;
- g) Rate of CPR performed during transport;
- h) Incidence of sentinel events;
- i) Unintended neonatal hypothermia upon arrival to destination;
- j) Transport crew injury during transport; and

Indiana Perinatal Transport Standards

Standard VI: Neonatal Quality Assurance
k) Standardized patient care hand-off performed (site specific protocol used).
6.2 When a sentinel event occurs, the neonatal transport team, medical director, and medical control physician must have a debrief that is initiated within 72 hours and the root cause analysis completed within 5 working days.
6.3 Teams are required to have a pre-transport briefing regarding the patient(s) condition prior to assuming care of the patient(s).
6.4 Each perinatal transport team shall have written internal quality review procedures/protocols.
6.5 Each hospital with a neonatal transport team shall implement a routine schedule of Quality Improvement meetings and a record of minutes maintained.
6.6 The neonatal transport team conducts a Quarterly Review of the following elements and maintain documentation of the reviews in compliance with 836 IAC 1-1-1-5(c): <ul style="list-style-type: none">A. Reason for transport;B. Mechanism of illness;C. Medical intervention performed or maintained;D. Time of intervention consistently documented for:<ul style="list-style-type: none">a. patient response to interventions; andb. appropriateness of intervention performed or omission of needed intervention;E. Patient outcome at arrival of destination;F. Patient's change in condition during transport;G. Timeliness and coordination of the transport from reception of request to lift off or ambulance enroute time;H. Pre-transport check of ambulance by EMT on Transport records;I. Operational criteria to include, at a minimum, the following quality indicators:<ul style="list-style-type: none">a. number of completed transports;b. number of aborted or canceled flights/transports due to weather;c. number of aborted or canceled flights/transports due to maintenance;d. number of aborted or canceled flights/transports due to patient condition and alternative modes of transport;J. Communications Center of organization must monitor and track:<ul style="list-style-type: none">e. Instrument Flight Rules (IFR)/Visual Flight Rules (VFR)

Indiana Perinatal Transport Standards

Standard VI: Neonatal Quality Assurance

- f. weather at time of request and during transport if changes occur; and
- g. all aborted and canceled transport requests - times, reasons and disposition of patients as applicable.

Standard VII: Neonatal Competencies

7.1 Nursing: In addition to compliance with IC 25-23 and IAC 848, Neonatal transport nurses shall adhere to the national neonatal standards as set forth by AAP and AWOHNN in *Neonatal Nursing: Clinical Competencies and Education Guide*. The documentation of compliance with the standards must be maintained in the employee personnel files.

7.2 Emergency Medical Technician/Paramedic: Must meet and/or exceed the requirements established in 836 IAC Article 4.

7.3 Neonatal Transport Medical Director:

- A. Must be Board-certified or be an active candidate for Board certification in Neonatology and is responsible and accountable for supervising and evaluating the quality of medical care provided during a neonatal transport.
- B. Must be licensed and authorized to practice in the location in which the medical transport service is based. a
- C. Must be knowledgeable of current concepts of appropriate use of transport assets - annually must include but is not limited to the following
 - a. "Just Culture": Highly reliable standards of patient safety;
 - b. Patient care capabilities and limitations;
 - c. Continuing education in transport;
 - d. Crew resources management;
 - e. Stress recognition and management; and
 - f. Infection control
- D. Must have risk management and safety training.

7.4 Clinical Care Supervisor:

- A. Responsible for supervision of patient care provided by the members of the team directly employed by the transport program and works collaboratively with the medical director;
- B. Oversees quality initiatives of the program;
- C. Responsible for hire, train, and provide continuing education for the service;

Indiana Perinatal Transport Standards

Standard VII: Neonatal Competencies

- D. Responsible for the evaluation of the crew members; and
- E. Must maintain documentation of competencies for each employee.

7.5 Program Manager:

- A. Has overall responsibility for a program
- B. Must demonstrate the following competencies:
 - a. Human factors;
 - b. Just culture: Highly reliable standards of patient safety;
 - c. Sleep deprivation;
 - d. Stress recognition and management;
 - e. Safety and risk management;
 - f. Quality management; and
 - g. Knowledge of national, regional and local standards of clinical practice, aviation and ground regulations as appropriate.
- C. Must maintain documentation of competencies in each employee's personnel file.

7.6 At least one member of the neonatal transport team that is in the patient compartment must demonstrate the following competencies at a minimum on a quarterly basis. If the skill is demonstrated in the quarter, documentation should be maintained in the log along with success rate. The demonstrated competencies must use patient-based simulation as a component in their training a minimum of every six months where appropriate.

- A. Arterial access;
- B. Glucometer and/or Point of Care Blood Gas analyzer;
- C. Nasogastric/Orogastric tube insertion;
- D. Bag/valve/mask ventilation/capnography and/or end tidal CO₂;
- E. Radial sticks;
- F. Oxygen delivery methods;
- G. Laryngeal Mask Airway;
- H. Oral/nasal airways;
- I. Use and ability to troubleshoot equipment such as transport isolette, med infusion pumps, ventilators, Cardiac/Apnea

Indiana Perinatal Transport Standards

Standard VII: Neonatal Competencies
monitor; J. Suctioning of patients; K. Medication administration; L. Surfactant administration; M. Umbilical line insertion and management; N. Transport ventilator management (RT); O. High frequency (HF) ventilator management (if hospital uses HF transport) P. Needle decompression and chest tube management; and Q. Urinary catheter placement.
7.7 The following competencies are recommended but not required: A. Central line insertion and management (Peripherally Inserted Central Catheter (PICC) or cut down; B. Tracheotomy management (required if center transports/manages tracheotomy patients); C. Nitric oxide administration (required if center uses in transport); and D. Cooling blanket, cooling cap (required if center uses in transport).
7.8 A record of competency training for all transport team members must be maintained.
7.9 In addition to the competencies, a component of each of the following topics should be included in the following neonatal educational modules completed each quarter: A. Information pertaining to maternal physiologic/pharmacologic issues related to the neonate; B. Neonatal assessment to include modules on all systems; C. Assessment of gestational age; D. Interpretation of diagnostic data to include: a. lab values; and b. radiograph basics (pneumothorax, diaphragmatic hernia, pneumoperitoneum, Endotracheal tube positioning); E. Thermoregulation; F. Arterial blood gas interpretation and ventilator management basics; G. Fluids and Electrolyte Balance; H. Ambulance/Aircraft safety and orientation and use of equipment within ambulance/aircraft;

Indiana Perinatal Transport Standards

Standard VII: Neonatal Competencies

- I. Ambulance/Aircraft physiology;
- J. Family-centered care; and
- K. Professionalism and Teamwork.

Standard VIII: Neonatal Equipment

8.1 . The ambulance used for neonatal transport must be at a minimum ALS and have emergency care equipment as identified in 836 IAC Article 2. In addition, the neonatal transport team must carry the following equipment:

- A. Cardiopulmonary monitor;
- B. Pulse oximetry;
- C. End tidal CO2 detector or capnography
- D. Portable transilluminators;
- E. Heimlich valves;
- F. Suction, including stand alone battery-powered device with adjustable pressure;
- G. Chest tubes;
- H. Umbilical catheter supplies;
- I. Transport ventilator;
- J. Transport incubator:
- K. Airway management tools:
 - i. Ambu bag/Flow-inflated bag;
 - ii. Laryngoscope;
 - iii. Endotracheal tubes;
 - iv. Laryngeal Mask Airway (LMA); and
 - v. Oxygen blender
- L. Oxygen and air cylinders with volume capable of delivery for two times the anticipated duration of the transport;
- M. Inhaled nitric oxide (optional but considered standard);
- N. Temperature monitoring;

Indiana Perinatal Transport Standards

Standard VIII: Neonatal Equipment

- O. Infusion pumps capable of delivering neonatal volumes;
- P. Defibrillator (neonatal pads); and
- Q. Point of care testing:
 - i. glucometer or device capable of providing glucose measure; and blood gas analyzer.

Standard IX: Neonatal Medications

9.1 The ambulance used for transport must have medication as identified in 836 IAC Article 2. In addition, the following neonatal medications, or an alternative as determined by the neonatal medical director, must be available and carried by the neonatal transport team:

- A. Weight dose tables for code drugs, drips and antibiotics should be available to facilitate administration;
- B. Drug cards should be made by each team to assist in mixing and administration of medications;
- C. IVF:
 - i. D10W;
 - ii. D5W;
 - iii. NS and 1/2 NS;
- D. Inotropic agents:
 - i. Epinephrine;
 - ii. Dopamine;
 - iii. Dobutamine; and
 - iv. consider Norepinephrine and Milrinone;
- E. Code medications:
 - i. Epinephrine;
 - ii. Naloxone;
 - iii. Lidocaine;
 - iv. Sodium Bicarbonate;
 - v. Adenosine; and

Indiana Perinatal Transport Standards

Standard IX: Neonatal Medications

- vi. Atropine;
- F. Paralytic - short half-life;
- G. Furosemide;
- H. Antibiotics:
 - i. Ampicillin;
 - ii. Gentamicin;
 - iii. Cefotaxime,
 - iv. Cefazolin; and
 - v. Acyclovir
- I. Prostaglandin (as indicated);
- J. Sedation: Midazolam;
- K. Pain Medication:
 - i. Morphine;
 - ii. Fentanyl;
- L. Surfactant; and
- M. Anticonvulsant.

Standard X: Perinatal Transport Personnel Licensure, Certification and Education

10.1 All transport personnel must be certified/licensed in the state appropriate for their job title (i.e. RN, RT, EMT, MD, APN, PA).

10.2 The maternal-fetal transport team must have a minimum staff of:

- A. maternal-fetal transport nurse; and
- B. one of the following:
 - i. Paramedic;
 - ii. Nurse;
 - iii. Nurse Practitioner; or

Indiana Perinatal Transport Standards

Standard X: Perinatal Transport Personnel Licensure, Certification and Education

iv. Physician.

10.3 All maternal-fetal transport staff in the patient compartment shall have the following current education:

- A. Basic Life Support Health Care Provider (BLS)
- B. Neonatal Resuscitation Program (NRP);
- C. The Learner STABLE Program; and
- D. Advanced Cardiovascular Life Support or Obstetric Advanced Life Support (ACLS, OB-ACLS)
- E. Competency testing of academic knowledge and clinical decision-making skill, which may include but is not limited to:
 - a. written examinations;
 - b. Transport and clinical case presentations and reviews;
 - c. oral examinations conducted by the coordinator or medical director of the transport team;
 - d. Medical record review;
 - e. Current national certification specific to the patient population served; and
 - f. intranet or internet modules.

For RNs: National Certification Corporation (NCC) credential in Inpatient Obstetrics (RNC) is encouraged but not required.

- A. APNs or PAs with an expertise in maternal fetal assessment with current national certification with consummate Indiana credentials and state licensure.
- B. A certificate of added credentials in topics such as Electronic Fetal Monitoring is encouraged but optional.
- C. All maternal-fetal transport team members shall complete 24 hours of area specific didactic and/or continuing education on an annual basis. The 24 hours include the maintenance of competencies above.

10.4 The neonatal transport team must have a minimum staff of two qualified neonatal providers. The providers must be from the following categories:

- A. Respiratory Therapist;
- B. Neonatal Nurse;
- C. Neonatal Nurse Practitioner; and
- D. Physician.

10.5 All neonatal transport staff in the patient compartment shall have the following current education or documentation of

Indiana Perinatal Transport Standards

Standard X: Perinatal Transport Personnel Licensure, Certification and Education

successful completion:

- F. Basic Life Support Health Care Provider (BLS)
- G. Neonatal Resuscitation Program (NRP); and
- H. The Learner STABLE Program.

10.6 Neonatal transport team nurses present in the patient compartment shall have one or more of the following certifications:

- a) National Certification Corporation (NCC) credential in Neonatal Intensive Care Nursing (RNC);
- b) Neonatal certificate of added qualification in neonatal-pediatric transport,
- c) Certified Emergency Nurse (CEN)
- d) Certified Flight Registered Nurse (CFRN),
- e) National Certification Corporation (NCC) credential in Critical Care Adult, Neonatal and Pediatric Nursing (CCRN).

Certification is expected within three years of hire unless NNP/PA status is current. Certification shall be maintained during tenure as a transport team member.

APNs or PAs: Current national certification with consummate Indiana credentials and state licensure.

RTs: CRT/RRT credentials, Neonatal-Pediatric Specialist credential

If these requirements cannot be met, a neonatologist or NNP-BC, or a PA with training in neonatology and neonatal transport medicine adequate for independent decision making and administration of procedures must be in the patient compartment.

10.7 In the case of back transport (maternal-fetal or neonatal) the staffing for the patient compartment is up to the discretion of the transferring hospital based on the patient's presenting condition.

Standard XI: Universal Safety Measures

11.1 Each hospital with an in-house transport team must ensure the following safety measures are in place:

- A. Criteria for emergent vs. non-emergent status - protocol driven;

Indiana Perinatal Transport Standards

Standard XI: Universal Safety Measures

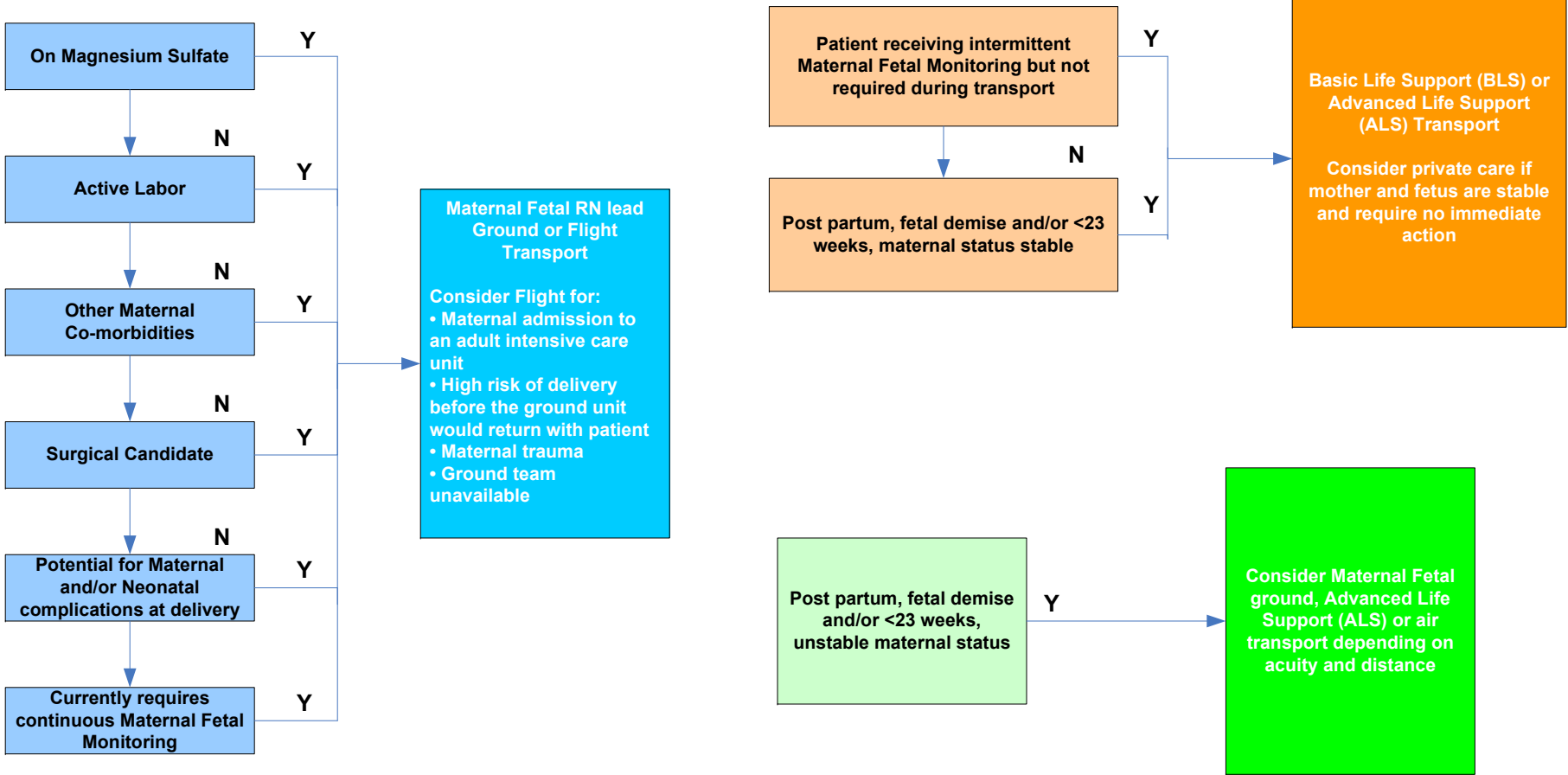
- i. track percentage of emergent transports as portion of QI process;
- ii. protocol driven; and
- iii. can be overridden by any member of the team;
- B. Document pre-transport check of ground ambulance or aircraft by EMT on Transport records;
- C. Return by ground transport with lights and sirens reviewed for appropriateness;
- D. Record of safety meetings and minutes should be maintained;
- E. Training for driver or pilot to recognize aircraft or ambulance tampering; and
- F. Security policy in place to address aircraft or ambulance if left unattended on a helipad, hospital ramp, or unsecured parking lot.

Standard XII: Universal Policies and Protocols

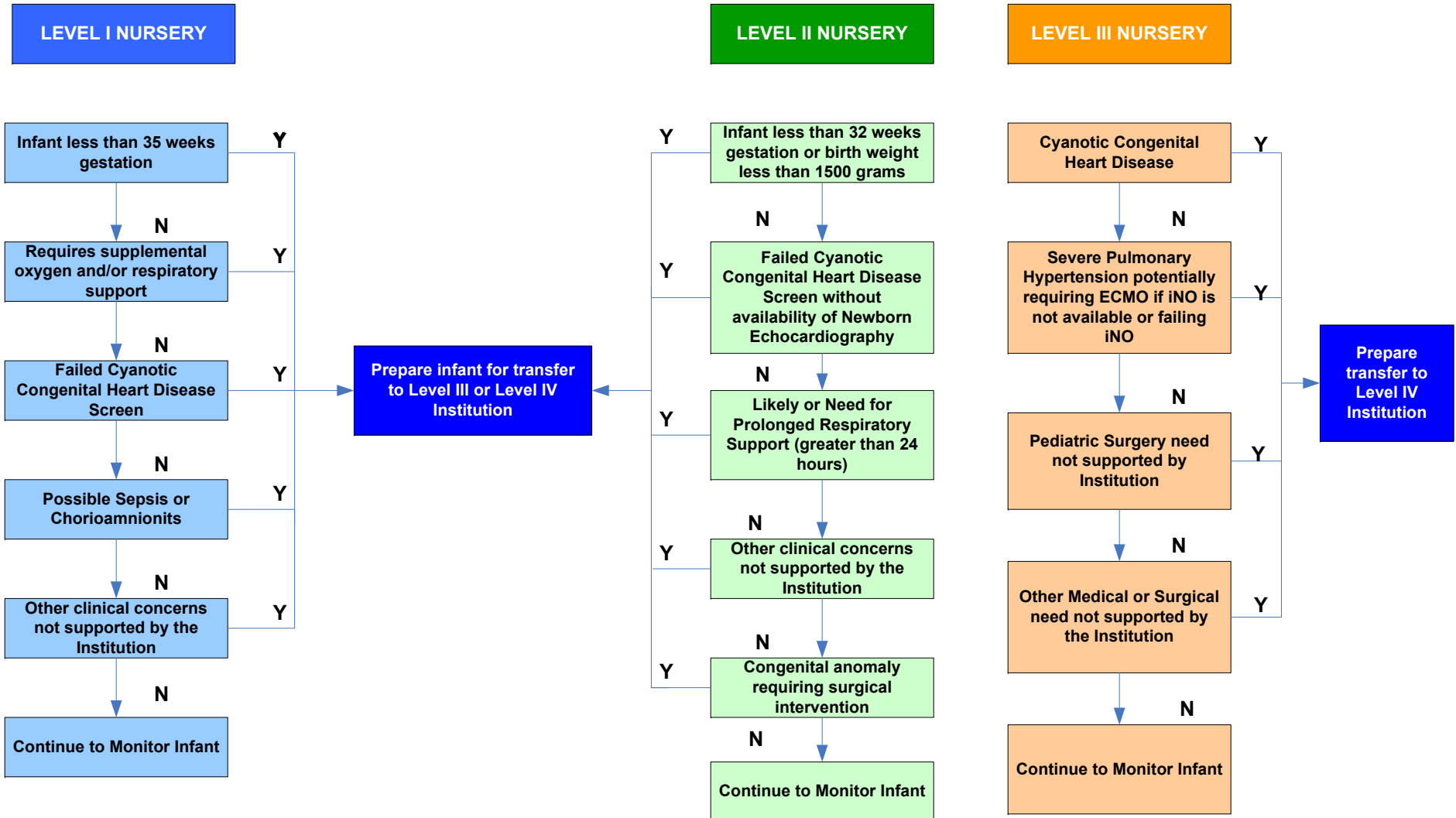
12.1 Each hospital with an in-house transport team must have written documentation for the following:

- A. Standardized departure protocol;
- B. Protocol for communication with referring facility:
 - i. receiving facility should provide update to staff and physicians within 24 hours of admission;
 - ii. Follow-up should include outcome of transport, therapies initiated at admission and current status of infant;
- C. If possible, referring physician and delivering physician should be notified of infant status.

Maternal Fetal Transport Algorithm
≥ 23 Weeks with Viable Fetus



Neonatal Transport Algorithm





Appendix D: Addressing Infant Mortality in Indiana



Indiana Perinatal Quality Improvement Collaborative

Addressing Infant Mortality in Indiana

A Report to the IPQIC Governing Council

The Quality Improvement Committee

Endorsed by the IPQIC Governing Council, March 26, 2014

2014

Table of Contents

Executive Summary..... 4

List of Tables..... 6

List of Figures 6

List of Acronyms..... 6

Introduction 7

 Brief Review of US and Indiana Infant Mortality..... 7

Complexity of Addressing Infant Mortality..... 8

 Complexity of Perinatal Care That Influences Health and Outcomes..... 9

 Data Complexity 12

 Implementation as a Complex Science 13

 Complexities of Securing and Allocating Resources 15

Evidence-Based and Successful State Models to Address Infant Mortality..... 15

 Best Practice Models: Perinatal Quality Collaboratives..... 15

 Best Practice Models: Perinatal Periods of Risk (PPOR) Model 19

Strengths and Gaps in Indiana MCH Resources 20

 Strengths 20

 Gaps..... 21

Benefit to Indiana..... 22

Recommendations for a Comprehensive Perinatal Quality Collaborative 23

 Recommended Next Steps..... 24

Conclusion..... 25

Appendix 1 - IHI Breakthrough Series..... 29

Appendix 2 - TIPQC Project for Development 30

Appendix 3 - Organizational Charts for Three Perinatal Quality Collaboratives..... 31

Appendix 4 - Results of IPQIC’s Environmental Scan of Indiana’s Current MCH Resources 32

Appendix 5 - Impact on Indiana by Cause if IMR is Reduced to the US IMR (2011)..... 40

Appendix 6 - Impact on Indiana by Race/Ethnicity if IMRs are Reduced to US IMRs (2011)
..... 41

The following individuals were involved in the development of this reports:

Name	Agency	Role
Ann Alley	IN State Department of Health	Office of Primary Care
Bill Engle, MD	Riley Hospital for Children	Neonatologist
Karen Greuter	Dupont Hospital	NICU Team Specialist
Ken Herrmann, MD	Deaconess Hospital	Neonatologist
Dawn Kackley, MSN, WHNP, RNC	Terre Haute Regional Hospital	Clinical Coordinator Women & Children Services
Julie Kathman, MSN, RN, CNS-BC	I.U. Health Bloomington Hospital	Women and Children's Services Clinical Nurse Specialist
Joanne Martin, DrPH, RN, FAAN	Goodwill Industries of Central Indiana	Director, NFP Implementation Planning
Phil Morphew	IN Primary Health Care Association	Executive Director
Renee Stratton, MS, MPH Lead Author	Riley Child Development Center	LEND Fellow
Nancy Swigonski, MD, MPH Committee Chair	Children's Health Services Research	Pediatrician
Louis Winterheimer, MD	Raphael Health Center	Medical Director

Special thanks to Kelsey Gurganus and the Epidemiology team at ISDH for supporting the data needs for this report.

Executive Summary

Background

For more than 100 years, Indiana has had one of the highest infant mortality rates (IMR) in the nation. In 2013, reducing this infant mortality rate became the top priority for the Indiana State Department of Health (ISDH).¹ Infant mortality reflects the health of a population at large and serves as a key indicator of a community's health and care resources. Addressing infant mortality may have a positive health impact that goes beyond infant health and in fact, could provide a model program for improving a wide array of health outcomes for all Indiana residents. Indiana currently has some existing strengths and resources for addressing infant mortality; however they are not coordinated or focused under a comprehensive model or strategic plan and lack financial support for expansion.

Purpose

In this paper, we analyze the resources and gaps impacting Indiana's infant mortality rate and develop recommendations for addressing it. We provide an overview of IMR statistics and review the challenges that IMR presents due to the complexity of issues which affect it. The Indiana State Department of Health called on maternal child health (MCH) professionals to, "learn from successes in other states". As a result, review of other state programs to reduce infant mortality rates shows that the development and operation of an infrastructure of evidence based policies and clinical best practices – generally termed Comprehensive Perinatal Quality Collaboratives and the use of Perinatal Periods of Risk (PPOR) analyses have been successful in focusing their efforts and is making a positive impact. We discuss how similar programs might benefit Indiana and provide actionable recommendations for decreasing Indiana's infant mortality rate.

Recommendations and Next Steps

The Indiana Perinatal Quality Improvement Collaborative (IPQIC) Quality Improvement Committee recommendation to ISDH to address Indiana's high infant mortality rate is to build a Comprehensive Perinatal Quality Collaborative. Specifically to:

- a) **Improve data timeliness, data linkages (birth certificate, death certificate, birth defects registry, immunization, etc.) and analysis systems to identify the causes and contributing factors associated with infant mortality and to track outcomes over time.** A model (e.g., PPOR model) for identifying causes and factors is needed in Indiana. Birth certificate data is currently two years in arrears and fails to reflect the current state of infant mortality in Indiana. An improvement project to improve birth certificate accuracy and timeliness would assist Indiana to focus efforts on reducing infant mortality where needed most. It is also necessary to augment birth and death certificate data by incorporating additional sources of data.
- b) **Work with the current IPQIC structure, existing champions and organizations to formalize priorities and develop strategic aims** to address infant mortality. Improvement

aims or goals will ideally be guided by a life-course perspective, informed by data and coordinated with regional and national efforts to reduce infant mortality.

- c) **Define/develop organizational structure(s) to carry out IPQIC initiatives** including expertise in clinical content, team development, data collection and reporting, benchmarking and QI processes. The organizational structure(s) will formulate strategies to carry out high priority perinatal quality improvement projects and support local QI teams by providing quality improvement experts, tools, and measures. The organizational structure(s) will provide a process for trend analysis with real-time data and feedback to support rapid cycle improvement and ensure that processes are resulting in improvements. Public reporting of data will ensure transparency and development of a learning community to share best practices.

We recommend that IPQIC and ISDH sponsor a day long retreat with state QI experts, infant mortality experts, data experts and current members from each of the IPQIC committees to:

- Leverage existing relationships with improvement partnerships to engage national consultant's knowledge and experience to facilitate the retreat
- Prioritize and set time specific, measurable aims or goals;
- Define the contribution of each IPQIC sub-committee to achieving the priority goals;
- Delineate the organizational structure(s) necessary to support the implementation QI processes to achieve priority goals;
- Determine resources including feasible funding necessary to implement priority improvement projects.
- Provide resources and funding to pilot the Comprehensive Perinatal Quality Collaborative priority project over the next 9-12 months.

List of Tables

Table 1. Examples of Birth and Death Certificate Data Use 12
 Table 2. 2011 Infant Mortality Indicators..... 22
 Table 3. 2011 Indiana Indicators by Race/Ethnicity..... 23
 Table 4. Impact on Indiana by Cause if IMR is Reduced to the US IMR (2011)..... 40
 Table 5. Impact on Indiana by Race/Ethnicity if IMRs are Reduced to US IMRs (2011) 41

List of Figures

Figure 1. Percent Contribution of Two Components to Decline in US IMR 2005-2009, by Race/Ethnicity 7
 Figure 2. Continuum of Services from Prior to Pregnancy to Birth Needed to Improve the Health of Women and Birth Outcomes 10
 Figure 3. Continuum of Services Following Birth Improve Infant Health and Survival 11
 Figure 4. Implementation “How/When” Matrix 13
 Figure 5. 2002 Meta-Analysis..... 14
 Figure 6. PDSA Cycle Example and PQC’s Locations in US 16
 Figure 7. "Driver Diagram" for Improving OH Birth Data Accuracy 18
 Figure 8. Example of Effectiveness and Estimated Cost Savings for NICU Infections by State Collaborative Project 18
 Figure 9. Ohio Perinatal Collaborative - "Run Chart" Example..... 19
 Figure 10. PPOR Matrix 19
 Figure 11. PPOR Helps Communities Move from Data to Action 20

List of Acronyms

- ABP - American Board of Pediatrics
- AMCHP - Association of Maternal & Child Health Programs
- CHIP-IN - Indiana’s Child Health Improvement Partnership
- CoIIN - Collaborative Improvement and Innovation Network
- CSHCS - Children's Special Health Care Services
- ECS - Every Child Succeeds
- FIMR - Fetal Infant Mortality Reviews
- IMR - Infant Mortality Rate
- IPQIC - Indiana Perinatal Quality Improvement Collaborative
- ISDH - Indiana State Department of Health
- MCH - Maternal Child Health
- NCHS - National Center for Health Statistics
- NFP - Nurse Family Partnership
- NIH - National Institutes of Health
- PDSA - Plan-Do-Study-Act
- PPOR - Perinatal Periods of Risk
- PQCs - Perinatal Quality Collaboratives
- PRAMS - Pregnancy Risk Assessment Monitoring System
- QI - Quality Improvement
- SACIM - Secretary’s Advisory Committee on Infant Mortality
- SIDS/SUID - Sudden Infant Death Syndrome/Sudden Unexpected Infant Death
- VCHIP - Vermont Child Health Improvement Program
- WIC - Women Infants and Children

Introduction

In November 2013, Indiana held its first infant mortality summit to present a “state of the State” and serve as a networking event for maternal child health (MCH) professionals and others concerned about the State’s high infant mortality rate. The State Health Commissioner, Dr. William C. VanNess II, identified reducing the State’s infant mortality rate (IMR) as the Indiana State Department of Health’s (ISDH) number one goal for the next four years.¹ Analysis of the most recent United States (US) data found that Indiana had the seventh highest infant mortality rate (2010 Indiana IMR=7.5).^{2,3} Indiana Governor Mike Pence spoke at the summit offering encouragement to the audience while calling upon attendees to not simply focus on “reducing the number of deaths, but also reducing heartbreak”.

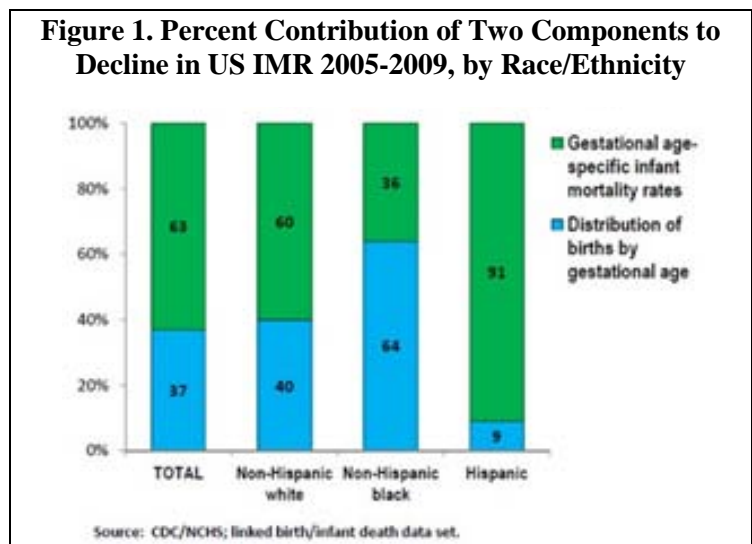
The purpose of this paper is to:

- 1) Provide a brief review of national and Indiana infant mortality rates;
- 2) Describe the complexity of addressing infant mortality;
- 3) Examine examples of successful state approaches to infant mortality;
- 4) Give an overview of Indiana’s strengths and gaps to address infant mortality;
- 5) Show the benefits to Indiana if the state’s IMR was decreased to the US IMR; and
- 6) Provide rationale and recommendations to address Indiana’s high infant mortality rate.

Brief Review of US and Indiana Infant Mortality

In 2005, the latest available year for international rankings, the US ranked 30th in the world in infant mortality, behind most European countries, Canada, Australia, New Zealand, Hong Kong, Singapore, Japan, and Israel.⁴ The lowest IMRs (i.e., ≤ 3.0) were found in Scandinavian countries (i.e., Sweden and Finland) and East Asian countries (i.e., Japan, Hong Kong, and Singapore).⁴ By comparison, the rate in the US was 6.86 in 2005.⁵ There are some differences in the reporting of live births between countries that may have an impact when making individual comparisons of infant mortality, however, the US and 14 of 19 European countries are required to report all live births at any gestational age or birth weight so comparisons to other developed countries are generally valid.

After a five year plateau, the US IMR declined 12% from 2005-2011. Changes in the overall infant mortality rate can be analyzed by examining two key components: 1) distribution of births by gestational age and 2) gestational age-specific infant mortality rates. Using a linked birth/infant death data set, the Centers for Disease Control and Prevention/National Centers for Health Statistics (NCHS) analyzed the decline in US infant mortality rate 2005-2009 by race and ethnicity (see Figure 1). For Black women, 2/3 of the 2005-2009 IMR



decline was due to declines in preterm births. For White and Hispanic women, the majority of their infant mortality declines were due to declines in gestational age-specific IMRs. This method of examining two key components in the changes in the overall infant mortality rate by 1) the distribution of births by gestational age; and 2) gestational age-specific infant mortality rates is called the Kitagawa method and is the foundation for the Perinatal Periods of Risk approach to infant mortality. It allows states and communities to better address the root causes and disparities of infant mortality. For example, in non-Hispanic blacks where the distribution of births by gestational age accounts for 64% of mortality, there is a need to focus on preventing preterm births. For Hispanics, distribution of births by gestational age only accounts for 9% of the mortality (i.e., there are fewer preterm births) so focusing efforts on access to high quality birth and infant care are likely to garner the greatest impact.

Historically, Indiana has had higher infant mortality rates than other states. The state has reported an $IMR \geq 6.9$ for over a century.¹ Recent findings indicate that both higher Black as well as White IMRs contribute to Indiana's excess* infant mortality when compared to other states.^{6,7} Indiana also has documented racial disparity in infant mortality. In 2011, the difference in IMR between Blacks and Whites was nearly double (Black $IMR=12.3$ versus White $IMR=6.9$).⁸ Preterm-related causes contributed the most to the mortality disparity between Black and White infants.⁷ In 2010, Indiana ranked *last* (35th of 35) among the states that had sufficient numbers of Black births to meet statistical reporting requirements for infant mortality and *last* (33rd of 33) among states with sufficient numbers of Hispanic births to report.⁹

In 2011, 643 Indiana babies died from preterm-related causes (n=294, 45.7%), congenital anomalies (n=169, 26.3%), sudden infant death syndrome/sudden unexpected infant death (SIDS/SUID)/accidents (n=100*, 15.6%), assault/neglect (n=9*, 1.4%), and all other causes (n=71, 11%).¹ The 2013 Region V infant mortality report supports the state's findings for causes of death. Specifically, the report cited preterm-related causes (53%), congenital anomalies (19%), and injuries (14%) as the primary causes of the excess mortality.⁷ Not surprisingly, Indiana has higher rates of risk factors (e.g., late prenatal care and tobacco exposure) associated with infant mortality than other states. Approximately one-third of Indiana mothers (31.9%) do not receive prenatal care in their first trimester.¹ Almost one-fifth of pregnant women in Indiana are smokers, which is about twice the national average (Indiana~17% versus US=9.1%).¹⁰ Only eight states have higher proportions of pregnant women who smoke.⁶ Indiana is ranked 8th in the nation for obesity.¹¹ As a risk factor, obesity is associated with preterm births (obese=25%, morbidly obese=33%).¹ The negative health outcomes associated with preterm births can also be risk factors for mortality and include low/very low birth weights, respiratory distress, and feeding issues.¹²

Complexity of Addressing Infant Mortality

The complexity of infant mortality and morbidity as a public health problem cannot be overstated. There is no one approach robust enough to address the problem. Given Indiana's poor historic and current IMR, a different approach to preventing infant deaths and poor outcomes is warranted. "A comprehensive approach to improving birth outcomes and reducing

* In these instances, excess mortality is the "simple difference in infant mortality rates between a given state/region and all other regions (positive numbers indicate greater mortality and negative numbers indicate lower mortality).

infant mortality follows a life course approach, acknowledging and accounting for the interplay of biological, behavioral, psychological, social, economic and environmental influences on one's health across the course of their life".¹³ To meet the challenge, four areas of complexity in addressing IMR are presented: 1) perinatal care that influences health and outcomes, 2) data, 3) implementation, and 4) resource securement. For this paper, "perinatal care" is defined as "interventions extending from preconception services into postpartum period, and even infancy and toddlerhood".¹⁴

Complexity of Perinatal Care That Influences Health and Outcomes

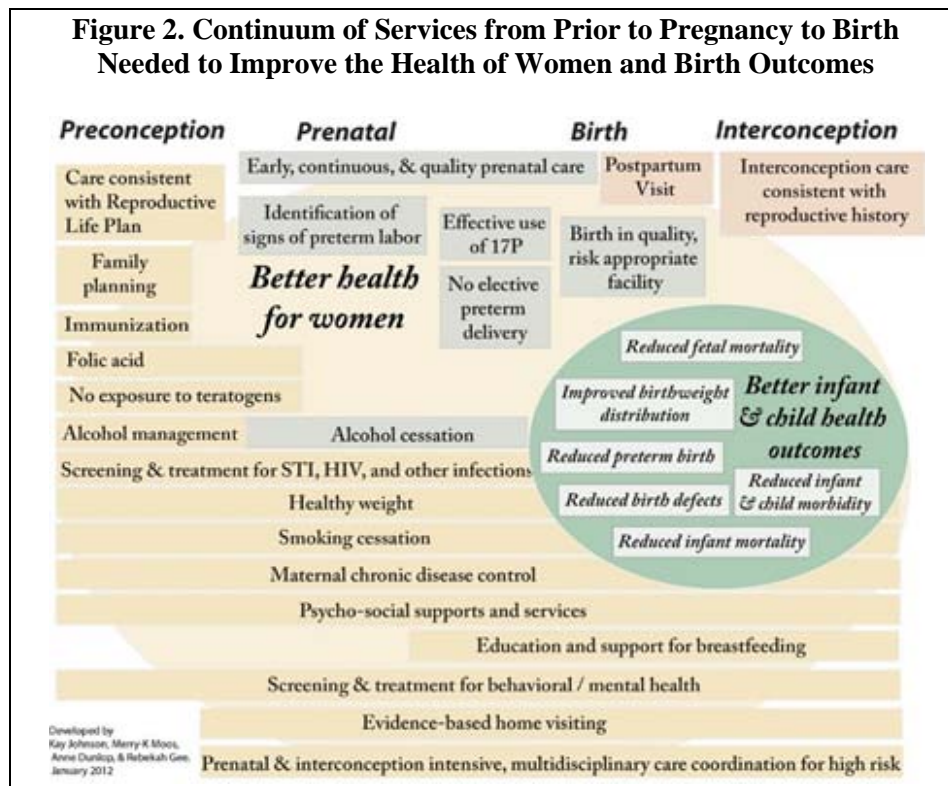
Four types of services affect maternal and newborn outcomes over a life course. As defined by the Secretary's Advisory Committee on Infant Mortality (SACIM), service types are preconception, prenatal, birth, and interconception (see Figure 2).¹⁴ The emotional, behavioral and physical health of women before, during, and after pregnancy impacts birth outcomes. Prenatal care is necessary, but on its own, it is not sufficient to ensure optimal outcomes. Preconception and interconception care are important for all women and essential for women with chronic health conditions or who previously experienced poor pregnancy outcomes.

- 1) *Preconception services.* Preconception is the period of time in the life course before a woman of child bearing age becomes pregnant. It encompasses a wide range of care from reproductive health to emotional wellbeing. Emerging research in the field of epigenetics demonstrates that events during this period impact not only an infant's immediate well-being, but also has life-long and generational impacts on health. For example, the Hunger Winter Famine study assessed the effects of maternal nutrition status on the life course of their offspring by monitoring the children's health for over 60 years. Maternal nutrition was found to correlate with infant and adult health through *two* generations.¹⁵

Preconception health of women and their offspring is dependent on a woman's access to primary care and wellness services, adequate nutrition, maternal illness and treatments (e.g., diabetes, hypertension), avoidance of toxins (e.g., tobacco, herbicides) and negative effects caused by physical, emotional, and behavioral stress. Addressing the health status of women of child bearing age prior to pregnancy positions them to begin pregnancy in optimal health. This is important because in the first 4 weeks of pregnancy, before many women know they are pregnant, the rapidly dividing fetal cells have already formed the heart and the initial development of the brain, spinal cord, and gastrointestinal tract has begun.¹⁶ Poor maternal health during this period increases the risk of pregnancy complications and birth defects related to these and other body systems.

- 2) *Prenatal services.* Prenatal care describes the care/services that a woman receives during the three trimesters of pregnancy (i.e., duration~40 weeks). Necessary for all pregnancies, both mother and fetus benefit from this care by: monitoring overall maternal health and appropriate fetal development, screening for risks/problems, and identifying resources facilitating a healthy pregnancy. Prenatal care is the frontline strategy for preventing and identifying risks for preterm births, which is the primary cause of infant deaths nationally and in Indiana. Eliminating barriers to accessing and using quality prenatal care has proved challenging. Examples of such barriers include a lack of financial resources, availability of

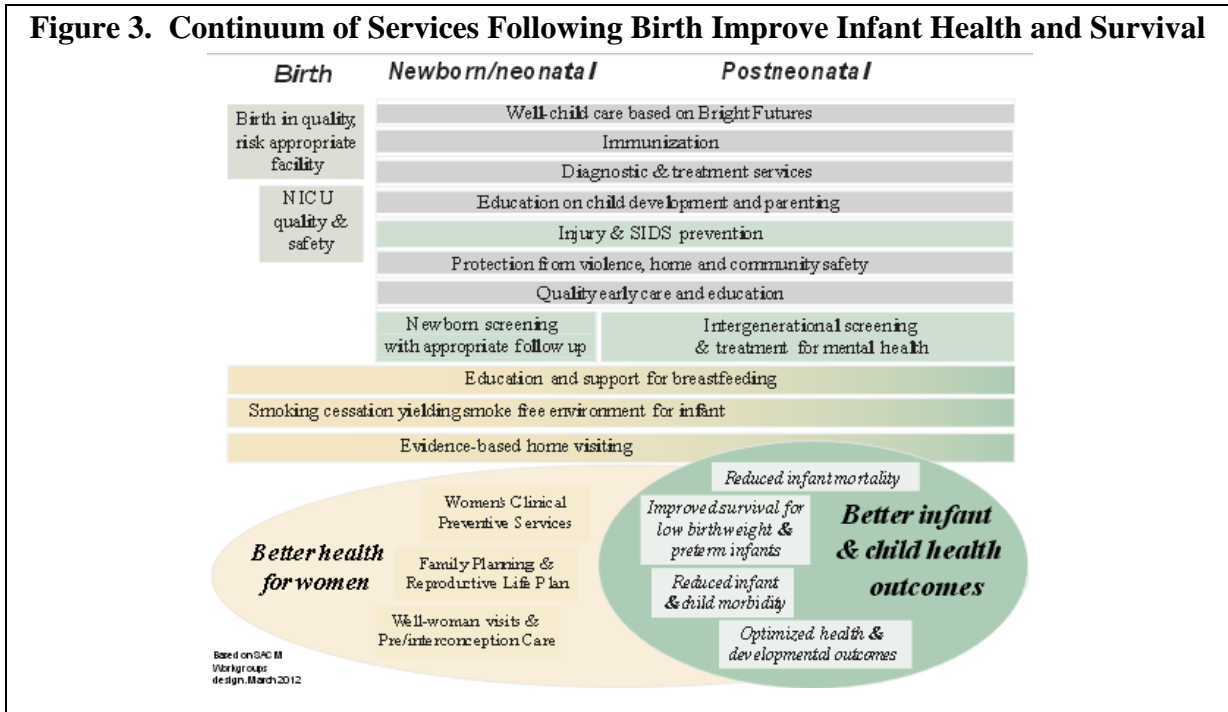
skilled providers, motivation to obtain care and adopt healthy behaviors, and knowledge of the impact of prenatal and preconception care on future health of the mother and her offspring.



- 3) *Birth services.* Birth includes the following stages: labor, delivery, and newborn care (see Figure 2). Inherent in each stage are varying levels of risk to mother and child. Provider assessment and monitoring throughout these stages reduces risk of fetal/infant mortality, decreases likelihood of complications, and improves ability to transition after birth¹⁴. For high risk labor, deliveries, and newborns, initial stabilization at community delivering facilities and timely transport of sick mothers and ill/preterm infants to a higher level care facility (i.e., regionalized care) are critical to obtaining positive health outcomes. Existing examples of beneficial programs that support maternal and infant health include maternal and neonatal transport services, NICU outreach education, and provider skill building programs.
- 4) *Interconception services.* Interconception care is provided to women of reproductive age between pregnancies. This care begins with postpartum care and addresses specific health and other risk factors that may have contributed to previous poor pregnancy outcomes. Additionally, interconception services ensure that conditions and behaviors which may pose maternal and infant risks are identified and managed proactively.¹⁷

Furthermore, health and outcomes for infants are generally divided into 3 types of services. SACIM identified these services types as birth, newborn/neonatal and postneonatal (see Figure 3).

- 1) *Birth services.* The focus of care for the newborn during the birth process is safe transition to extrauterine life. This includes access to facilities that can support the labor, delivery, and neonatal stabilization. Identifying appropriate facilities to provide care is based on risk and physical location of mother. Appropriate training for care providers in the initial stabilization, identification of complications, and need for higher level of care and structures for transferring care to appropriate providers adds complexity to this service.
- 2) *Newborn/Neonatal services.* Provisions needed for ongoing care to newborns depends upon their gestational age, presence of complications related to intrauterine exposures and development, birthing process, and the availability of appropriate personnel and support services. This care is complex because it spans from micro-prematurity (i.e., babies weighing <1000 grams) and congenital anomalies that often require months of hospitalization, to healthy term infants who transition quickly to extrauterine life after a few days of hospitalization.¹⁸ The neonatal mortality rate (deaths that occur between birth and 28 days) typically accounts for two-thirds of the infant mortality rate.
- 3) *Postneonatal services.* This encompasses care provided to the infant from 28 days to one year after birth. The postneonatal mortality rate typically accounts for one-third of the infant mortality rate. Due to rapid development during this time, frequent monitoring via wellness visits is essential to the optimal health of this population. The focus is on reaching developmental milestones, maintaining nutritional status and growth, and protection from harm by immunization, safe sleep, car safety seat use, and parenting guidance. This focus applies to typical newborns and those with special health care needs, which adds to care complexity.



Data Complexity

Two different types of data systems are needed for a comprehensive Perinatal Quality Improvement Collaborative. Data is essential to 1) understand the causes of infant mortality and evaluate outcomes over time after the implementation of new policies and programs and 2) to provide “real time” data and feedback mechanisms that are needed to inform and enact timely and ongoing quality improvement efforts.

A wide range of data may be used to better understand reproductive and infant health by describing the extent, causes, and contributors to infant mortality and poor birth outcomes.¹⁹ Birth and Death Certificate Data can be used to establish relationships between risk factors and outcomes, monitor risk factors and track outcomes (see Table 1).

Table 1. Examples of Birth and Death Certificate Data Use	
Birth Certificate Data Uses	Death Certificate Data Uses ²⁰
<ul style="list-style-type: none"> • Establish relationship of smoking and adverse pregnancy outcomes. • Determine caesarean delivery rates and vaginal births after a caesarean delivery. • Monitor teenage births trends. • Determine LBW risks. • Measure racial disparities in pregnancy outcomes. 	<ul style="list-style-type: none"> • Monitor perinatal and infant mortality. • Track progress/regress in reducing IMR from the leading causes of death. • Document racial disparities. • Provide information for programmatic interventions.

Developing a comprehensive picture of infant mortality may require working with a range of agencies and partners to share data across and within systems and programs. Comprehensive data systems may include linkages with claims data from Medicaid and other health insurers, vital statistics, chronic disease programs, birth defects registries, newborn screening (e.g., blood spot), immunization registries, and the Women Infants and Children (WIC) program.¹⁹ Other important data that are not used in Indiana include Pregnancy Risk Assessment Monitoring System (PRAMS) which incorporates AMCHP’s recommended Life Course Indicators (postpartum depression, stressors during pregnancy, diabetes during pregnancy, racial discrimination during pregnancy) and Fetal Infant Mortality Reviews (FIMR) which are available in only a few sites and can be used to identify local clinical and community factors contributing to deaths.

Data sources and the “human factor for error” in the collection of data (e.g., person-level: postpartum woman, researcher; facility-level: doctor’s office, medical records department) complicates the use of data. Data collection techniques vary (e.g., paper/pencil, electronic) and can be used discretely or in combination. Opportunities for inaccuracies exist when data is transferred from paper to electronic systems. Data entry/input quality as well as how the data is “cleaned” in preparation for analysis factor into its validity and reliability.

Analysis and interpretation of data is complicated by unfamiliar terminology and variable definitions. For example, gestational age can be determined by at least two different statistical

methodologies. Also, there have been recent changes in the uses of designations (e.g., near term births, late preterm births) and even categories of term births.²¹ Using consistently defined and agreed upon variables is critical to ensuring correct data analysis and interpretation. If clinicians, researchers, and decision makers are unsure of whether they are discussing the same problem or asking the right questions, designing hypotheses for examination or aims (goals) for quality improvement will prove challenging.

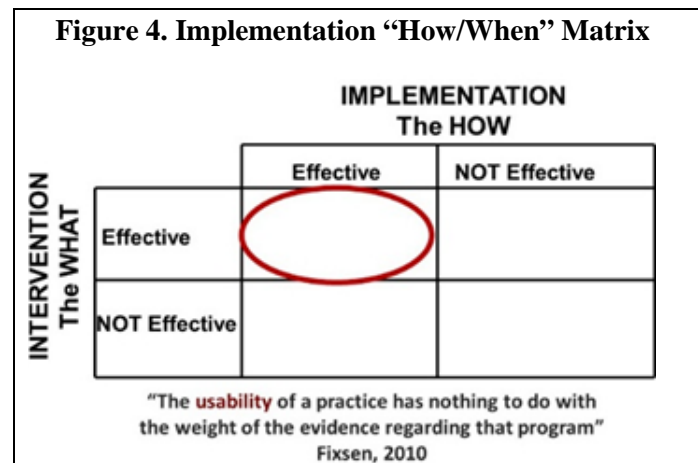
The second type of data needed is “real time” data and feedback mechanisms to inform and enact timely and ongoing quality improvement efforts. Hospitals, community-based agencies and health care providers as part of QI need to engage in data collection, interpretation, feedback into activities and benchmarking of data. Rapid improvement cycles feed process change that is tracked over time with weekly or monthly data points. Benchmarking (i.e., practice protocol comparison) of performance metrics, or outcome measures to best practices or results from other programs/hospitals/states is complicated by the variety of care models used at different facilities. Benchmarking provides a way to improve care process, set priorities, and identify best practices on which to focus QI activities. It is important that the indicators used are defined in the same manner by all the facilities and sites or when comparing the progress of different programs or states. If the measures are aligned, then all participating organizations can hold each other accountable and evaluate successes and failures along the way. A learning community is formed as regular reports are disseminated to stakeholders on progress of QI efforts and best practices are shared.

Implementation as a Complex Science

Implementation of evidence based policies and best practices into health care is complex. This complexity is geometrically multiplied when implementing statewide programs across vastly different health systems, geographies, and populations. Policies, procedures, techniques, or technologies must be designed to be flexible and scalable to allow implementation into multiple settings with different cultures and resources. Best policies or evidence based interventions, no matter how strong the evidence or wise the process, are not effective without sound implementation.

Implementation science is a relatively new field of research that focuses on the “how” rather than on “what” to implement (evidence of effectiveness) (see Figure 4).²² The National Institutes of Health (NIH) define implementation science as:

“...the study of methods to promote the integration of research findings and evidence into healthcare policy and practice. It seeks to understand the behavior of healthcare professionals and other stakeholders as a key variable in the sustainable uptake, adoption, and implementation of evidence-based interventions.”²³



We have long known that there is lengthy lag time between the development of recommended policies or evidence based interventions and their implementation into practice.²⁴ Implementation science recognizes that the smallest practice or largest government department are composed of micro and macro systems and relying on a single person or a single group of people without accounting for complexity rarely works.²⁵ Hence, education alone is likely to be ineffective in advancing change. In a 2002 meta-analysis, Fixen and colleagues reviewed the evidence for various means of training including 1) education & discussion regarding theory, 2) education plus demonstration, 3) education plus demonstration and practice with feedback during training and 4) education plus coaching *in the actual setting* (see Figure 5). Only education along with coaching in actual setting resulted in true change and use.²⁶ Hence, effective change occurred when coaches were in the actual setting to address system barriers and give real time advice and facilitate problem solving. The old adage “education is necessary but not sufficient for behavior change” continues to be true but is frequently ignored.²⁷

Figure 5. 2002 Meta-Analysis
% of Participants Who Demonstrate Knowledge, Demonstrate New Skills in a Training Setting, and Use New Skills in Actual Setting

TRAINING COMPONENTS	Knowledge	Skill Demonstration	Use in the Actual Setting
Theory and Discussion	10%	5%	0%
...+ Demonstration in Training	30%	20%	0%
...+ Practice & Feedback in Training	60%	60%	5%
...+ Coaching in Actual Setting	95%	95%	95%

Joyce and Showers, 2002

The American Board of Pediatrics (ABP) has developed a model as the optimal means to improve pediatric health outcomes. The model’s key components are ²⁸:

- A common aim to improve care;
- Prospective collaborative improvement efforts;
- Reducing unnecessary variation by identifying, adopting, and testing best practices;
- Shared, valid, high-quality real-time data;
- Infrastructure support to apply improvement science; and
- Public sharing of outcomes to identify best practices.

Many states have developed an infrastructure to address challenges surrounding the reduction of infant mortality and put into practice the ABP model’s key components. These “improvement partnerships” have successfully addressed a variety of challenges, including those associated with infant mortality (described in the “Best Practice Models: Perinatal Quality Collaboratives” section, page 15).

Complexities of Securing and Allocating Resources

Securing resources to reduce infant mortality can be difficult. Resources vary from state to state, county to county, city to city, hospital to hospital, and practice to practice. In Indiana, more than 50% of births are currently paid by Medicaid which pays more poorly than private insurance.²⁹ Over time, the number of births paid for by Medicaid has steadily increased. Between 2003-2009, Medicaid covered births increased 5.72% (n=6,219).³⁰ Although Indiana has recently developed policies of best practices (e.g., presumptive eligibility), implementation barriers and problems in the system have limited the state's success.³¹

Additionally, identification of resources and funding is time consuming. As with data collection and analysis, earmarking personnel and time resources is often an afterthought or an added responsibility for those doing the work of caring for the patient. Assuming funding can be secured, decision makers must determine how to allocate funds. Funding at the federal, state, local, and facility levels can be inconsistent based on political influence and payment issues.

Perinatal Quality Collaboratives vary in costs. Costs are driven by the size and scope of the collaborative, including the number of hospitals/community sites involved and the number of initiatives or services provided by the collaborative. Initial investment requires financial resources to pay for staff and training, data infrastructure and management, direct support to hospitals/sites engaged in the collaborative and external QI consultant support. A recent report by the Avalere group to the Congress of Obstetricians and Gynecologists estimated a range between \$1 million (Michigan) to \$1.7 million (Ohio) to develop a collaborative. Annual operating costs are required beyond the initial upfront development. These costs include ongoing administration, data management, staff training, stakeholder engagement, and expansion of best practices to other sites. Ongoing costs also vary depending on a number of factors such as the level of provider engagement, scope of services, and availability of data. Estimated annual operating costs are between \$500,000 (Ohio) to \$975,000 (North Carolina) to continuously improve maternity and perinatal care.³²

Evidence-Based and Successful State Models to Address Infant Mortality

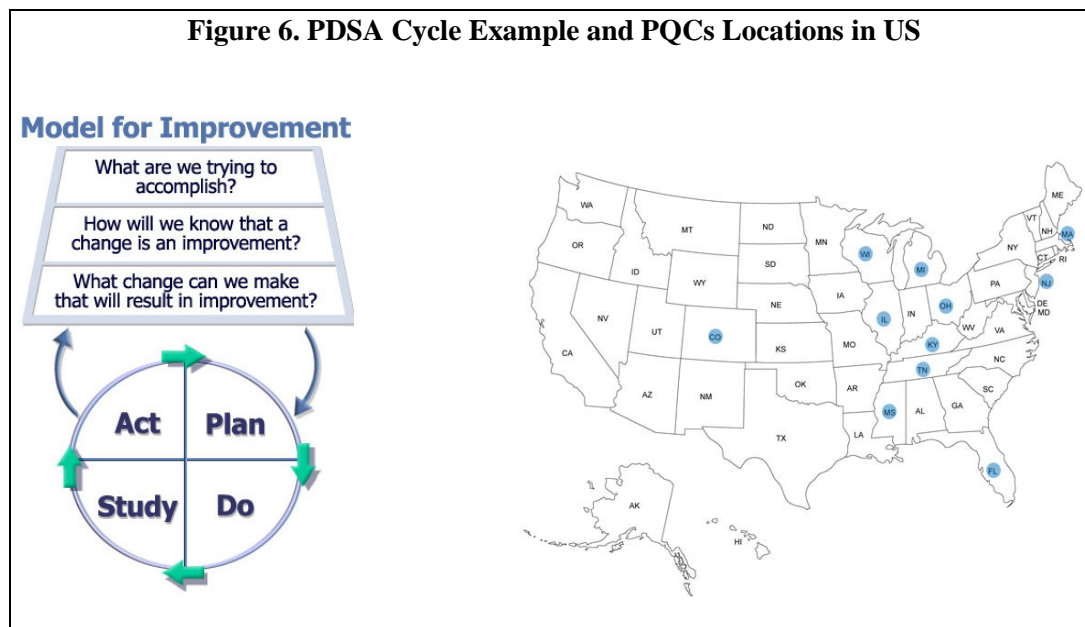
ISDH has called on MCH professionals to, “learn from successes in other states”. After a comprehensive literature review and identification of other states’ best practices, two major commonalities were observed in states that have successfully lowered their infant mortality rate: 1) development and operation of an infrastructure of evidence based policies and clinical best practices – generally termed Perinatal Quality Collaboratives, and 2) the application of the Perinatal Periods of Risk (PPOR) Model.

Best Practice Models: Perinatal Quality Collaboratives

State Perinatal Quality Collaboratives (PQCs) are networks of perinatal care providers and public health professionals working to improve pregnancy outcomes for women and newborns by advancing evidence-based clinical practices and processes. PQCs include hospitals, pediatricians and neonatologists, obstetricians and maternal-fetal medicine specialists, midwives, nurses, state

health department personnel, and other MCH professionals. Members come together as part of learning collaboratives to address specific processes of care. An infrastructure that supports the baseline and ongoing collection of data is imperative.³³ Collaborative members implement changes in clinical practices according to evidence-based guidelines. “Rapid improvement cycles” then feedback real-time data and analysis to participants in the collaborative to evaluate whether or not the change resulted in improved outcomes.

The Model for Improvement is a frequently used framework to organize improvement efforts. The Model for Improvement starts with a specific, time delineated and measurable statement of the aim or goal of the project.³⁴ Other elements of an improvement model include identifying the “drivers” or ideas of what needs to improve to accomplish the Aim. The drivers are generally generated from review of the literature, evidenced-base and local experts. The next steps include developing change ideas, benchmarking and gathering baseline outcome data, and then implementing repeated cycles of process changes through Plan-Do-Study-Act (PDSA) improvement cycles (Figure 6).³⁵ An IPQIC-created map indicates states that are successfully using PQCs: California, Massachusetts, North Carolina, Ohio, Tennessee, Illinois, New Jersey, Colorado, Mississippi, Wisconsin, Michigan, Florida, and Kentucky (see **Error! Reference source not found.**).³⁶



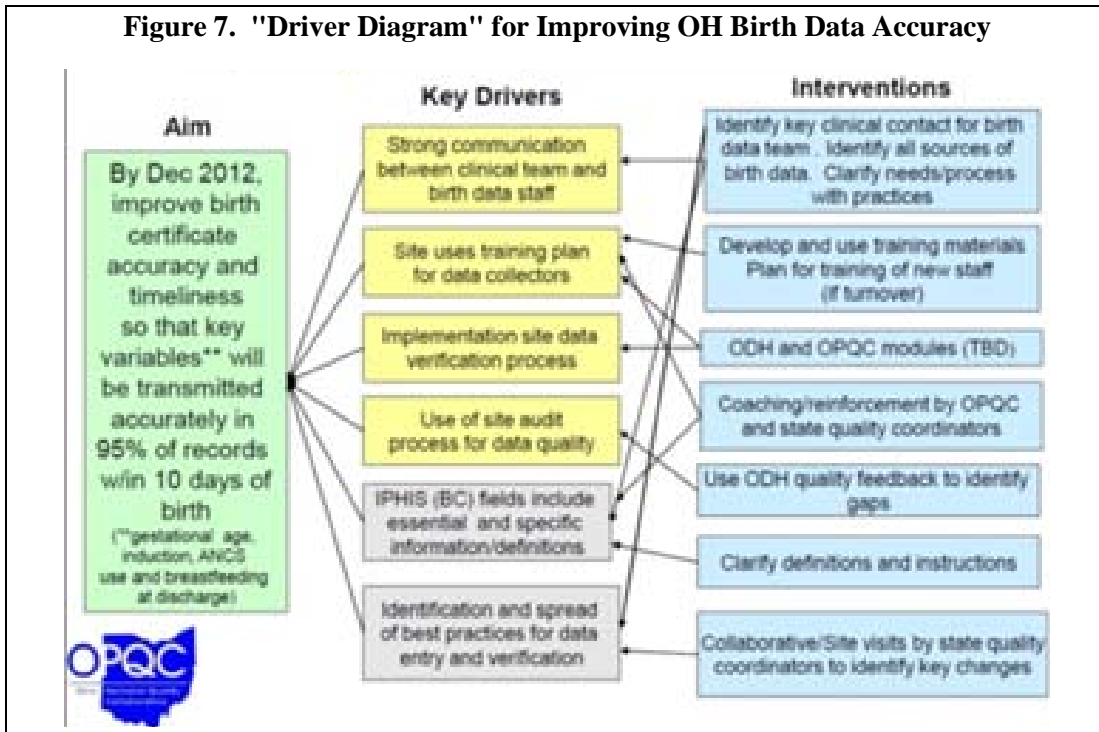
California, Tennessee, North Carolina and Ohio’s PQCs have been leaders in the field and serve as examples of collaboratives with multidisciplinary groups and payors. Common features of these leading collaboratives include:

- *Perinatal Quality Improvement administrative team* with expertise in quality improvement, data collection, data reporting, literature review, and biostatistics that is responsible for oversight, training and supporting the teams who are carrying out the projects. PQCs may be administered by academic medical centers, state health departments, or non-profit entities set up for that purpose. Core staffing includes a program manager, data manager,

quality improvement experts, content experts and administrative support (Appendix 3, page 31).

- *Responsive, timely, risk-adjusted perinatal data system* to identify targets and monitor public health effects of interventions and system changes, over time. Data sets frequently include linked birth and death records, immunization, Medicaid claims and birth defects registry.
- *Toolkit or change package development with training of stakeholders and staff in quality improvement methods.* On-site coaching and technical support using rapid improvement cycles are needed as they are the grassroots foundation for all of the quality improvement work.
- *Real-time data feedback loops with benchmarking against local, state and national metrics.* Weekly / monthly feedback with annotation as rapid improvement cycles are tested allow monitoring of responsiveness to change and displaying of results over time in trend charts to ensure that improvements are maintained.
- *Networks of public and private hospitals, key community partners, payors, and policy makers.* All stakeholders and key partners are engaged: parents, families, providers (e.g., obstetric, neonatal, pediatric, private and academic), departments of health, hospital associations, public and private payors (e.g., Medicaid, Blue Cross and Blue Shield, United Health Care), business groups, legislators, nongovernmental advocacy groups (e.g., March of Dimes, Perinatal networks), and professional organizations (American Academy of Pediatrics, American College of Obstetrics and Gynecology, and perinatal/neonatal nursing organizations).
- *Funding sources who share a common vision of improving perinatal outcomes and reducing health care costs through collaborative quality improvement.* Funding is essential for PQCs to be successful. Examples of commonly involved sources of funds are state government funds, state department of health funds, Medicaid, private payors, and state hospital associations. California has had sustainability success by linking Medicaid reimbursement to participation in PQCs for many years. Grants from state and national sources have also been instrumental in quality improvement collaboratives but such funds are not usually sustainable.

In the following paragraphs we give examples of some of the initiatives, tools (driver diagrams, run charts) and outcomes from PQCs. One of the first improvement projects for many PQCs is to improve birth certificate accuracy and timeliness. A “driver diagram” for Ohio’s improvement project outlines the goal (or Aim), the key drivers (or what it would take to accomplish the Aim), and the interventions or activities that will drive the PDSA cycles for rapid improvement (see Figure 7). Improving the accuracy and timeliness of birth certificate data then allows the data to be reliably used to follow responses to changes in the systems and track outcomes over time.

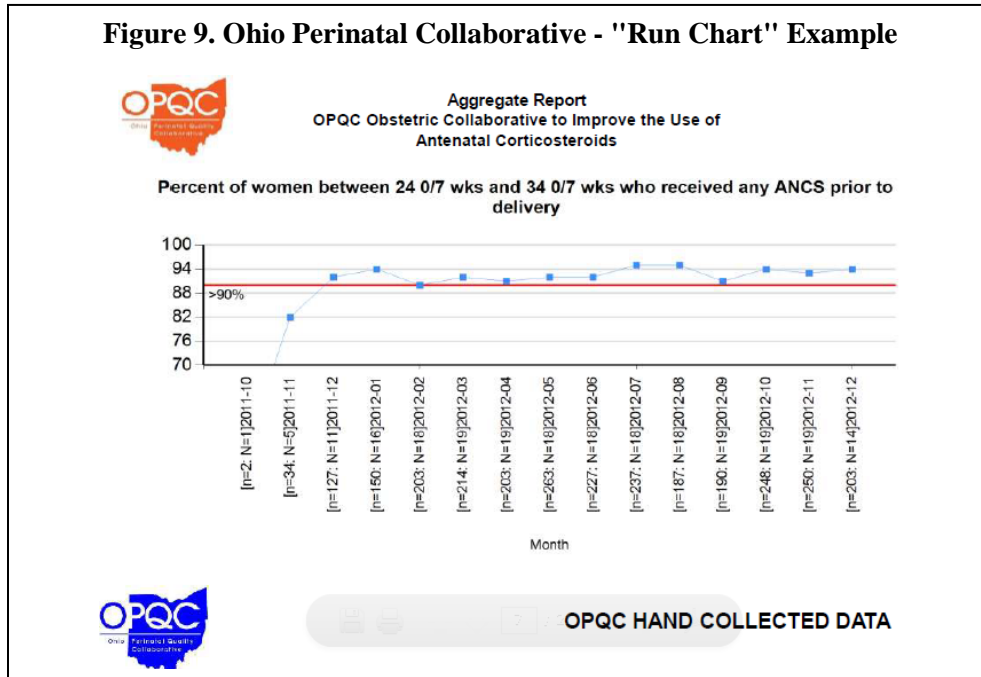


Other examples of quality collaborative projects with proven successes include: central line associated infections, necrotizing enterocolitis, promotion of mothers own milk for preterm infants, antenatal corticosteroids, postnatal corticosteroids, late preterm infants, reduction of elective inductions, or deliveries before 39 weeks of gestation, and smoking cessation (Appendices 1-2, pages 29-30). The results (effectiveness and estimated cost savings) of five Perinatal Collaboratives who addressed infections in the neonatal intensive care unit are shown in Figure 8.³²

Figure 8. Example of Effectiveness and Estimated Cost Savings for NICU Infections by State Collaborative Project

<i>Measure</i> State (Collaborative)	Effectiveness	Estimated Cost Savings
<i>NICU Infections</i>		
CA (CPQCC)	19% decreased risk of nosocomial infections	NA
NC (PQCNC)	50% reduction	\$1.2M
OH (OPQC)	18.2% to 14.3%	Per case savings estimates
TN (TIPQC)	75% reduction	\$2M/yr.
VT (VON)	0.74% to 0.40%	Per case savings estimates

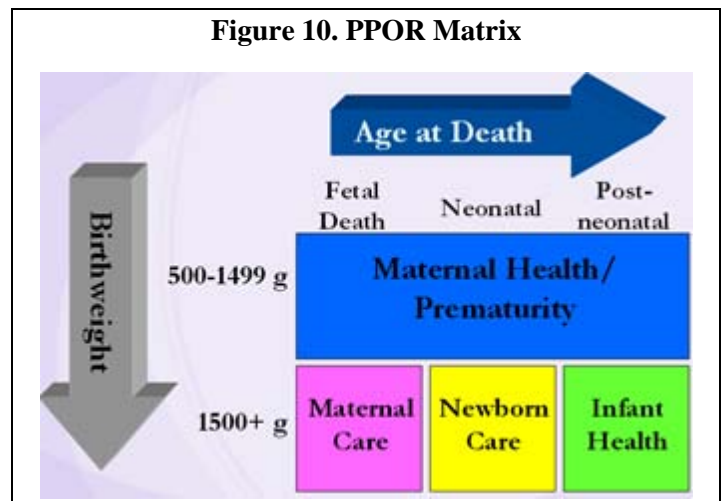
The example below demonstrates a frequently used data tool i.e., a “run chart” demonstrating the increase in antenatal corticosteroid administration from a baseline of 82% to 94% through the work of Ohio’s Perinatal Collaborative (see Figure 9).



Other opportunities exist to implement community practices in Indiana that have proven successful in supporting mothers and infants. Every Child Succeeds (ECS) and Nurse Family Partnership (NFP) are two home visiting programs that the Association of Maternal & Child Health Programs (AMCHP) has evaluated as “Best Practices” on Infant Mortality & Improving Birth Outcomes. In greater Cincinnati counties, ECS achieved a 60% reduction in the infant mortality rate by enhancing home visiting models (NFP and Healthy Families America). There is a CenteringPregnancy pilot in Indiana, another evidence-based practice that has the potential for expansion and opportunities for future financial sustainability.

Best Practice Models: Perinatal Periods of Risk (PPOR) Model

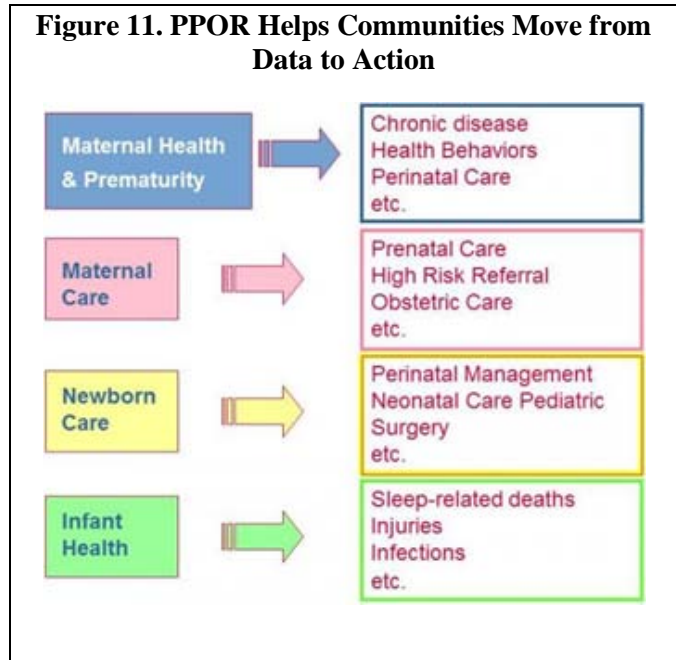
When applied to linked birth and death records, the PPOR model creates a matrix of fetal and infant deaths by birth weight and age at death, with an overlay of care categories for each of the created cells (see Figure 10).^{37,38} There are two birth weight categories comprising the table rows (500-1499 g and 1500+ g). Babies born at < 500 grams and/or < 24 weeks gestation are included in the fetal death category. These criteria are designed to exclude possible definition variability, allowing the focus to be put on problem



identification and solution implementation opportunities. The three columns are when the death occurred (i.e., fetal, neonatal, or postneonatal). The cells, derived from the intersection of the rows and columns, define 4 root cause categories: Maternal Health and Prematurity (i.e., 500-1499 grams), Maternal Care (i.e., ≥ 1500 grams, stillbirths), Newborn Care (i.e., ≥ 1500 grams, ages 0-27 days), and Infant Health (i.e., ≥ 1500 grams, ages 28-365 days).³

PPOR is highly valued for its ability to provide an overall picture of infant mortality, from antenatal to postneonatal periods. The fetal-infant death rate corresponds to each of the cells and can be calculated (i.e., number of fetal & infant deaths in cell divided by total # of live births and fetal deaths in population then multiplied by 1000). Each cell combines deaths that have common sets of causes and risk factors. Categories have been statistically validated by CityMatch³⁹. Community comparison is possible and “excess mortality” can be targeted (see Figure 11).³⁹ Within the risk periods indicating excess mortality, CityMatch recommends taking the following steps⁴⁰:

- Identifying causal pathways or biologic mechanisms for excess mortality
- Estimating prevalence of risk and preventive factors by type of mechanism
- Estimating the impact of the risk and preventive factors.



Of note, the PPOR model cannot be applied to a dataset if the records are not accurate and linked. It also requires a minimum dataset of sixty death records within a five year period.³⁸

Strengths and Gaps in Indiana MCH Resources

Strengths

IPQIC sampled its MCH expert panel for an environmental scan of Indiana’s current resources that could be tapped to address infant mortality. Results of the sampling found quality improvement initiatives, ongoing quality collaboratives, capacity building projects/organizations, form/guideline/toolkit resources, and over 30 community resources (Appendix 4, page 32).

- 1) *Quality improvement initiatives/expertise.* Initiatives primarily focus on quality improvements in clinician guideline development and maternal/newborn care. Examples include monitoring quality assurance metrics, hard stops on elective inductions/cesarean sections before 39 weeks gestation, and placental transfusion in preterm infants. Expertise is available within the Indiana School of Medicine as well as the Indiana Hospital Association.

- 2) *Quality Collaboratives.* Quality collaboratives in Indiana are comprised of a variety of partnerships and focus on an array of child health topics. Projects undertaken by the collaboratives include creation of a training program delivering/stabilizing preterm and term neonates precipitously delivered at a critical access facility, a learning collaborative linking providers and patients to improve first trimester care, and linkages with other states with well-developed QI systems for outcomes. For example, CHIP-IN for Quality (Indiana’s Child Health Improvement Partnership) works with 18 states in the National Improvement Partnership Network. Indiana is also participating in the MCH Region V Collaborative Improvement and Innovation Network (CoIIN) initiative to lower infant mortality. The initiative is just starting and provides expertise in data and PPOR analyses, quality improvement including building driver diagrams to focus activities and shared learning.
- 3) *Capacity Building.* Capacity building within the state occurs through many efforts of hospitals, academic institutions, public health and community-based organizations. Examples include recruitment and training of family medicine residents in rural areas, hospital-wide support of March of Dimes’ annual fundraiser, and the development of operational capacity to manage projects and grants. Also, the IU Fairbanks School of Public Health and IU School of Medicine are joining together to form an “implementation science special interest group” for shared learning.
- 4) *Form/Guideline/Toolkit Resources.* Existing resources are being used to improve care. Resources range from a patient safety checklist to standardized scheduling, guidelines for medically and elective inductions of labor, toolkits for standardized clinical pathways, techniques for measuring processes and outcomes, and clinical and patient education resources.
- 5) *Community Resources.* With over 30 resources, this category is the most diverse of Indiana’s resource strengths. Examples of the resources identified include nonprofit organizations (e.g., March of Dimes), governmental agencies (e.g., WIC), neighborhood health clinics, community/patient education classes (e.g., preparing for childbirth, infant CPR), lactation support, car safety seat inspections, care coordination, and family support advocates.

Gaps

The MCH expert panel also identified the most *important gaps* in the infrastructure that is necessary to support successful quality improvement collaborative processes in Indiana as:

- 1) *Lack of timely and accurate birth certificate data or an agreed upon system to identify causes and factors leading to infant mortality.* The IPQIC data committee, Indiana Hospital Association, local health departments, and other partners have identified that Indiana birth certificate data are not timely and often incomplete. This hinders efforts to identify causes and factors leading to infant mortality. Some local communities have tried the PPOR process, but have found the birth certificate data to be incomplete and/or the numbers too small to perform the analysis. A goal is to have a statewide PPOR analysis that is updated annually with the most recent data possible.

- 2) *Lack of an organization responsible for carrying out IPQIC identified priorities.* There is no mechanism for setting priorities or carrying out perinatal quality improvement projects. Local QI teams require support from quality improvement experts to provide tools, define core components or best practices, measure progress, and provide feedback loops. Identifying an administrative organization to focus on implementing a small number of high impact priorities is needed.

- 3) *Absence of real time data collection and feedback systems to fuel rapid improvement cycles.* Currently earmarking personnel and time resources to do a QI project is often an afterthought or an added responsibility for those doing the work of caring for the patient. These personnel rarely have adequate training in QI processes or data collection, are not able to analyze data or develop run charts, and do not have a basis for setting benchmarks. To implement quality improvement processes, participants must be able to report data to a central administrative team and receive quick feedback to see if the change is having an effect. Real time feedback systems usually include graphing of results in “run charts” so the results can be visualized, tracked over time and easily compared to benchmark success rates.

- 4) *Absence of funding partnerships or innovative strategies with payors to support system change through improvement science.* A comprehensive Perinatal Quality Collaborative requires dedicated staff to implement QI training and consultation, organize and staff an executive steering committee, implement the real time data system to give quick feedback to participants, and procure ongoing additional funding.

Benefit to Indiana

In the following paragraphs, we calculate the number of babies who could be saved if Indiana’s infant mortality decreased to the national level. Preliminary analysis of 2011 infant mortality data by the National Center for Health Statistics (NCHS) found the US IMR=6.048.⁴¹ If Indiana’s IMR (IMR=7.67) were decreased to this national rate, our state’s IMR would be reduced by about one-fifth (21.23%).⁴² This would result in 137 more babies surviving in Indiana each year. Closer examination of the causes of death indicate Indiana’s areas of excessive IMR compared to the US are: perinatal risks, congenital malformations, SUIDS, other accidents, and assaults (see Appendix 5, page 40). Refer to Table 2 for a comparison of infant mortality indicators for Indiana and the US.⁴²⁻⁴⁵

Table 2. 2011 Infant Mortality Indicators			
	IN	US	% Difference, IN vs. US
Low Birthweight (%)	8.1	8.1	0.0
*Preterm (%)	11.6	11.7	-0.9
Smoking during Pregnancy (%)	16.6	9.1	45.2
Early Prenatal Care (%)	68.1	73.7	8.2
Teen Birth Rate (per 1,000)	34.8	31.3	10.1
Obesity Among Women of Childbearing Age (%)	28.7	24.6	14.3
Births on Medicaid (%)	45.9	40.0	12.9

*National preterm rates are only available using the date of last menstrual period (LMP).
 Notes: Low birthweight is less than 2500 grams. Preterm birth is less than 37 weeks gestation. Early prenatal care is within the first trimester. Teen birth rate corresponds to women aged 15-19 years. Obesity among women of childbearing age only includes women from 18-44 years due to the data source.

Although the US has had an observable decrease in its IMR over the past decade, disparities in race and ethnicity still exist.⁴⁶ The 2011 preliminary IMR for Blacks in the US is 11.42 compared to 5.11 for White infant.⁴¹ This finding mirrored ISDH results for Indiana (Black IMR=12.31 [neonatal=7.57, postneonatal=4.74]; White IMR=6.91 [neonatal=4.72; postneonatal=2.19]).⁴² If lowered to US rates, more Indiana babies of both races would survive. Using information provided by ISDH (Appendix 6, page 41) lowering the Black IMR in Indiana to the national rate would result in nine more infants surviving each year (IMR decrease= 7.25%, neonatal=1, postneonatal=8). Lowering the White IMR in Indiana to the national rate would result in 125 more babies surviving each year (IMR decrease=26%, neonatal=88, postneonatal=37). Survival rates among Hispanics infants in Indiana would also improve if IMR was lowered to the US rate (more infants surviving=11/year, Hispanic IMR decrease=19.95%) (See Appendix 6, page 41).

Reaching these national rates for race would be an improvement; however to be a model for other states, Indiana needs go even further. Recent analyses from ISDH indicate priority risk factors associated with infant mortality by race and ethnicity. Prioritizing evidence-based smoking cessation/abstinence programs for whites, early prenatal care access for blacks and prevention of teen pregnancy in Blacks and Hispanics are likely to lead to improved outcomes (see Table 3).⁴²

Table 3. 2011 Indiana Risk Factors by Race/Ethnicity				
	White	Black	Other	Hispanic
Low Birthweight (%)	7.4	13.3	7.2	8.1
*Preterm (%)	9.6	13.5	8.4	10.5
Smoking during Pregnancy (%)	17.9	13.3	3.2	5.1
Early Prenatal Care (%)	70.3	56.1	59.3	57.3
Teen Birth Rate (per 1,000)	31.2	54.5	57.6	49.7
* Indiana preterm rates are typically reported using the obstetric estimate due to increased accuracy of the measure compared to LMP. Notes: Low birthweight is less than 2500 grams. Preterm birth is less than 37 weeks gestation. Early prenatal care is within the first trimester. Teen birth rate corresponds to women aged 15-19 years.				

Recommendations for a Comprehensive Perinatal Quality Collaborative

The IPQIC QI committee concurs with SACIM’s report and affirmation of the need for investment in infrastructure that ensures access, quality, safety, and accountability for outcomes across a continuum of prevention and intervention services to improve the health and well-being of women, infants, and families. To improve infant/maternal outcomes, Indiana needs to build on existing strengths and resources and fill the most important gaps in the quality improvement collaborative processes. The foundation for reducing infant mortality (or any other health outcome) is continuous quality improvement. Real-time data and analysis systems, development and implementation of evidenced-based strategies to address factors contributing to infant mortality, and continuous assessment of metrics targeting such factors is crucial to reducing infant mortality. California, Ohio, North Carolina, and Tennessee have implemented successful

perinatal quality collaboratives and provide valuable resources for the construction of a similar collaborative in Indiana[†].

The IPQIC QI Committee recommends that the ISDH build a robust Comprehensive Perinatal Quality Collaborative that will decrease infant mortality and serve as a model to address other key public health issues that impact the health of all people in Indiana. Specifically:

- a) **Improve data timeliness, data linkages (birth certificate, death certificate, birth defects registry, immunization, etc.) and analysis systems to identify the causes and contributing factors associated with infant mortality and to track outcomes over time.** A model (e.g., PPOR model) for identifying causes and factors is needed in Indiana. Birth certificate data is currently two years in arrears and fails to reflect the current state of infant mortality in Indiana. An improvement project to improve birth certificate accuracy and timeliness would assist Indiana to focus efforts on reducing infant mortality where needed most. It is also necessary to augment birth and death certificate data by incorporating additional sources of data.
- b) **Work with the current IPQIC structure, existing champions and organizations to formalize priorities and develop strategic aims** to address infant mortality. Improvement aims or goals will ideally be guided by a life-course perspective, informed by data and coordinated with regional and national efforts to reduce infant mortality.
- c) **Define/develop organizational structure(s) to carry out IPQIC initiatives** including expertise in clinical content, team development, data collection and reporting, benchmarking and QI processes. The organizational structure(s) will formulate strategies to carry out high priority perinatal quality improvement projects and support local QI teams by providing quality improvement experts, tools, and measures. The organizational structure(s) will provide a process for trend analysis with real-time data and feedback to support rapid cycle improvement and ensure that processes are resulting in improvements. Public reporting of data will ensure transparency and development of a learning community to share best practices.

Recommended Next Steps

We recommend that IPQIC and ISDH sponsor a day long retreat with state QI experts, infant mortality experts, data experts and current members from each of the IPQIC committees to:

- Through existing relationships with improvement partnerships, engage national consultant's knowledge and experience to facilitate the retreat
- Prioritize and set time specific, measurable aims or goals;
- Define the contribution of each IPQIC sub-committee to achieving the priority goals;
- Delineate the organizational structure(s) necessary to support the implementation QI processes to achieve priority goals and
- Determine resources including feasible funding necessary to implement priority improvement projects.

[†] For more information, go to www.cdc.gov/reproductivehealth/MaternalInfantHealth/PQC.htm

- Provide resources and funding to pilot the Comprehensive Perinatal Quality Collaborative priority project over the next 9-12 months.

Conclusion

The death of a child violates the societal accepted, natural order of the maternal child health life course. Infant deaths reveal more about a community than simply how babies are dying – infant mortality serves as a prime epidemiological indicator of health. Addressing the complex issue of infant mortality entails several factors including: understanding the life course continuum of care that influences maternal and infant health and outcomes; understanding resources and resource allocation; recognizing the need for different levels of data - from complex linked data to local quality improvement data - and the complexity of implementing policies and best practices with fidelity to ensure that change is being measured and resources wisely spent. Several states have been successful in their approaches to infant mortality by using comprehensive Perinatal Quality Collaboratives and Perinatal Periods of Risk analyses to focus the implementation work. Indiana has existing strengths and resources but they are not coordinated or focused under a model or strategic plan and lack financial support to expand their efforts to scale. A well-supported infrastructure that utilizes a comprehensive Perinatal Quality Collaborative framework and PPOR analyses will allow Indiana to make positive strides in decreasing infant mortality and morbidity and develop a model program for improving health outcomes for all Hoosiers.

References

1. *Infant Mortality Summit*. Indianapolis, IN2013.
2. Murphy S, Xu J, Kochanek K. *Deaths: Final data for 2010*. Hyattsville, MD: National Center for Health Statistics;2013.
3. Gurganus K. RE: Revised White Paper for 1.22 IPQIC QI call. In: Ganser J, Greer M, Stratton RM, eds. Email communication regarding IN's IMR. ed2014:1.
4. MacDorman M, Mathews TJ. Behind International Ranking of Infant Mortality: How the US Compares with Europe. *NCHS Data Brief*. 2009;23:1-8.
5. MacDorman M, Mathews TJ. The Challenge of Infant Mortality: Have We Reached a Plateau? *Public Health Rep*. 2009;124(5):670-681.
6. Kids Count 2013.
7. Schempf A. Infant Mortality Data Resource Sheets for Region V - March 2013. Paper presented at: Region V Infant Mortality Summit 20132013; Chicago, IL.
8. Caine VA. Why Should We Care About Health Disparities in Infant Mortality? . Paper presented at: Indiana Infant Mortality Summit2013; Indianapolis, IN.
9. MacDorman M, Mathews T. *Recent trends in infant mortality and infant mortality risk factors*. April 25, 2013 2013.
10. Spitznagle M. Reduced tobacco use = Reduced infant mortality. Paper presented at: Indiana Infant Mortality Summit2013; Indianapolis, IN.
11. Indiana - Obesity. 2012; <http://www.americashealthrankings.org/IN/Obesity>. Accessed December 15, 2013.
12. Hess N. Healthy babies are worth the wait. . Paper presented at: Indiana Infant Mortality Summit2013; Indianapolis, IN.
13. Forging a comprehensive initiative to improve birth outcomes and reduce infant mortality: policy and program options for state planning (draft). *HRSA Region IV and VI Infant Mortality Summit: Association of Maternal & Child Health Programs*; 2012:72.
14. *Report of the Secretary's Advisory Committee on Infant Mortality: Recommendations for Dept of HHS Action and Framework for a National Strategy*2013.
15. Lumey LH, Stein, A. D., Kahn, H. S., van der Pal-de Bruin, K. M., Blauw, G. J., Zybert, P. A., & Susser, E. S. Cohort profile: the Dutch Hunger Winter families study. [Research Support, N I H , Extramural]. *Int J Epidemiol*. 2007;36(6):1196-1204.
16. 3.5 week fetus: A.D.A.M.; 2013.
17. Inter-conception Care Defined. *Pre-conception / Inter-conception Care Training Curriculum 2* n.d.; <http://www.dhs.state.il.us/page.aspx?item=51247>. Accessed January 16, 2013.
18. Alexander F, Smith A. Mortality in micro-premature infants with necrotizing enterocolitis treated by primary laparotomy is independent of gestational age and birth weight. *Pediatr Surg Int*. 2008/04/01 2008;24(4):415-419.
19. Forging a Comprehensive Initiative to Improve Birth Outcomes and Reduce Infant Mortality: Policy and Program Options for State Planning, July 2012, Washington, D.C. Paper presented at: Association of Maternal and Child Health Programs2012; Washington, DC.
20. MORE BETTER FASTER Strategies for Improving the Timeliness of Vital Statistics. Paper presented at: National Association for Public Health Statistics and Information Systems2013; Silver Spring, MD.

21. ACOG Committee Opinion No 579: Definition of term pregnancy. *Obstet Gynecol.* 2013;122(5):1139-1140.
22. Schroeder J. Integrating Implementation Science, Practice, and Policy. Paper presented at: Rosalynn Carter Institute Annual Summit; Oct 5-7, 2011, 2011; Georgia Southwestern State University, Americus, GA.
23. Frequently Asked Questions about Implementation Science. 2013; <http://www.fic.nih.gov/News/Events/implementation-science/Pages/faqs.aspx>. Accessed January 17, 2014.
24. Crossing the quality chasm: A new health system for the 21st century. In: Medicine Io, ed. Washington, DC: National Academy Press; 2001.
25. McGlynn EA, Asch SM, Adams J, et al. The Quality of Health Care Delivered to Adults in the United States. *New England Journal of Medicine.* 2003;348(26):2635-2645.
26. Mangione-Smith R, DeCristofaro AH, Setodji CM, et al. The Quality of Ambulatory Care Delivered to Children in the United States. *New England Journal of Medicine.* 2007;357(15):1515-1523.
27. Nichols JL. Changing public behavior for better health: is education enough? *Am J Prev Med.* 1994;10(3 Suppl):19-22.
28. Lannon C, Peterson L. Pediatric Collaborative Improvement Networks: Background and Overview *Pediatrics.* 2013;131(Suppl 4):S189-S195.
29. FSSA. Presumptive Eligibility - a program for pregnant women. In: Indiana So, ed.n.d.
30. Number of Births Financed by Medicaid - Indiana. *State Health Facts* n.d.; <http://kff.org/medicaid/state-indicator/total-medicaid-births/?state=IN#graph>. Accessed January 17, 2014.
31. Medicaid Medical Advisory Cabinet Report. 2013.
32. Chapman R, Munevar D, Manry B, Hoban N. *Maternity & Perinatal Care Collaboratives: Evidence of Effectiveness and Costs: Avalere Health Report to American Congress of Obstetricians & Gynecologists*;2013.
33. Perinatal Quality Collaboratives. *Reproductive Health* 2013; <http://www.cdc.gov/reproductivehealth/MaternalInfantHealth/PQC.htm>. Accessed January 22, 2014.
34. Langley G, Nolan K, Nolan T, Norman C, Provost L. *The Improvement Guide: A Practical Approach to Enhancing Organizational Performance (2nd Edition)*.. San Francisco, CA: Jossey Bass; 2009.
35. Model for Improvement: Associates in Process Improvement; 2014.
36. Jones B. United States of America. Free US and World Maps.com2009:Vector map of the United States.
37. Lanza JJ. *Maternal and Child HealthData Analysis 2002-2005 with Perinatal Periods of Risks*n.d.
38. Analytic Approach. n.d.; <http://www.citymatch.org/perinatal-periods-risk-ppor/analytic-approach>. Accessed November 7, 2013.
39. PPOR helps communities move from data to action: CityMatch. n.d.; <http://www.citymatch.org/perinatal-periods-risk-ppor-home/what-ppor>. Accessed November 20, 2013.
40. PPOR/How to/Content. n.d.; <http://www.citymatch.org/PPOR/HowTo/Content/PHAS2IH.doc>. Accessed November 13, 2013.

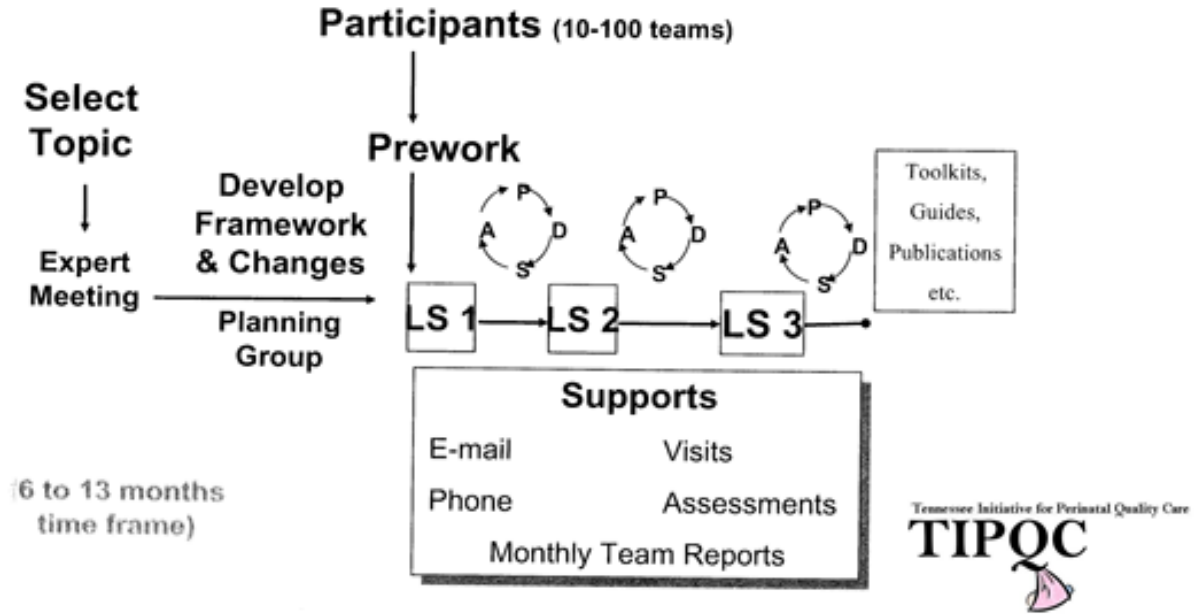
41. Hoyert D, Xu J. Deaths: Preliminary data for 2011. Vol 61. Hyattsville, MD: National Center for Health Statistics; 2012.
42. Gurganus K. Indiana Data Source: Indiana State Department of Health-Maternal and Child Health Epidemiology Division 2014.
43. Martin J, Hamilton B, Ventura S, et al. Births: Final data for 2011. Vol 62. Hyattsville, MD: National Center for Health Statistics; 2013.
44. Natality public-use data 2007-2011 United States Department of Health and Human Services (US DHHS), Centers for Disease Control and Prevention (CDC), National Center for Health Statistics (NCHS), Division of Vital Statistics; 2013.
<http://wonder.cdc.gov/natality-current.html> Accessed February 20, 2014.
45. Behavioral Risk Factor Surveillance System (BRFSS). In: National Center for Chronic Disease Prevention and Health Promotion DoPH, ed: United States Department of Health and Human Services (US DHHS), Centers for Disease Control and Prevention (CDC); 2011.
46. MacDorman MF, Mathews TJ. Understanding Racial and Ethnic Disparities in U.S. Infant Mortality Rates. *NCHS Data Brief* 2011;
<http://www.cdc.gov/nchs/data/databriefs/db74.htm>. Accessed January 16, 2014.

Appendix 1 - IHI Breakthrough Series

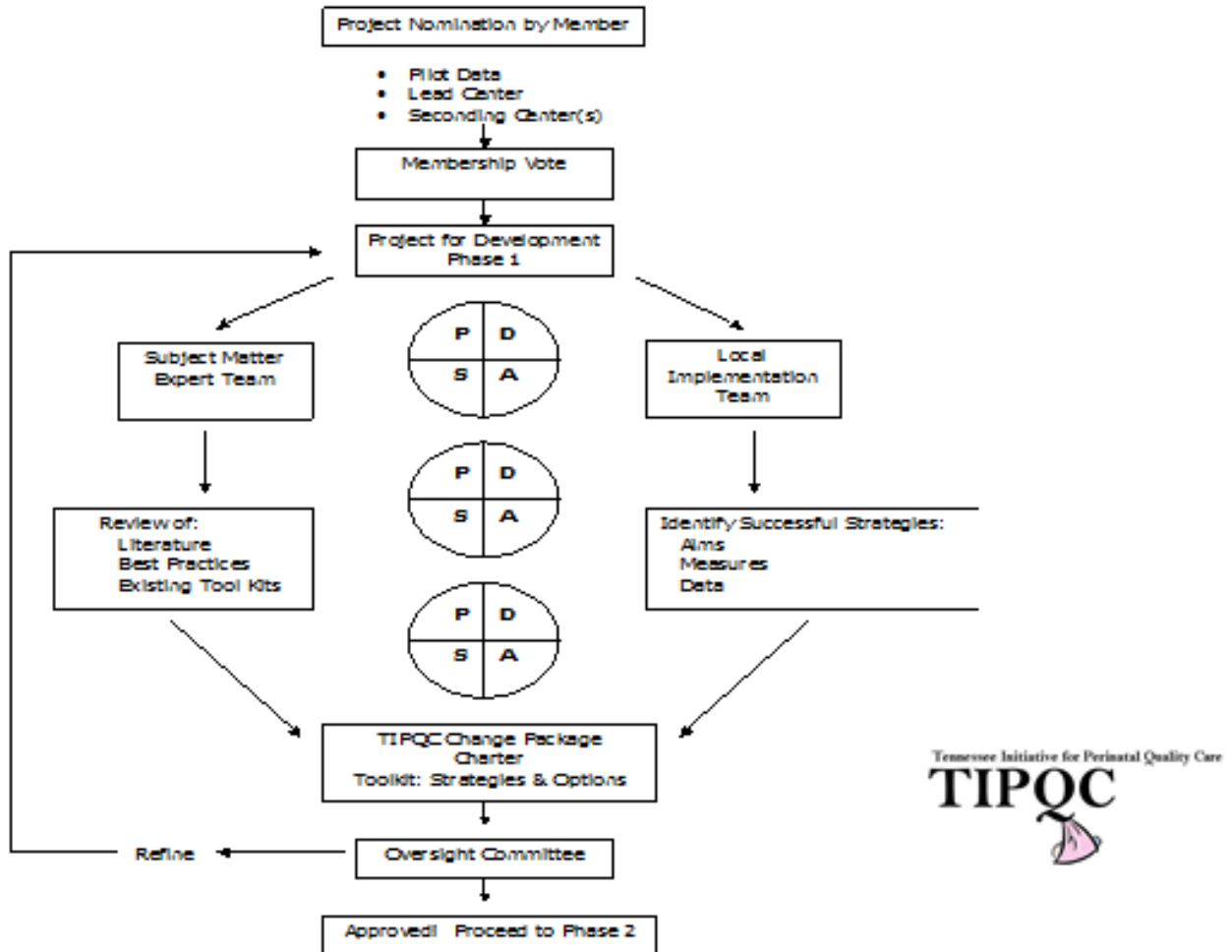


IHI Breakthrough Series

An improvement method that relies on spread and adaptation of existing knowledge to multiple settings to accomplish a common aim



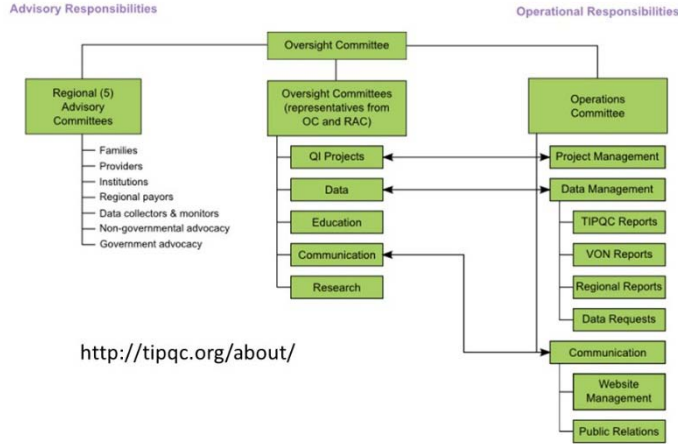
Appendix 2 - TIPQC Project for Development



Appendix 3 - Organizational Charts for Three Perinatal Quality Collaboratives

Tennessee Initiative for Perinatal Quality Care

Organizational Chart



Florida Perinatal Quality Collaborative

FPQC Organizational Chart



<http://health.usf.edu/publichealth/chiles/fpqc/governance.htm>

Illinois Perinatal Quality Collaborative

ILPQC Structure



http://www.ilpqc.org/docs/bootcamps/20131216/Welcome_ABorders.pdf

Appendix 4 - Results of IPQIC's Environmental Scan of Indiana's Current MCH Resources

Quality Improvement Initiatives in Indiana

- Indiana Medicaid has a Neonatal Quality Committee which meets quarterly. The committee (e.g., managed care entities, external stakeholders) addresses quality concerns related to the health of the mother and child.
- Union Hospital completed the March of Dimes 39+ week quality improvement initiative. Outcroppings include a new policy and placement of hard stops to prevent any elective inductions prior to 39 weeks, with the chief of obstetrics to enforce. After project completion, the hospital kept its policy of no elective inductions/cesarean sections under 39 weeks (as of March 2013) and continues the provided scheduling form. Data collection for future analysis is underway.
- Indiana Vermont Oxford Network Quality Collaborative (IVONQC)
 - Outgrowth of the statewide Medical Directors Quarterly meetings (teleconference for those outside Riley hospital) sponsored by the Section of Neonatal-Perinatal Pediatrics.
 - Breast Milk Use/Necrotizing Enterocolitis-2009: collaborative formed and initiated a project to demonstrate feasibility of a collaborative network in Indiana, increase mothers own milk use in NICUs, and reduce the morbidity and mortality associated with necrotizing enterocolitis. VON Database fields are used for outcomes analysis were integral to project completion.
 - Placental Transfusion in Preterm Infants project: Following the success of the 2009 QI project, the group agreed to engage our obstetric and maternal-fetal medicine colleagues in implementing the practice of placental transfusion in preterm infants by umbilical cord clamping 30-60 seconds after birth or cord milking. The approach is a quality improvement approach with 11 participating sites. A grant to reduce infant mortality has been submitted to ISDH.
- Guideline Development Group, Section of Neonatal-Perinatal Pediatrics (Section), IUSM
 - The Section has committed time resources for development of Clinical Guidelines to reduce variation in care practices. Systematic reviews are performed, guidelines implemented, and quality improvement metrics monitored. Eight guidelines have been developed and implemented. Such guidelines can be used in statewide QI efforts to improve care and reduce infant mortality incrementally.

Quality Collaborations

- CHIP-IN for Quality (Child Health Improvement Partnership – Indiana) is a partnership with family organizations, professional organizations, public insurers, academic medical center and ISDH CSHCS to implement quality initiatives around child health. CHIP-IN provides on-site coaching for system changes, community environmental assessment and linkage of resources, real-time data feedback for rapid cycle improvement.
- Union Hospital worked with the Rural Health Improvement Collaborative to create a community program designed to help train staff at critical access hospitals how to deliver, stabilize, and preterm/ term neonates precipitously delivered at their facility. Two of the hospital's NICU nurses have become STABLE instructors. The hospital also has a Neonatal Resuscitation Program comprised of regional trainers/instructors.

- Terre Haute Regional Hospital (THRH) has had a hard stop policy on inductions at 39+ weeks since November of 2011 and has been 100% since that time as reported to The Joint Commission. It is a Hospital Corporation of America initiative of which THRH is a part
- Neonatal Outreach Program of the Section of Neonatal-Perinatal Pediatrics, Department of Pediatrics; Indiana University School of Medicine provides an Outreach Simulation Program affiliated with Riley Hospital for Children using hands-on clinical scenarios as well as adjunct didactic education to train multiprofessional resuscitation teams in their own environment. The goal of the program is to improve the outcomes of newborns requiring resuscitation and stabilization at birth hospitals throughout Indiana. A foundation for these training sessions is the Neonatal Resuscitation Program (NRP) of the American Academy of Pediatrics. Through such programs, neonatal mortality caused by intrauterine asphyxia and complications related to prematurity are reduced. Furthermore, these programs focus on initial performance in the delivery room which is critical to short and long term neonatal outcomes in this vulnerable population. The Neonatal Community Outreach Simulation Program has reached nearly two thousand learners in Indiana who have been trained in advanced neonatal resuscitation. Technical skills emphasized include providing positive pressure ventilation, troubleshooting ineffective ventilation, coordination of chest compressions with ventilation, endotracheal intubation, and decompression of pneumothoraces. During the educational sessions, learners practice skills associated with the thermoregulation of premature infants, diagnosis and treatment of pneumothoraces, stabilization of neonates with unexpected congenital anomalies, and the proper use of resuscitation medications. In addition, the program provides interactive didactic sessions emphasizing recognition and management of neonatal abstinence syndrome and the use of non-invasive neonatal respiratory support. The simulation format is ideal for reinforcing effective team communication in a crisis situation as well as identifying latent safety threats.
- This year, 27 of Indiana's state-sponsored community health centers are participating in primary care learning collaborative to ensure planned care, patient self-management, and links with community resources are practiced by providers and patients in conjunction with improving prenatal care of patients in their first trimester. The participating centers have 14,088 women patients of ages 14 – 44 whose preconception health and prenatal care are one of the focal points of the collaborative. Having initiated a collaborative and data reporting infrastructure within the community health center network, the State hopes to expand and refine a future learning collaborative focused on preventing infant mortality at the local level.
- CoIIN is a public-private partnership to reduce infant mortality and improve birth outcomes. Participants learn from one another and national experts, share best practices and lessons learned, and track progress toward shared benchmarks. CoIIN is using the science of quality improvement and collaborative learning to reduce infant mortality. It builds on the success of multiple public and private investments to improve birth outcomes. In Region V, following the 2013 Infant Mortality Summit, five priorities to reduce infant mortality and improve birth outcomes were selected:
 - Reduce elective delivery at less than 39 weeks of pregnancy;
 - Expand access to interconception care (between pregnancies) through Medicaid;
 - Promote infant safe sleep practices;

- Improve perinatal regionalization (a geographically-targeted approach to assure risk-appropriate care for mothers and infants); and
- Reduce racial disparities in perinatal outcomes.

ISDH's Maternal and Child Health Division is participating in the Region V CoIIN and has also included the reduction of the percentage of pregnant women who smoke as a priority. The CoIIN project helps identify opportunities for leveraging resources and maximizing investments across federal and state programs, identify needs and provide technical assistance through a variety of vehicles to state MCH programs, and define an organizational framework for continued collaboration.

- Indiana has relationships with leadership in other states with state-wide QI collaboratives (e.g., California, Tennessee, North Carolina, Ohio, and Illinois).
 - Consultation from states with well-developed QI systems for outcomes improvement is readily available, specifically Tennessee and North Carolina. Sandra Hoesli, MD, Faculty in Neonatology at IUSM participated in the Tennessee collaborative while a faculty member at Vanderbilt University School of Medicine. Ken Herrmann, MD and William Engle, MD, Faculty at the IUSM, have participated in the state collaborative meetings during Vermont Oxford Network national meetings.
- IU Health's delivering facilities collaborated to eliminate elective deliveries prior to 39 weeks gestation, and availability and guidelines for use of 17 α -hydroxyprogesterone caproate.

Capacity Building

- The Department of Obstetrics and Gynecology at Indiana University School of Medicine (IUSM) has a new fellowship training program that was accredited in May of 2012 by the American Board of Obstetrics and Gynecology (ABOG). Additional Maternal-Fetal Medicine (MFM) practitioners are needed to fill a regional shortage of perinatologists and arm them with the necessary skills to independently care for pregnant women with multiple medical and obstetrical problems in the rural communities of the mid-West.
- Union hospital recruits and trains family medicine residents.
 - They seek out opportunities to hire providers to practice within the Union Hospital Health Group.
 - The OB staff support the March of Dimes and participate in its annual fundraiser. The hospital is also a corporate sponsor of March of Dimes.
- Indiana funds 45 community health centers, including 20 Federally Qualified Health Centers that also receive federal funds to provide health care to all individuals regardless of a patient's ability to pay. Collectively the centers see approximately 500,000 individuals. The centers also represent an informal network of primary care providers and offer an opportunity to impact significant numbers of child-bearing age women. Most importantly, community health centers are frequented by women whose access to prenatal care is further complicated by lack of transportation, lack of social support, and whose pregnancies are often unplanned.
- The Indiana Perinatal Network's mission is to lead Indiana to improve the health of all mothers and babies. They accomplish their mission by providing high quality provider education, raising consumer awareness and spearheading sound public policies. Since its' founding in 1998, IPN has demonstrated a proven ability to bring together competing

health systems, diverse disciplines and public and private organizations to reach consensus on how to address complex issues affecting the health of women, infants, and children in our state. Some of the issues they address impacting infant mortality include breastfeeding promotion, promoting policies to increase access to care, reducing unplanned pregnancies, reducing substance use during pregnancy, safe sleep practices and perinatal mood disorders. IPN's strengths and resources that could be utilized to build QI perinatal infrastructure in the state include the following:

- Statewide network of nearly 3,000 multidisciplinary perinatal providers and human service professionals;
- Statewide network of more than 40 community-based, grassroots breastfeeding coalitions and drop-in centers;
- Reputation for serving as a neutral, convening organization;
- Expertise in providing or coordinating high quality professional education at a statewide or regional level;
- Expertise in working with elected and state agency officials to develop and implement policies to improve perinatal care;
- Organizational and operational capacity to manage projects and grants

Form/Guideline Resources

- *Scheduling Induction of Labor* – The American College of Obstetricians and Gynecologists (ACOG) created a patient safety checklist form that helps facilities standardization their scheduling process. The healthcare provider completes the checklist; the hospital reviews the information to determine appropriateness of the procedure. The form information: Scheduling induction of labor. Patient Safety Checklist No. 5. American College of Obstetricians and Gynecologists. *Obstet Gynecol* 2011; 118:1473–4.
- *Northern New England Perinatal Improvement Network Guidelines for Medically Indicated Induction and Elective Labor Induction* – The Northern New England Perinatal Improvement Network Guidelines provide suggestions for medically and elective inductions of labor. Guideline information: www.nnepqin.org/Guidelines.asp
- *State Title V Program Approaches to Improving Birth Outcomes Lowering Non-Medically Indicated Deliveries* – Issue brief by Association of Maternal Child Health Programs (AMCHP) http://publish.amchp.org/Policy-Advocacy/health-reform/Documents/AMCHP_Kellogg_NMI%2039%20week%20Issue_Brief%20FINAL.pdf

Toolkit Resources

- *Policy Toolkit to Support Reduction of Early Elective Delivery* – The Midwest Health Initiative Innovators Council and Maternal, Child, and Family Health Coalition (located in St. Louis, MO region) developed this toolkit. It includes drafts of policy components, sample consents, and sample scheduling forms. Toolkit information: *Policy Toolkit to Support Reduction of Early Elective Delivery*. Midwest Health Initiative (n.d.) Retrieved from http://www.midwesthealthinitiative.com/upload/media/FINAL_TOOLKIT5.pdf
- *March of Dimes Elimination of Non-medically Indicated (Elective) Deliveries Before 39 Weeks Gestational Age; Quality Improvement Toolkit* – The toolkit provides methods to identify opportunities of improvements and outlines techniques for measuring process

and outcomes. It is a collaborative effort between the March of Dimes, California Maternal Quality Care Collaborative, and California Department of Public Health, Maternal, Child, and Adolescent Health Division. Toolkit information:

<https://www.prematurityprevention.org/portal/server.pt>

- *40 Weeks of Pregnancy Every Week Counts Provider Toolkit* – The Indiana Medicaid Hoosier Healthwise developed a toolkit for providers. The toolkit includes clinical resources and patient education resources.
- *Go the Full 40-* Association for Women’s Health, Obstetric and Neonatal Nurses’ (AWHONN) campaign to reduce early elective deliveries. This website offers women and families advice from nurses about the importance of delivering at term. This site also provides guidance on other areas of perinatal health.
http://www.health4mom.org/a/40_reasons_121611
- *Assessment and Care of the Late Preterm Infant Implementation Toolkit:* AWHONN developed a toolkit for purchase which includes clinical resources and patient education resources. <http://www.awhonn.org/awhonn/lpitoolkitresources/home.jsp>
- *March of Dimes Preterm Labor Assessment Toolkit* – The toolkit help medical providers establish a standardized clinical pathway for the assessment and disposition of women with suspected preterm labor. Better identification of women in preterm labor will not only provide timely and appropriate interventions; it will also promote effective management to improve neonatal outcomes. The development of the toolkit was collaborative effort of Sutter Medical Center, Sacramento Maternal –Fetal Medicine Medical Group, Inc., Santa Clara Valley Medical Center, Hospital Corporation of America, and March of Dimes Foundation. Toolkit information:
<https://www.prematurityprevention.org/portal/server.pt>

Evidence-based Home Visitation to Improve Birth Outcomes

The Affordable Care Act includes funding for Maternal Infant Early Childhood Home Visiting (MIECHV). The more common national home visiting models funded under this initiative are Healthy Families America, Nurse Family Partnership and Early Head Start. Indiana received funding for Healthy Families Indiana (HFI) to expand services in Marion County and other selected counties and to initiate Nurse Family Partnership (NFP) in Marion County. In addition, HFI receives funding from Family and Social Services Administration to provide home visiting services in each Indiana county.

In Indiana, NFP is implemented by Goodwill Industries of Central Indiana and has the capacity to serve 600 families in Marion County. NFP serves low-income mothers who are expecting their first baby. This evidence-based nurse home visitation model is designed to improve pregnancy outcomes, child health and development economic self-sufficiency of the family. NFP home visiting begins as early as possible during pregnancy (at least by 28 weeks gestation) and continues until the child is two years old. Each home visitor is a baccalaureate-prepared registered nurse with a caseload of 25 families. NFP has 30 years of research that demonstrates effectiveness, including David Olds’ randomized trials with diverse populations. Because NFP home visiting always begins during pregnancy, it has demonstrated success in improving pregnancy and birth outcomes. Impressive results related to reducing infant mortality and morbidity include: a 79% reduction in preterm birth for women who smoke, 35% reduction in hypertensive disorders of pregnancy, 39% fewer injuries among children birth to age 2,

statistically significant reductions in smoking, fewer second pregnancies within 24 months and increased initiation of breastfeeding.

CenteringPregnancy®

CenteringPregnancy is a model of group prenatal care that integrates three major components of care: health assessment, education, and support. These components provide facilitated discussions of pregnancy, birth and newborn care as well as overall health, and stress management within a supportive and collaborative environment to share pregnancy and experiences.

A 2007 multi-site randomized controlled trial conducted by Yale and Emory researchers found that participation in CenteringPregnancy care reduced the risk of premature birth by 33 percent compared to traditional prenatal care. Researchers concluded CenteringPregnancy care “resulted in equal or improved perinatal outcomes at no added cost.” The CenteringPregnancy model has been demonstrated to improve several key outcomes for pregnancy in sample population studies not only increasing breastfeeding rates and duration of breastfeeding but decreasing preterm birth rate.

The Center for Medicare & Medicaid Innovation (CMS Innovation Center) has recognized the CenteringPregnancy model as one of three evidence-based maternity care service approaches that enhance the current care delivery. Through the Strong Start for Mothers and Newborns initiative the CMS evaluates CenteringPregnancy as an enhanced prenatal care intervention to reduce the rate of preterm birth, improve the health outcomes for pregnant women and newborns and decrease the anticipated total cost of medical care during pregnancy, delivery and over the first year of life for children born to mothers in Medicaid or CHIP.

In Indiana, CenteringPregnancy has been implemented at over 22 sites within 14 health care systems since 2005 according to the Centering Healthcare Institute. March of Dimes, in partnering with WellPoint Foundation, has actively involved in CenteringPregnancy implementation in majority of the sites by providing grants for start-up trainings, advanced trainings, and site approval to ensure quality continuation of the care. CenteringPregnancy also has opened opportunities to serve pregnant women with diverse risks. Physicians at Eskenazi Health recognized CenteringPregnancy as a model to provide prenatal care to pregnant women who may need long-term management of chronic health conditions and implemented CenteringPregnancy for Hispanic women with gestational and type II diabetes. St. Vincent Hospital Primary Care Center not only has provided CenteringPregnancy to teen pregnant women but is currently reviewing efforts to provide CenteringPregnancy to pregnant women with obesity. According to March of Dimes, through their chapter grant program in 2012 CenteringPregnancy was provided to a total of 378 pregnant women at 4 different sites. The rate of preterm birth among CenteringPregnancy participants was 7.1% compare to overall state preterm birth rate of 11.7% (2012).

Community Resources

- March of Dimes
- WIC

- Allen county: Healthy Families, The Hope Center, Tobacco Free Coalition, Neighborhood Health Clinic
- Northeast Indiana Perinatal Collaborative
- Lutheran Health Network
 - Participation in Vermont Oxford Data Collection
 - Dupont Hospital: 24 hour OB stat coverage
 - Dupont Hospital: Host for 2014 Regional Perinatal Education
 - Dupont Hospital: Perinatal Classes for Community
 - Preparing for Childbirth
 - Trimester Series (Trimester #1, Trimester #2, Trimester #3, and Postpartum Class [Trimester #4])
 - Newborn Class
 - Infant Safety/CPR
 - Breastfeeding Basics
 - Breastfeeding and Returning to work class
 - Grandparents Class
 - Car Seat Education Class
 - Sibling Class
 - Breastfeeding and Mom to Mom Support Group
 - Preconception and Multiples Classes planned for 2014
 - Outpatient Lactation Support Services with our IBCLC's
 - Mood Changes
 - Inpatient car seat inspections as well as outpatient inspections through our fitting station
 - The Mad Anthony's Children's Hope House
- St Joseph Hospital
 - Perinatal Classes for the Community, in the Community
 - Classes include During Pregnancy, Postpartum Care, Care of Newborn, Breastfeeding, Gestational Diabetes, Sibling Class
 - Collaboration with Neighborhood Health Clinic-new program that all patients will be enrolled in classes at beginning and at approximately 25 weeks. They will also attend gestation diabetes education as regular part of their plan of care
 - Classes offered at the patient's convenience to encourage participation for the inner city population we serve.
 - All classes available in any language with interpreter services.
 - Beginning in 2014, a designed to give every patient in-depth education on Safe Sleep before discharge.
 - Providing classes at The Hope Center in 2014
- IU Health Bloomington Hospital
 - Perinatal classes for the community in Bloomington and Martinsville
 - Star Bright Beginnings Classes:
 - Four week series or one day class
 - Sibling Preparation
 - Toddler
 - Sibling 3-5 years
 - Grandparents Class

- Breastfeeding Basics and Breast Pumps
- CPR for New Parents
- Period of Purple Crying implementation to prevent Shaken Baby Syndrome
- Family Support Advocates (a collaboration with Bloomington Area Birth Services and IU Health-Bloomington Hospital) provide free in-hospital emotional support to the entire family, and help moms and babies get breastfeeding and bonding off to a good start. FSAs volunteer for 24-hour on-call shifts, and can spend anywhere from a couple of hours to most of a day with a family.
- See <http://bloomingtonbirth.org/after-baby/support/family-support-advocates/> for more resources.
- Collaboration with Lactation Consultants across the community including IUHB inpatient, Riley Physicians at Southern Indiana Physicians, WIC, and Bloomington Area Birth Services.
- Care coordination with Riley Physicians at Southern Indiana Physicians and IU Health Children's Therapy Center for Special Care Follow-up at well child checks.

Appendix 5 - Impact on Indiana by Cause if IMR is Reduced to the US IMR (2011)

Table 4. Impact on Indiana by Cause if IMR is Reduced to the US IMR (2011)					
41,42					
Cause of Death	INDIANA IMR (per 100,000)	US IMR (per 100,000)	Rate Difference Between IN and US Rate	% IN IMR Decline if Lowered to US Rate	Increased number of infants surviving
Perinatal Risks ¹	351.0	299.6	51.4	14.64%	43
Congenital Malformations ²	201.8	126.1	75.7	37.53%	63
SUIDs ³	97.9	65.1	32.8	33.52%	27
Other accidents ⁴	20.3	7.7	12.6	62.00%	11
Assaults ⁵	7.2	4.5	2.7	37.47%	2
Infections ⁶	7.2	14.0	-6.8	-93.92%	0*
All Other Causes	82.4	87.8	-5.4	-6.55%	0*
Total	767.8	604.8	163.0	21.23%	137

Notes:

- Cause of Death Category ICD-10 Codes: ¹[P00-P96]; ²[Q00-Q99]; ³[R95, R99, W75-W77, W81-W84, Y06-Y07, Y20]; ⁴[V01-W74, W78-W80, W85-W99, X00-59, Y86]; ⁵[X85-X99, Y00-Y05, Y08-Y09]; ⁶[A00-B99]
- Infant Mortality Rates are typically displayed per 1,000 live births; however, this table uses per 100,000 live births due to low numbers when sorting deaths by specific cause category.
- (*) indicates categories in which Indiana fairs better than the nation. The rows for increased infants survived equals zero. Thus, if added together, the Increased Number of Infants Surviving column does not equal the total number of infants survived.

Appendix 6 - Impact on Indiana by Race/Ethnicity if IMRs are Reduced to US IMRs (2011)

Table 5. Impact on Indiana by Race/Ethnicity if IMRs are Reduced to US IMRs (2011) 41,42						
		IN IMR (per 1000)	US IMR (per 1000)	IMR Difference	% IN IMR Decline if Lowered to US IMR	Increased Number of Indiana Infants Surviving
Black ¹	Total	12.31	11.42	0.89	7.25%	9
	Neonatal	7.57	7.45	0.12	1.58%	1
	Post-Neonatal	4.74	3.97	0.77	16.23%	8
White ²	Total	6.91	5.11	1.80	26.00%	125
	Neonatal	4.72	3.45	1.26	26.82%	88
	Post-Neonatal	2.19	1.66	0.53	24.23%	37
Hispanic ³	Total	6.54	5.23	1.30	19.95%	11
	Neonatal	4.69	3.65	1.04	22.11%	8
	Post-Neonatal	*	1.58	-	-	-
Total	Total	7.68	6.05	1.63	21.23%	137
	Neonatal	5.19	4.04	1.16	22.31%	97
	Post-Neonatal	2.48	2.01	0.47	18.97%	39

¹Total Black

²Total White

³Includes all persons of Hispanic origin of any race

*Rates are unstable



Appendix E: Coordinated Perinatal Systems of Care

2014

Coordinated Perinatal Systems of Care

Recommendations to the Indiana Perinatal
Quality Improvement Collaborative (IPQIC)
Governing Council

Endorsed by the Governing Council on May 21, 2014





Table of Contents

Literature Review	3
Definition	4
Roles and Responsibilities	5
1. Perinatal Conferences:	5
2. Training for Affiliate Hospitals:	5
3. Quality Assurance	6
4. Support Services that will be provided by the Centers to affiliate hospitals:	7
5. Coordination of Maternal-Fetal and Neonatal Back Transports to Affiliate Hospitals	7
6. Transition to post-partum and interconception care.....	8
7. NICU Transition to Home & Follow-up Program.....	8
8. Develop & Implement Agreements (MOU)	8
Appendix A: Perinatal Centers Quality Measures	12
Appendix B: Transport Quality Measures	19
Appendix C: Transport Algorithms	23
Appendix D: Shared Patient Responsibilities	26
Appendix E: Annotated Bibliography.....	29

COORDINATED PERINATAL SYSTEMS OF CARE

The Indiana Perinatal Quality Improvement Collaborative (IPQIC) System Development Committee is recommending that the Governing Council endorse the recommendation that Coordinated Perinatal Systems of Care be established that will promote high quality service delivery systems and risk appropriate health care before, during and after pregnancy for all women of childbearing age. There is significant evidence that a statewide coordinated perinatal system of care will improve infant mortality and morbidity and reduce the cost of care for high risk newborns. The Coordinated Systems will also promote and ensure that all hospitals, regardless of level, have an important role to play in assuring that all babies born in Indiana have the best start in life.

Literature Review

In 1976, a landmark document, *Toward Improving the Outcome of Pregnancy, Recommendations for the Regional Development of Maternal and Perinatal Health Services (TIOP I)*, was released by an ad hoc Committee on Perinatal Health.¹ Constructed from a growing body of evidence suggesting that rates of perinatal mortality can be greatly reduced if patients are identified early and given appropriate care,² the March of Dimes, along with member representation that included the American Academy of Family Physicians, American Academy of Pediatrics, American College (now Congress) of Obstetricians and Gynecologists, and the American Medical Association, proposed a system of regionalized care based on designated levels of care at each facility which included an inter-hospital transport system, and that would have formal oversight by a neutral entity.³ The impact of this document on perinatal health care delivery in the United States was broad and immediate as this ideal system of care began to be implemented in varying degrees by states over the next several decades. Further research looked at the economic impact and the overall cost effectiveness of implementing geographical systems of perinatal care.⁴

Several study reviews support regionalization as a conduit for improving perinatal mortality and morbidity.⁵⁻¹¹ The data suggest that states with formalized regional programs have lower infant mortality rates, better outcomes and resource utilization, and lower cost expenditures than states without such regionalization.¹² Improving perinatal mortality and morbidity rates is the ultimate goal, yet short-term measures of quality assurance can also include: access equality, appropriate capacity and

staffing, a reduction in inappropriate transfers, and networks that have robust local communication and collaboration.¹³

Strengthening perinatal systems of care in states that have unfinished business of high infant mortality is effective, especially among the most preterm infants.⁷ “Although they represent less than 2% of US births, 55% of infant deaths occur among very low birth weight infants.”⁵ A major intent of the March of Dimes TIOP I was to identify and transfer high-risk pregnancies *in utero*, as neonatal transfer is much riskier.¹⁴ Healthy People 2020 goals recognize increasing the proportion of very low birth weight infants born in Level III hospitals as a national priority measure, targeted to 83.7%.¹⁵ Indiana 2011 (latest data available) percentages are lower than national priority goals as well as overall US percentages at just 69%.¹⁶

The impact of appropriate care is not limited to the smallest and youngest premature infants. A review of 17 studies related to perinatal outcomes and regionalized perinatal systems found that, in addition to a decline in neonatal mortality overall, very low birth weight infants were more likely to be born in appropriate Level III facilities with a formal system of perinatal regionalization, which improved the outcome for infants admitted to Level I facilities.⁴ And finally, in addition to improving outcomes for high risk pregnancies and births, regionalization stratifies care by level in order to match perinatal patients by risk and ensures cost-effective utilization of available resources.¹⁷

Benjamin Disraeli, noted statesman, once said, “The health of the people is really the foundation upon which all their happiness and all their powers as a state depend.” The formal development of regionalized perinatal care will not be an easy task. In all instances of implementation, the perseverance of visionary individuals, hospitals, support organizations, and governmental entities working together with the purpose of improving perinatal health must be the overarching driver to achieve success.¹⁸

Definition

The Perinatal Center must meet the ACOG and AAP guidelines for a Level III Obstetric (OB) Unit and a Level III or IV Neonatal Unit. Its affiliate hospitals will meet the guidelines for Level I or II OB and for Level I, II and III Neonatal. The Level I or II OB and Level I,II and III neonatal units may be affiliated with more than one Perinatal Center. In addition all Perinatal Centers will be required to participate in the Vermont Oxford Network (VON) and the Indiana Vermont Oxford Network (IVON).

Roles and Responsibilities

The Perinatal Centers have the following responsibilities with their affiliate hospitals' delivery units:

1. Perinatal Conferences:

- Each Perinatal System is responsible for participating in a Statewide Perinatal Conference, sponsored by the Indiana State Department of Health, that brings together all perinatal systems to share timely regional mortality and morbidity statistics, identify best practices and/or challenges with time for solution discussion, evaluate regional FIMR and/or Maternal Mortality data, evaluate general transport data, and incorporate ISDH updates.
- Each Perinatal System and its affiliates must hold an annual meeting that would include timely local system mortality and morbidity statistics, also identify best practices and/or challenges with time for solution discussion, evaluate system FIMR and/or Maternal Mortality data, evaluate general transport data, and incorporate ISDH updates. Perinatal systems that share common geography are encouraged to jointly conduct their meetings.

2. Training for Affiliate Hospitals:

The Perinatal Center will provide training for their affiliate hospitals related to both obstetric and neonatal topics:

- Obstetric

Topics may include but are not limited to:

- Basic fetal heart rate monitoring(mandatory)/advanced fetal heart monitoring;
- High risk OB (e.g., identification of high risk patients, indications for transfer, development of protocols with neonatology);
- Conferences/Trainings developed to address local learning needs;
- Nursing exchange program (e.g., shadowing, orientation, nursing in-services);
- Perinatal hospice and bereavement training;
- Training for transport team personnel;
- Team training (communication and patient safety issues); and
- Conferences/Trainings developed to address local learning needs.

- Neonatal

Topics may include but are not limited to:

- STABLE (Post resuscitation/pre-transport Stabilization care of sick infants) S.T.A.B.L.E. stands for the 6 assessment parameters covered in the program: Sugar, Temperature, Airway, Blood pressure, Lab work, and Emotional support for the family;
- NRP (Neonatal Resuscitation Program);
- Nursing/ Respiratory therapy (RT) exchange program (e.g., shadowing, orientation, nursing in-services);
- Perinatal hospice and bereavement;
- Training of transport team personnel;
- Team training (communication and patient safety issues); and
- Conferences/Trainings developed to address local learning needs.

3. Quality Assurance

The Perinatal Center will be responsible for the implementation of the following obstetric and neonatal quality assurance metrics in affiliate hospitals as appropriate to each hospital's level of care. These data will be reported to the state and will be used to identify best practices that support optimal perinatal outcomes. The definition of each metric is contained in Appendix A.

- Obstetric Measures:
 - Maternal Death;
 - Sentinel Events;
 - Maternal transports;
 - Ruptured Uterus;
 - 5 minute Apgar<4;
 - Elective Delivery without medical indication at < 39 0/7 weeks gestation;
 - Delivery at >41 6/7 weeks gestation; and
 - Fetal Demise at >20 0/7 weeks;
 - Deaths in the delivery room;
 - Antenatal Steroid Administration; and
 - Any additional event identified by hospital staff.
- Neonatal Measures:
 - All neonatal transports;
 - Sentinel Events;
 - Infant Mortality > 12 hours;

- Infant Mortality < 12 hours
- Any respiratory support for VLBW babies at 36 weeks;
- Late onset sepsis/bacteremia;
- Hypothermia on admission;
- Mother's milk at discharge; and
- Any additional event identified by hospital staff.

4. Support Services that will be provided by the Centers to affiliate hospitals:

- Obstetric:
 - Maternal Fetal Medicine consults 24/7 (phone/telemedicine);
 - Maternal Fetal Transports 24/7;
 - Maternal Fetal Medicine outpatient services; and
 - Reliable and comprehensive communication system for initiating transport that can be readily accessed (i.e., one quick phone call to one number to initiate transport).
- Neonatal:
 - Neonatal consults 24/7 (phone/telemedicine);
 - Neonatal Transports 24/7;
 - Reliable and comprehensive communication system for initiating transport that can be readily accessed (i.e., one quick call to one number to initiate transport); and
 - Implementation of Developmental Follow up Program.

5. Coordination of Maternal-Fetal and Neonatal Back Transports to Affiliate Hospitals

The Perinatal Center and affiliate hospital physicians will discuss patient(s) to be transferred in order to assure that patient is stable for transfer and the receiving hospital is capable of continuing care. The plan of care must be determined jointly. Perinatal Center specialists (Maternal-Fetal Medicine and Neonatology) will be available for questions, consultation and support regarding shared patients.

If a shared patient is discharged directly from perinatal center, specialists will discuss the patient with their primary physician(s) to discuss plan of care, and ensure continuity of care

- **Maternal Fetal:** After discussion with the referring obstetric provider, there will be a written plan of care for follow up locally for the remainder of the pregnancy. This can be in the discharge summary sent to the local provider. A sample form is included in Appendix B. The plan of care will

reflect local levels of care that can be provided by the referring hospital and provider (i.e. Gestational age based care, etc).

- **Neonatal:** Regional perinatal centers will make every effort to transfer patients back to affiliate (referring) hospitals (level 4 to 3 and 2, level 3 to 2) when appropriate and by mutual agreement as specified in the MOU. Perinatal Centers will be responsible for ROP follow up if needed. Perinatal centers will work with affiliate hospital at time of discharge and provide developmental follow up as needed and assist with any subspecialist follow up

6. Transition to post-partum and interconception care

At the time of maternal discharge, the discharging OB/MFM will communicate with the referring OB/FP about the outcome of the pregnancy. This communication would include the diagnosis, brief description of inpatient management and outcome. The OB/MFM will make recommendations for post-delivery care, inter-pregnancy care and management strategies for the next pregnancy. This information will be shared with the patient. This information may be documented on a “form” that the patient and referring MD can view and keep.

7. NICU Transition to Home & Follow-up Program

Each Perinatal System will be responsible for the following activities:

- Retinopathy of Prematurity (ROP) Screening;
- Implementation of a Developmental Clinic for high risk newborns; and
- Assistance in accessing pediatric subspecialty care as needed.

8. Develop & Implement Agreements (MOU)

The Perinatal Center and its affiliates will need to develop and implement individual agreements that specify the relationship and reciprocal responsibilities that each will have. This is especially important when hospitals affiliate with more than one Perinatal Center. Frequency of visits and specific educational support will be determined by the needs of each affiliate hospital, and described in the agreement;

- Data sharing agreements must be part of MOU; and
- Perinatal Centers will provide training and support, but ultimate responsibility for patient care and outcomes will remain with individual hospitals

The MOU will need to address issues from both the perspective of the Perinatal Center and the Affiliate Hospitals.

The following are components that must be discussed in the MOU:

1) Regional Perinatal Centers:

- a) Coordination of regional meetings;
- b) Training (as specified in MOU) for affiliate hospitals;
- c) Annual visit to affiliate hospitals to evaluate outcomes and assist with quality assurance;
- d) Support services (as specified in MOU) to affiliate hospitals including transports; and
- e) Support for the transition of patients from specialists (MFM/neonatologists) to primary physicians.

2) Affiliate Hospitals:

- a) Compliance with state standards requirements;
- b) Collection of quality assurance data;
- c) Attendance and participation in regional meetings;
- d) Collaboration with perinatal centers and provision of data during annual visit to evaluate outcomes; and
- e) Collaboration with perinatal center related to transition home and back transports of shared patients.

References

1. Committee on Perinatal Health. (1976). Toward improving the outcomes of pregnancy, recommendations for the regional development of maternal and perinatal health services. White Plains, NY: March of Dimes National Foundation.
2. The American College of Obstetrics and Gynecology. (1975). Toward improving the outcome of pregnancy: Recommendations for the regional development of perinatal health services. *Journal of the American College of Obstetrics and Gynecologists*, 45(5), 375-384.
3. March of Dimes. (2011). Toward improving the outcome of pregnancy III. White Plains, NY: March of Dimes Foundation.
4. Neogi, S., Malhotra, S., Zodpey, S., Mohan, P. (2012). Does facility-based newborn care improve neonatal outcomes? A review of the evidence. *Indian Pediatrics*, 49, 651-658.
5. Lasswell, S., Barfield, W., Rochat, R., Blackmon, L. (2010). Perinatal regionalization for very low-birth-weight and very preterm infants, a meta-analysis. *The Journal of the American Medical Association*, 304(9), 992-1000.
6. Strobino, D., Grason, H., Koontz, A., Silver, G. (2000). Reexamining the organization of perinatal service systems: A preliminary report. Women's and Children's Policy Center, Baltimore, MD.
7. Lorch, S., Baiocchi, M., Ahlberg, C., Small, D. (2012). The differential impact of delivery hospital on outcomes of premature infants. *Pediatrics*, 130, 270-278.
8. Bode, M., O'Shea, M., Metzguer, K., Stiles, A. (2001). Perinatal regionalization and neonatal mortality in North Carolina, 1968-1994. *American Journal of Obstetrics and Gynecology*, 184(6), 1302-1307.
9. Wright J., Herzog, J., Shah M., Bonanno C., Lewin S., Cleary K., Simpson L., Gaddipati S., Sun X., D'Alton M., Devine, P. (2010). Regionalization of care for obstetric hemorrhage and its effect on maternal mortality. *Obstetrics & Gynecology*, 116(6), 1194-1200
10. Bronstein J., Capilouto E., Carlo W., Haywood, J., Goldenberg, R. (1995). Access to neonatal intensive care for low-birthweight infants: the role of maternal characteristics. *American Journal of Public Health*, 85(3), 357-361.
11. Haberland, C., Phibbs, C., Baker, L. (2006). Effect of opening midlevel neonatal intensive care units on the location of low birth weight births in California. *Pediatrics*, 118, e1667-e1679.
12. Staebler, S. (2011). Regionalized systems of perinatal care: health policy considerations. *Advances in Neonatal Care*, 11(1), 37-42.

13. Marlow, N., Gill, B. (2006). Establishing neonatal networks:
14. Hein, H. Regionalized perinatal care in North America. (2004). *Seminars in Neonatology* 9, 111-116.
15. United States Department of Health and Human Services. (2013). Healthy People 20/20: Maternal, Infant, and Child Health. Retrieved from:
<http://healthypeople.gov/2020/topicsobjectives2020/objectiveslist.aspx?topicId=26>
16. Indiana State Department of Health. (2013). Levels of Care Outcomes [PowerPoint Slides].
17. Committee on Fetus and the Newborn. (2012). Levels of neonatal care. *Pediatrics*, 130, 587-597.
18. Yu, V., Dunn, P. (2004). Development of regionalized perinatal care. *Seminars in Neonatology*, 9, 89-97.

Appendix A: Perinatal Centers Quality Measures

Perinatal Centers Quality Measures

Neonatal Measures							
				Report by Each Level of Care			
Metric	Definition	Numerator	Denominator	Level I ¹	Level II	Level III	Level IV
<u>N1. All neonatal interfacility transports</u>	Quality Measures identified in the <i>Indiana Perinatal Transport Standards</i>			E	E	E	E
<u>N2. Sentinel events</u>	<p>“A sentinel event is an unexpected occurrence involving death or serious physical or psychological injury, or the risk thereof. Serious injury specifically includes loss of limb or function. The phrase "or the risk thereof" includes any process variation for which a recurrence would carry a significant chance of a serious adverse outcome.”</p> <p>Reference: http://www.jointcommission.org/sentinel_event.aspx</p>	# of Sentinel Events		E	E	E	E
<u>N3. Mortality > 12 hours</u>	<p>Infants who did not die in the delivery room and who survived more than 12 hours after birth. If your patient is transferred to a higher level nursery, and dies there, the mortality is assigned to your hospital</p> <p>Reference: Vermont Oxford Network</p>	# of deaths	All admissions	E	E	E	E
<u>N4 Mortality < 12 hours</u>	Babies that die in the first 12 hours after delivery and who did not die in the delivery room	# of deaths	All births ≥ 22 weeks	E	E	E	E

¹ Level I is the well newborn nursery. If a hospital has a Level I and another Level NICU, data must be reported separately.

Perinatal Centers Quality Measures

Neonatal Measures							
				Report by Each Level of Care			
Metric	Definition	Numerator	Denominator	Level I ¹	Level II	Level III	Level IV
<u>N5. Any respiratory support at 36 weeks</u>	VLBW infants either continuously or intermittently receiving supplemental oxygen at 36 weeks gestational age or discharged to home before 36 weeks on oxygen. Reference: Baby Monitor/Vermont Oxford	# VLBW infants who meet Vermont Oxford criteria for “Chronic Lung Disease” and/or “Oxygen at Discharge”	All VLBW survivors to age 36 weeks GA or discharge	NA	E	E	E
<u>N6. Late Onset Sepsis/ Bacteremia</u>	A positive blood culture, obtained in the presence of compatible clinical signs of septicemia, occurring after 72 hours, and treated with antibiotics for ≥ 5 days. Includes culture positive episodes in which the infant dies before an intended therapy of five or more days is completed. Vermont Oxford	All infants diagnosed with late onset sepsis as per VON criteria	All admissions	NA	E	E	E
<u>N7. Hypothermia on admission</u>	Axillary temperature less than 36 degrees centigrade within 60 minutes after birth. Reference: Bhatt, White, et al., <i>J Perinatal</i> 2007;27:S45-47, Reference: Baby Monitor	All infants with Temperature <36.0°C	All admissions with temperature measurement in the first hour	E	E	E	E

Perinatal Centers Quality Measures

Neonatal Measures							
				Report by Each Level of Care			
Metric	Definition	Numerator	Denominator	Level I ¹	Level II	Level III	Level IV
<u>N8(a). Babies weighing < 1500 gms at birth discharged on own mother's milk</u>	Babies weighing <1500 grams at birth discharged on any amount of own mother's milk	# of babies weighing <1500 grams at birth discharged on any mother's milk	# of babies weighing < 1500 grams at birth discharged to home	NA	E	E	E
<u>N8(b) All other babies with own Mother's milk at discharge</u>	Babies weighing >1500 grams at birth who were exclusively breastfed or who were fed formula in addition to own mother's milk at discharge.	# of babies weighing >1500 grams who were fed only own mother's milk and # of babies who were fed own mother's milk and formula.	# of babies who were eligible for breastfeeding. Babies who were stillborn, born, pre-term or twins are not included.	E	E	E	E
<u>N9. Any additional event identified by hospital staff</u>				E	E	E	E

Perinatal Centers Quality Measures

Obstetric Measures						
Metric	Definition	Numerator	Denominator	Level I	Level II	Level III
<u>OB1. Maternal death</u>	For reporting purposes, a pregnancy-related death is defined as the death of a woman while pregnant or within 1 year of pregnancy termination—regardless of the duration or site of the pregnancy—from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes. Reference: http://www.cdc.gov/reproductivehealth/maternalinfanthealth/pmss.html	# of patients who meet the criteria	All patients who deliver	E	E	E
<u>OB2. Sentinel event</u>	A sentinel event is an unexpected occurrence involving death or serious physical or psychological injury, or the risk thereof. Serious injury specifically includes loss of limb or function. The phrase, 'or the risk thereof' includes any process variation for which a recurrence would carry a significant chance of a serious adverse outcome. Reference: http://www.jointcommission.org/sentinel_event.aspx	# of Sentinel Events		E	E	E
<u>OB3. Maternal interfacility transports</u>	Quality Measures identified in the <i>Indiana Perinatal Transport Standards</i>			E	E	E
<u>OB4. Ruptured uterus</u>	Uterine rupture typically is classified as either complete (all layers of the uterine wall separated) or incomplete (uterine muscle separated but visceral	# of women who meet the criteria	All deliveries	E	E	E

Perinatal Centers Quality Measures

Obstetric Measures						
Metric	Definition	Numerator	Denominator	Level I	Level II	Level III
	peritoneum is intact). Incomplete rupture is also commonly referred to as uterine dehiscence. Reference: Williams Obstetrics					
OB5. <u>5 minute APGAR <4</u>		Babies with an Apgar <4 at 5 minutes	All deliveries	E	E	E
OB6. <u>Elective delivery without medical indication <39 0/7 weeks gestation</u>	Elective deliveries without medical indications that are performed before 39 0/7 weeks. Web Link to ISDH/IPQIC Guidelines to Reduce Early Elective Deliveries, January 2014	All deliveries without medical indication less than 39 0/7weeks	All deliveries under 39 0/7weeks	E	E	E
OB7. <u>Delivery at >41 6/7 weeks</u>		# of deliveries that meet the criteria of >41 6/7 weeks	All deliveries	E	E	E
OB8. <u>Fetal demise at >20 0/7 weeks</u>	Fetal death” means death prior to the complete expulsion or extraction from its mother of a product of human conception, irrespective of the duration of pregnancy, and which is not induced termination of pregnancy. The death is indicated by the fact that after such expulsion or extraction, the fetus does not breathe or show any other evidence of life, such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles. Heartbeats are to be distinguished from transient cardiac contractions; respirations are	Number of fetal deaths	All deliveries	E	E	E

Perinatal Centers Quality Measures

Obstetric Measures						
Metric	Definition	Numerator	Denominator	Level I	Level II	Level III
	to be distinguished from fleeting respiratory efforts or gasps.” Reference: http://www.cdc.gov/nchs/data/misc/itop97.pdf ACOG Practice Bulletin #102 (March 2009)					
<u>OB9. Deaths in the delivery room</u>	Deaths that occur after birth and before admission to the nursery.	All deaths that meet the definition	All deliveries	E	E	E
<u>OB 10. Antenatal Steroid Administration</u>	Antenatal corticosteroids administration to pregnant women between 24 weeks of gestation and 34 weeks of gestation who are at risk of preterm delivery within 7 days Reference: <i>ACOG Practice Bulletin #127, June 2012</i>	Women who delivered between 24 weeks of gestation and 34 weeks of gestation, who received at least one dose of antenatal corticosteroid, at least 12 hours prior to the delivery	All preterm deliveries between 24 weeks of gestation and 34 weeks of gestation	E	E	E
<u>OB11. Any additional event identified by hospital staff</u>				E	E	E

Appendix B: Transport Quality Measures

Standard II: Maternal-Fetal Quality Assurance

2.1 In addition to complying with all reports and records rules in 836 IAC 1-1-5, the certified provider of the Maternal Fetal Transport Program shall track the following benchmarks:

- a. Delivery \leq 30 minutes from arrival at receiving hospital;
- b. Diversion of transport due to maternal and or fetal status change in route;
- c. Incidence of loss of communication with medical control for anything longer than 5 minutes;
- d. Change in transport asset (ground to air or vice versa);
- e. Delivery in route;
- f. Incidence of sentinel events;
- g. Transport crew member injury during transport;
- h. Any reason for transport delay:
 - i. Accident—Motor Vehicle Ambulance, flight;
 - ii. Delay in unscheduled transport dispatch time is \geq 15 minutes;
 - iii. Delay in unscheduled transport enroute time is \geq 15 minutes;
 - iv. Mechanical failure of ambulance or aircraft that leads to a transport delay;
 - v. Equipment failure;
 - vi. Weather or road related (constructions, accidents) issues;
 - vii. Crew member;
- h. Maternal fetal injury during transport; and
- i. Maternal and or fetal status deemed unstable for transport at sending facility.

2.2 When a sentinel event occurs, the perinatal transport team, medical director, and medical control physician must have a debrief. The debrief must be initiated within 72 hours and the root cause analysis completed within 5 working days.

2.3 Teams are required to have a pre-transport briefing regarding the patient(s) condition prior to assuming care of the patient(s).

2.4 Each perinatal transport team shall have written internal quality review procedures/protocols.

2.5 Each hospital with an perinatal transport team shall implement a routine schedule of Quality Improvement meetings and a record of minutes maintained.

2.6 Transport teams must conduct quarterly reviews of the following elements and maintain documentation of the reviews in compliance with 836 IAC 1-1-5(c):

- a) Transport indication(s);
- b) Medical and/or nursing intervention performed or maintained;
- c) Time of intervention:
 - a. patient response to interventions; and
 - b. appropriateness of intervention performed or omission of needed

Standard II: Maternal-Fetal Quality Assurance

intervention

- d) Patient outcome at arrival of destination;
- e) Patient's change in condition during transport;
- f) Timeliness and coordination of the transport from reception of request to lift off or ambulance enroute time;
- g) Review of Pre-transport inspection documentation
- h) Safety practices documented;
- i) Operational criteria:
 - a. number of completed transports;
 - b. number of aborted or canceled flights/transports due to weather;
 - c. number of aborted or canceled flights/transports due to maintenance;
 - d. number of aborted or canceled flights/transports due to patient condition and alternative modes of transportation; and
 - e. number of aborted or canceled flights/transports due to unavailable team.
- j) Communications center or organization must monitor and track:
 - a. Instrument Flight Rules (IFR)/Visual Flight Rules (VFR);
 - b. Weather at time of request of the referring and accepting facility and during transport if changes occur;
 - c. Transport acceptance to lift off times or the road times; and
 - d. All aborted and cancelled transport requests - times, reasons and disposition of patients as applicable.

Standard VI: Neonatal Quality Assurance

6.1 In addition to complying with all reports and records rules in 836 IAC 1-1-5, the Certified Provider of the Neonatal Transport Program shall track the following benchmarks:

- a) Unplanned dislodgement of therapeutic devices;
- b) Radiograph verification of tracheal tube placement;
- c) Average mobilization time of transport team;
- d) First attempt tracheal tube placement success:
 - a. visualizations;
 - b. attempts at placement;
- e) Rate of transport-related patient injuries;
- f) Rate of medication administration errors;
- g) Rate of CPR performed during transport;
- h) Incidence of sentinel events;
- i) Unintended neonatal hypothermia upon arrival to destination;

Standard VI: Neonatal Quality Assurance

- j) Transport crew injury during transport; and
- k) Standardized patient care hand-off performed (site specific protocol used).

6.2 When a sentinel event occurs, the neonatal transport team, medical director, and medical control physician must have a debrief that is initiated within 72 hours and the root cause analysis completed within 5 working days.

6.3 Teams are required to have a pre-transport briefing regarding the patient(s) condition prior to assuming care of the patient(s).

6.4 Each perinatal transport team shall have written internal quality review procedures/protocols.

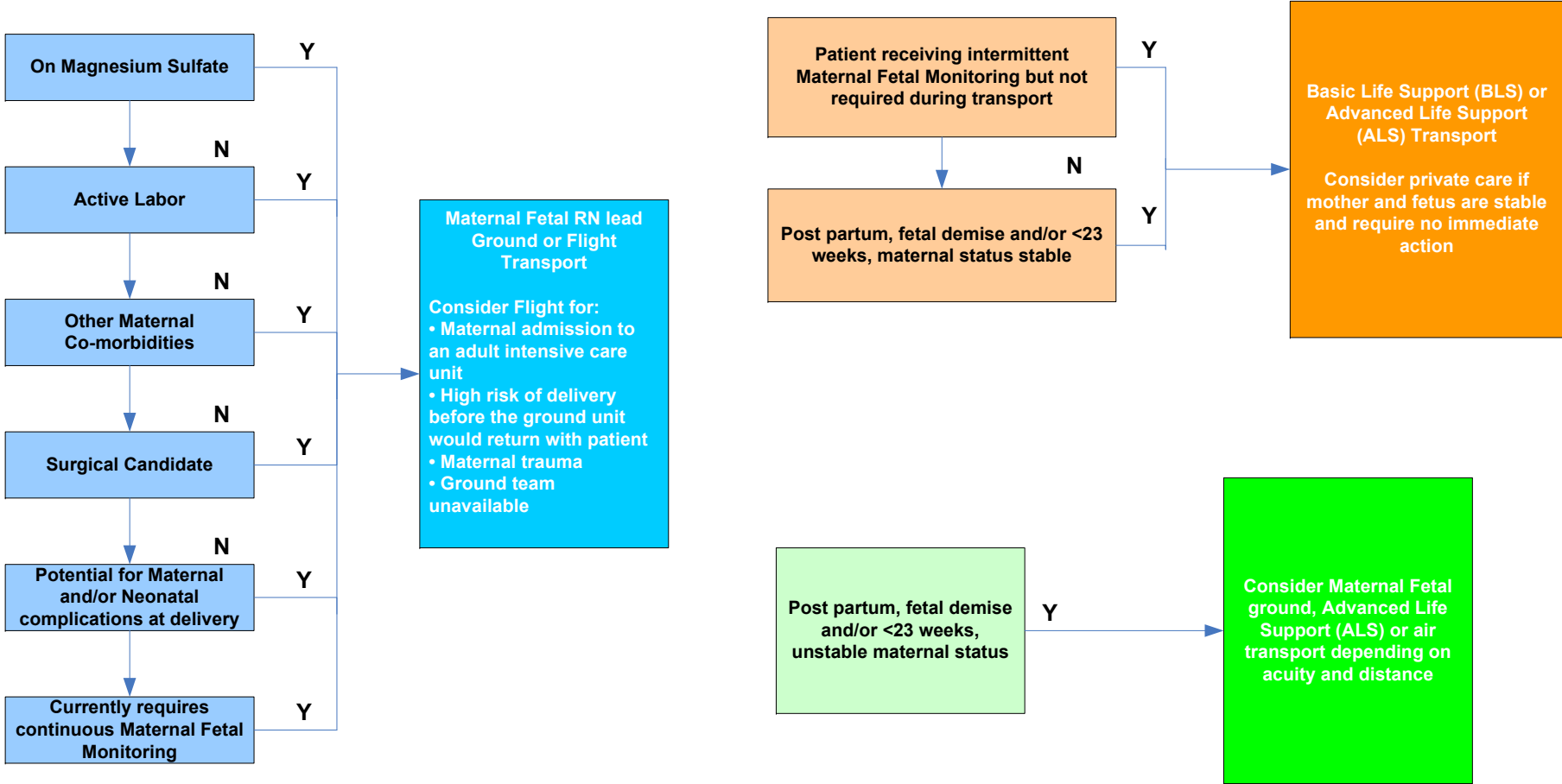
6.5 Each hospital with a neonatal transport team shall implement a routine schedule of Quality Improvement meetings and a record of minutes maintained.

6.6 The neonatal transport team conducts a Quarterly Review of the following elements and maintain documentation of the reviews in compliance with 836 IAC 1-1-1-5(c):

- A. Reason for transport;
- B. Mechanism of illness;
- C. Medical intervention performed or maintained;
- D. Time of intervention consistently documented for:
 - a. patient response to interventions; and
 - b. appropriateness of intervention performed or omission of needed intervention;
- E. Patient outcome at arrival of destination;
- F. Patient's change in condition during transport;
- G. Timeliness and coordination of the transport from reception of request to lift off or ambulance enroute time;
- H. Pre-transport check of ambulance by EMT on Transport records;
- I. Operational criteria to include, at a minimum, the following quality indicators:
 - a. number of completed transports;
 - b. number of aborted or canceled flights/transports due to weather;
 - c. number of aborted or canceled flights/transports due to maintenance;
 - d. number of aborted or canceled flights/transports due to patient condition and alternative modes of transport;
- J. Communications Center of organization must monitor and track:
 - e. Instrument Flight Rules (IFR)/Visual Flight Rules (VFR)
 - f. weather at time of request and during transport if changes occur; and
 - g. all aborted and canceled transport requests - times, reasons and disposition of patients as applicable.

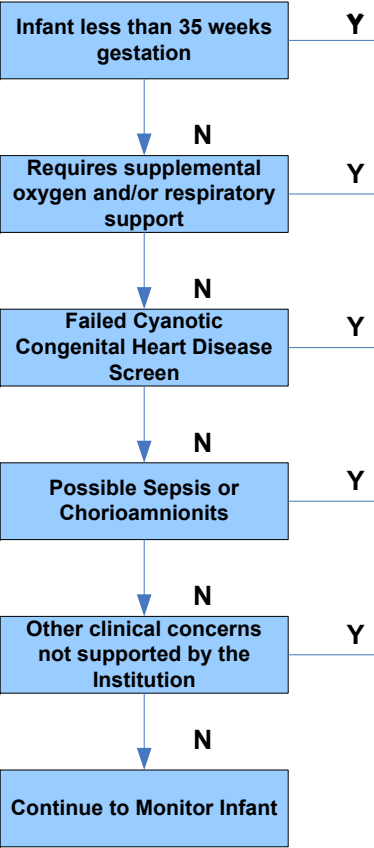
Appendix C: Transport Algorithms

Draft Maternal Fetal Transport Algorithm
October 2013
≥ 23 Weeks with Viable Fetus

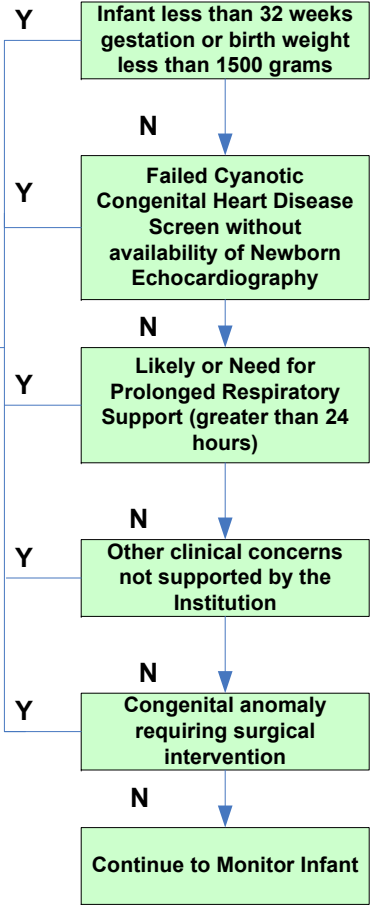


**Draft Neonatal Transport Algorithm
October 2013**

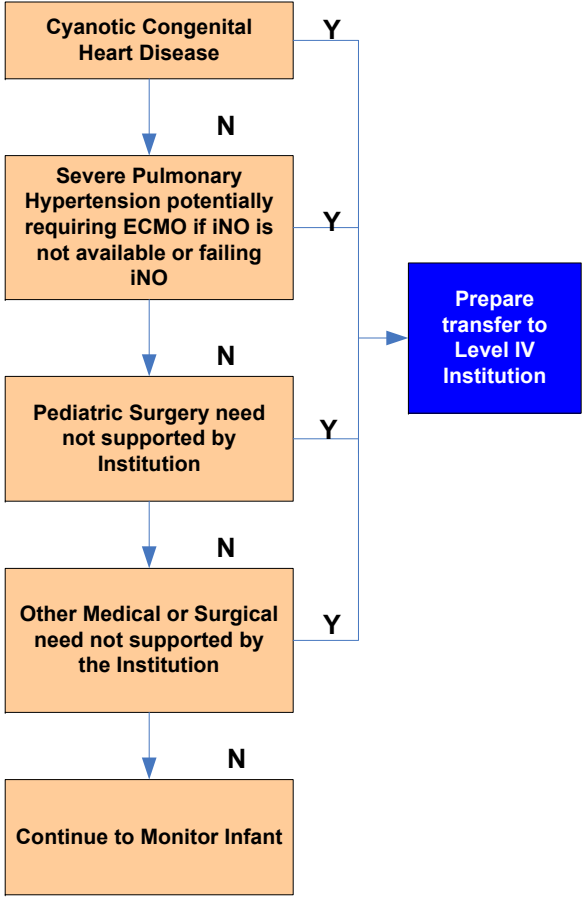
LEVEL I NURSERY



LEVEL II NURSERY



LEVEL III NURSERY



Prepare infant for transfer to Level III or Level IV Institution

Prepare transfer to Level IV Institution

Appendix D: Shared Patient Responsibilities

SUMMARY OF RECOMMENDATIONS FOR ANTEPARTUM CARE AFTER HOSPITALIZATION

Patient Name:	Gestational Age:
Sending Hospital:	Date of Discharge:
Primary Physician:	
Phone Number for any Questions (24/7):	
Receiving Hospital:	
Primary Physician:	Contact Information:
Diagnosis at Discharge:	Medications at Discharge:
Antepartum Surveillance Frequency Recommendations:	Frequency of Prenatal Visits:
<input type="checkbox"/> BPP: _____ <input type="checkbox"/> NST: _____ <input type="checkbox"/> Growth Ultrasound: _____ <input type="checkbox"/> Cervical Length: _____	<input type="checkbox"/> Primary OB: _____ ○ Next Appointment: _____ <input type="checkbox"/> Tertiary Center: _____ ○ Next Appointment: _____
Delivery Timing:	Delivery Route:
	<input type="checkbox"/> Cesarean <input type="checkbox"/> Vaginal <input type="checkbox"/> Operative Vaginal
Delivery Site:	Additional Recommendations:
<input type="checkbox"/> Local Hospital <input type="checkbox"/> Tertiary (or higher level) center)	

SUMMARY OF RECOMMENDATIONS FOR NICU PATIENTS AT DISCHARGE

Patient Name:	Gestational age at birth:
	Gestational age at discharge:
Hospital:	Date of Discharge:
Discharge Physician:	
Phone Number for any Questions:	Email:
Primary Physician:	Contact Information:
BW _____ % LT _____ HC _____ % _____ DC WT _____ % LT _____ HC _____ % _____ Main (Active) Discharge Diagnoses:	Medications at Discharge:
FEEDING INSTRUCTIONS:	IMMUNIZATIONS GIVEN (if any):
FOLLOW UP APPOINTMENTS:	HOME HEALTH CARE FOLLOW UP: (name of agency/frequency of visits ordered)
	ADDITIONAL RECOMMENDATIONS:

Appendix E: Annotated Bibliography

1. Bode, M. O'Shea, M., Metzguer, K., Stilies, A. (2001). Perinatal regionalization and neonatal mortality in North Carolina, 1968-1994. *American Journal of Obstetric Gynecology*, 184(6), 1302-1307.

Bode et al. study the trends of neonatal mortality in a changing health delivery environment in North Carolina from 1969-1994. Authors analyzed the number of weighing 500-1500 g, what level of hospital they were born in, and whether there was a correlation in where they were born and the mortality rates. Authors conclude the likelihood of very low birth weight neonates being born outside level III hospitals decreased by an average of 24 percent from 1968-1994 and after 1974 birth in a hospital with level III services was associated with a reduced rate of mortality.

2. Bridgman Perkins, B. (1993). Rethinking Perinatal Policy: History of Evaluation of Minimum Volume and Level-of-Care Standards. *Journal of Public Health Policy*, 14(3), 299-319.

Bridgman Perkins gives the historical origins of perinatal standards in the United States from the 1930s through the 1970s. The author details the change in opinions beginning in the 1980s as the health care system in the United States became more competitive in nature. The paper notes that the discrepancy between the research findings and changes in the delivery of care continues to be problematic from a financial standpoint.

3. Committee on Fetus and the Newborn. (2012). Levels of neonatal care. *Pediatrics*, 130, 587-597.

“Levels of neonatal care,” is an updated policy statement that reviews levels of care for neonates in the United States since the 2004 policy statement by the American Academy of

Pediatrics (AAP). Authors present new data since the 2004 AAP statement which largely support a well-defined regional system of perinatal care. The statement provides standards for health outcomes data comparisons, standardized definitions for public health, and standardized definitions for healthcare providers who provide neonatal care in the United States.

4. Clement, M. (2005). Perinatal Care in Arizona 1950-2002: A Study of the Positive Impact of Technology, Regionalization and the Arizona Perinatal Trust. *Journal of Perinatology*, 25, 503-508.

Clement describes the changes in perinatal care in Arizona from 1950-2002 and its positive impact on neonatal outcomes. The paper measures these outcomes quantitatively by analyzing birth and death records in 1950 and 2002 in order to report the change in mortality rate over time. Clement acknowledges a significant reduction in neonatal mortality rates over the past 50 years which he attributes to both advancement in technology and health policy developed to reduce infant mortality and disparities in the state.

5. Hein, H. (2004). Regionalized perinatal care in North America. *Seminars in Neonatology*, 9, 111-116.

In this paper, Hein details the status of regionalized perinatal health care in North America using the Iowa regionalization model. He reviews the history and evolution of regionalization in the 1960s and 1970s and the role of the March of Dimes in setting the first set of national guidelines for regionalized perinatal systems of care. In conclusion, Hein makes suggestions for controlling the impact of managed care on regionalization and quality perinatal care and makes a case for maintaining a regionalized system and prioritizing utilizing outcome data when making policy decisions.

6. Philip, A. (2005). The evolution of neonatology. *Pediatric Research*, 58(4), 799-815.

Philip gives a history of the practice of neonatology in the United States beginning with first meeting of the perinatal section of the American Academy of Pediatrics in 1975. Philip surveys the important innovations in technology which coincided with the subspecialty practice. In conclusion, Philip notes that the change and improvement in neonatal care in the United States as “remarkable” despite the fact that challenges still exist in the field of modern neonatology.

7. The American College of Obstetrics and Gynecology. (1975). Toward improving the outcome of pregnancy: Recommendations for the regional development of perinatal health services. *Journal of the American College of Obstetrics and Gynecologists*, 45(5), 375-384.

This policy statement, which was published by the American College of Obstetricians and Gynecologists in 1975, is the first recommendation for a regionalized system of perinatal care. The document outlines the hospital levels of care and the basic requirements of each level for optimal care. The document further outlines recommendations for communication, collaboration, and referral networks that must exist in a functional system. The final recommendation in this document acknowledges the financial burden to the higher level designated hospitals and patient number minimums for each level.

8. March of Dimes. (2010). Toward Improving the Outcome of Pregnancy III. [PDF] Retrieved from: <http://www.marchofdimes.com/materials/toward-improving-the-outcome-of-pregnancy-iii.pdf>

Toward Improving the Outcome of Pregnancy III (TIOP III) is a toolkit which intends to guide practitioners and policy makers in improving the quality, safety, and performance in the

sphere of perinatal care. TIOP III distinguishes itself from the previous TIOPs by focusing on the application of evidence based practice and acknowledging the importance of a woman's health throughout her life-course and its impact on a healthy pregnancy.

9. Staebler, S. (2011). Regionalized Systems of Perinatal Care. *Advances in Neonatal Care*, 11(1), 37-42.

Staebler presents options for policies on regionalization of perinatal care from a “doing nothing” (p. 39) approach to a state or federally mandated regionalized system of care. A “deregulation” (p. 37) of neonatal services occurred in the United States as the number of neonatologists and NICUs grew beyond geographical need and hospitals began operating under a more competitive model. The four policy options Staebler presents are no standardization, organizational/individual health system standardization, incremental changes at the state or federal levels, and formal regionalization. While the author gives the pros and cons of each option, she recommends option four, formal regionalization, as it “has the potential to decrease unnecessary duplication of services...improve morbidity and mortality, decrease costs, and promote better utilization of limited workforce personnel” (p. 41).

10. Shaffer, E. (2001). State Policies and Regional Neonatal Care: Progress and Challenges 25 Years After *TIOP*. [PDF] Retrieved from: <http://www.equalhealth.info/wp-content/uploads/Final-NICU-Report.pdf>

This study, completed for the March of Dimes, is the results of a survey of state health departments and of literature on perinatal systems and their operation in the United States. The study includes current, by state, (as of the writing of the report) terminology for neonatal intensive care unit (NICU) levels, policy for defining NICU levels of care, and its enforcement,

as well as how the systems have changed or are currently changing. Major findings of the study include: substantial variation among states on levels of care definitions, little public knowledge of NICU levels, and disparate opinions exist among facilities and staff on NICU levels.

11. Yu, V. Y.H., Dunn, P. M. (2004). Development of regionalized perinatal care. *Seminars in Neonatology*, 9, 89-97.

Yu and Dunn present a brief history of regionalized perinatal care in Canada, the United Kingdom, Australia, and the United States. The authors conclude that while regionalizing perinatal care has great benefits in birth outcomes in all countries studied, there is commonality in problems that arise when attempting to institutionalize a system of care. Additionally, authors further conclude that while developing and maintaining regionalized perinatal care is a difficult task, it can be achieved once the multidisciplinary teams and institutions are able to reach a common vision for the health of the population.

12. Van Mullen, C. Conway, A., Mounts, K., Weber, D., Browning, C. (2004). Regionalization of perinatal care in Wisconsin: A changing health care environment. *Wisconsin Medical Journal*, 103(5), 35-38.

Van Mullen et al. describe changes in perinatal health delivery structure in Wisconsin and the results of an increase in NICUs and neonatologists since the 1970s. This paper is a product of a series of meetings initiated by the Wisconsin Association for Perinatal Care (WAPC) in order to discuss the changing perinatal health environment and worsening of perinatal outcomes in the state. The authors conclude that the competitive health marketplace and lack of coordinated services have “led to the unnecessary duplication of services within a single community or geographic region, with the potential fragmentation and decreased coordination of

History of Perinatal Regionalization
Annotated Bibliography

care resulting in potential fragmentation and decreased coordination of care resulting in increased patient morbidity and mortality, as well as increased cost” (p. 37). The WAPC will continue to review the status of the state’s regionalization of perinatal care including implementing designations for standard levels of care and defining perinatal outcomes with a focus on quality of care.



Appendix F: Infant Mortality Maps



INFANT MORTALITY

INDIANA 2012

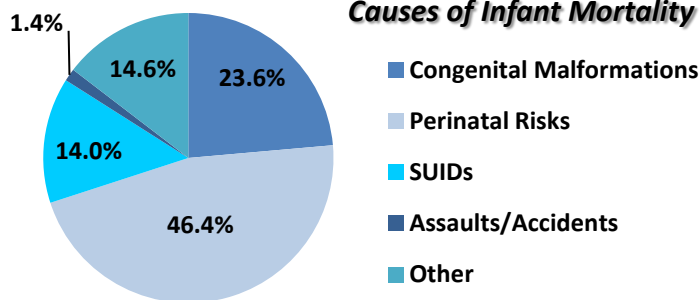
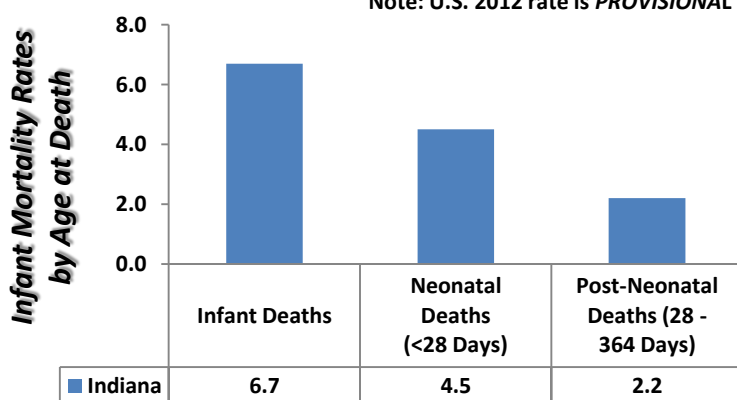
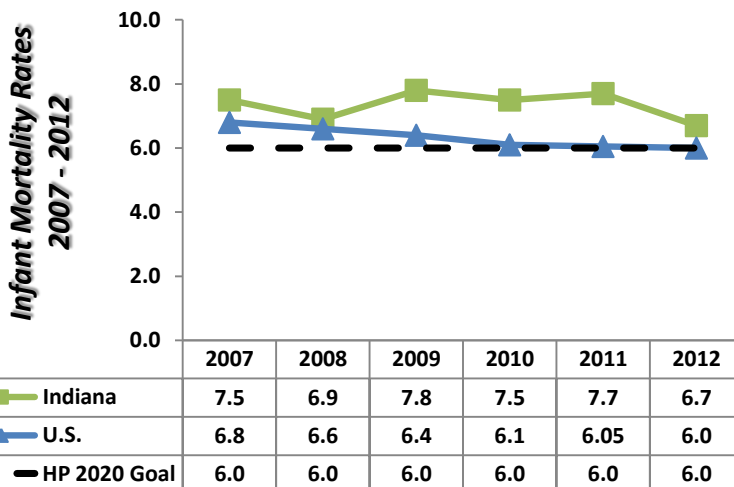
For more information on infant mortality in your area, please see the Indiana State Department of Health Mortality Report, Tables 2 and 8 (<http://www.in.gov/isdh/reports/mortality/2012/toc.htm>)

HOSPITAL REGION	IMR
CENTRAL Brown, Hamilton, Hancock, Hendricks, Johnson, Lawrence, Marion, Monroe, Morgan, Shelby	6.1
CENTRAL SOUTHWESTERN Clay, Greene, Owen, Parke, Putnam, Sullivan, Vermillion, Vigo	6.2*
EASTERN Blackford, Delaware, Grant, Henry, Howard, Jay, Madison, Randolph, Tipton	6.5
MIDWESTERN Cass, Fulton, Jasper, Miami, Newton, Pulaski, Starke, White	9.7
NORTHEASTERN Adams, Allen, DeKalb, Huntington, Kosciusko, LaGrange, Noble, Steuben, Wabash, Wells, Whitley	5.4
NORTHERN Elkhart, LaPorte, Marshall, St. Joseph	7.6
NORTHWESTERN Lake, Porter	8.4
SOUTHEASTERN Dearborn, Decatur, Fayette, Franklin, Ohio, Ripley, Rush, Union, Wayne	8.2
SOUTHERN Bartholomew, Clark, Crawford, Floyd, Harrison, Jackson, Jefferson, Jennings, Orange, Scott, Switzerland, Washington	6.4
SOUTHWESTERN Daviess, Dubois, Gibson, Knox, Martin, Perry, Pike, Posey, Spencer, Vanderburgh, Warrick	6.8
WESTERN Benton, Boone, Carroll, Clinton, Fountain, Montgomery, Tippecanoe, Warren	6.7

*Numerator less than 20, rate unstable.

INFANT MORTALITY FACTS

- Infant mortality is defined as the death of a baby before his or her first birthday
- The infant mortality rate (IMR) is the number of babies who die in the first year of life, per 1,000 live births
- If Indiana had the same rate of infant deaths as the national average, 56 more babies would have survived in 2012
- Black infants are 2.7 times more likely to die than white infants in Indiana



PRACTICES TO REDUCE INFANT MORTALITY

- Improve overall health for women of child-bearing age
- Promote early & adequate prenatal care
- Decrease early elective deliveries before 39 weeks
- Decrease prenatal smoking & substance abuse
- Promote safe sleep practices
- Increase breastfeeding duration & exclusivity
- Support birth spacing & interconception wellness



BIRTH OUTCOME INDICATORS

INDIANA 2012

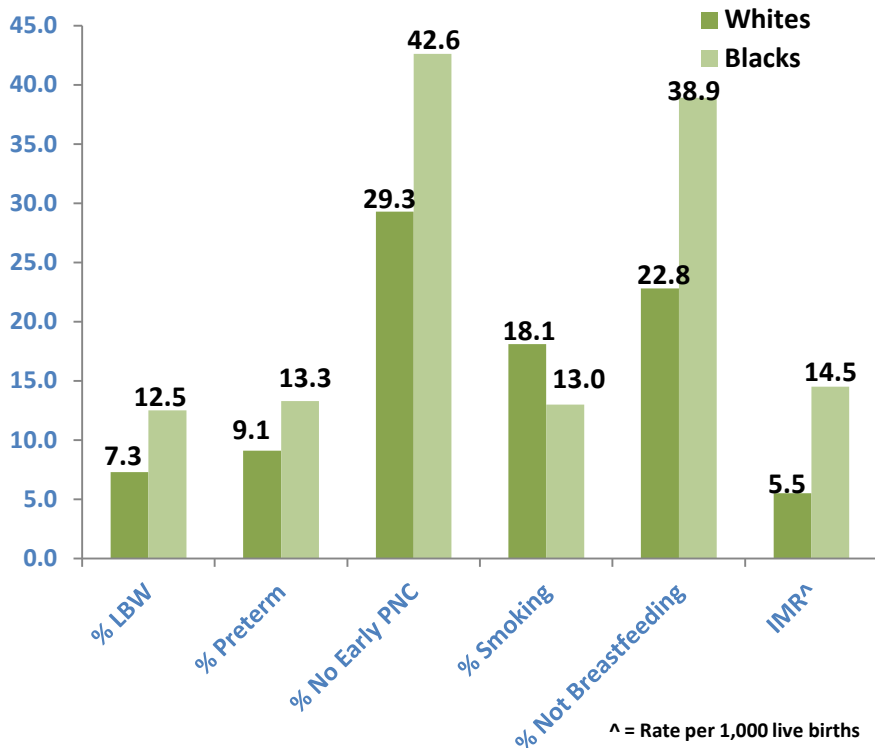
For more information on birth outcomes in your area, please see the Indiana State Department of Health Natality Report (<http://www.in.gov/isdh/reports/natality/2012/toc.htm>)

INDIANA QUICK FACTS

- 83, 250 live births:
 - 81.5% White
 - 12.1% Black
 - 90.4% Non-Hispanic
 - 9.5% Hispanic
- Better LBW rate compared to the nation
- Smoking rates among pregnant women are always one of the nation's worst
- Almost 1/3 of pregnant women do not receive early PNC

DISPARITIES IN INDIANA

- Black women in Indiana are more likely to have a LBW or preterm baby & not get early PNC
- Black women in Indiana are less likely to breastfeed at hospital discharge
- White women in Indiana are more likely to smoke during pregnancy



LBW = Low Birthweight PNC = Prenatal Care
IMR = Infant Mortality Rate NC= No Comparable Measure

	% LBW (< 2,500 G)	% PRETERM (<37 WKS GESTATION)	% NO EARLY PNC (1 ST TRIMESTER)	% SMOKING	% NOT BREASTFEEDING
Northwestern	8.5 7.6% Higher	10.6 10.4% Higher	30.1 4.7% Lower	10.9 33.9% Lower	31.3 28.3% Higher
Northern	7.7 2.5% Lower	9.2 4.2% Lower	37.6 19.0% Higher	16.4 0.6% Lower	18.1 25.8% Lower
Northeastern	7.7 2.5% Lower	9.2 4.2% Lower	45.5 44.0% Higher	14.3 13.3% Lower	19.2 21.3% Lower
Midwestern	7.9 No difference	9.0 6.3% Lower	33.3 5.4% Higher	23.4 41.8% Higher	28.4 16.4% Higher
Western	6.9 12.7% Lower	9.0 6.3% Lower	25.8 18.4% Lower	17.8 7.9% Higher	23.5 3.7% Lower
Eastern	8.7 10.1% Higher	9.9 3.1% Higher	26.6 15.8% Lower	24.7 49.7% Higher	32.3 32.4% Higher
Central Southwestern	7.1 10.1% Lower	8.1 15.6% Lower	30.3 4.1% Lower	23.7 43.6% Higher	31.6 29.5% Higher
Central	8.0 1.3% Higher	9.7 1.0% Higher	29.5 6.6% Lower	13.6 17.6% Lower	21.7 11.1% Lower
Southeastern	7.6 3.8% Lower	9.3 3.1% Lower	28.6 9.5% Lower	22.7 37.6% Higher	32.8 34.4% Higher
Southwestern	8.0 1.3% Higher	10.5 9.4% Higher	24.9 21.2% Lower	19.8 20.0% Higher	26.3 7.8% Higher
Southern	7.8 1.3% Lower	9.5 1.0% Lower	27.7 12.3% Lower	19.2 16.4% Higher	26.8 9.8% Higher
Indiana	7.9	9.6	31.6	16.5	24.4
United States	8.0	NC	25.9	8.7	22.5

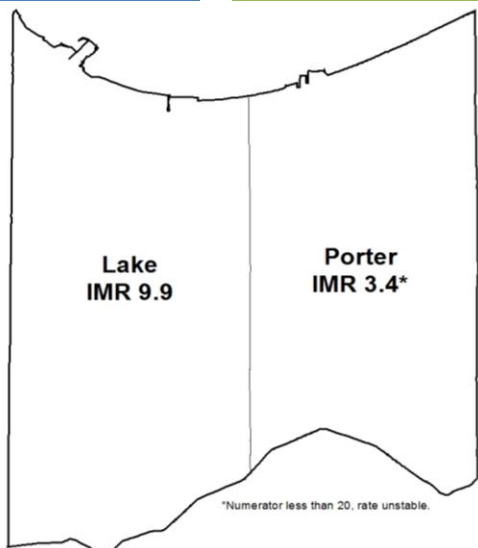
*Bottom number is percent difference from State.



INFANT MORTALITY

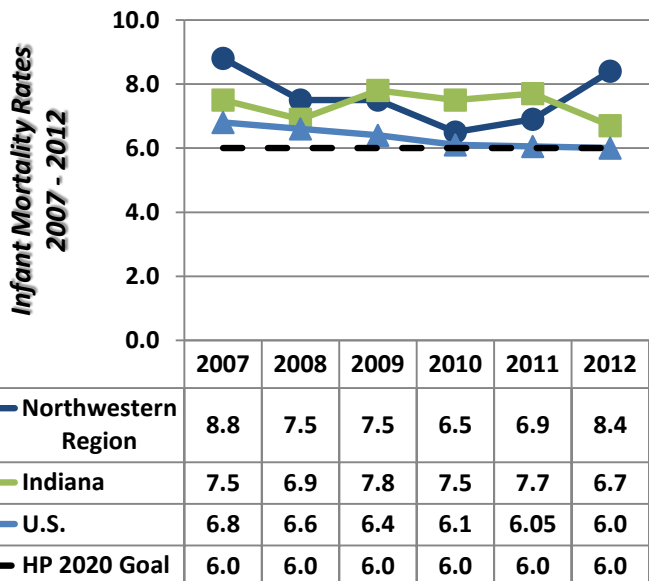
NORTHWESTERN HOSPITAL REGION 2012

For more information on infant mortality in your area, please see the Indiana State Department of Health Mortality Report, Tables 2 and 8 (<http://www.in.gov/isdh/reports/mortality/2012/toc.htm>)

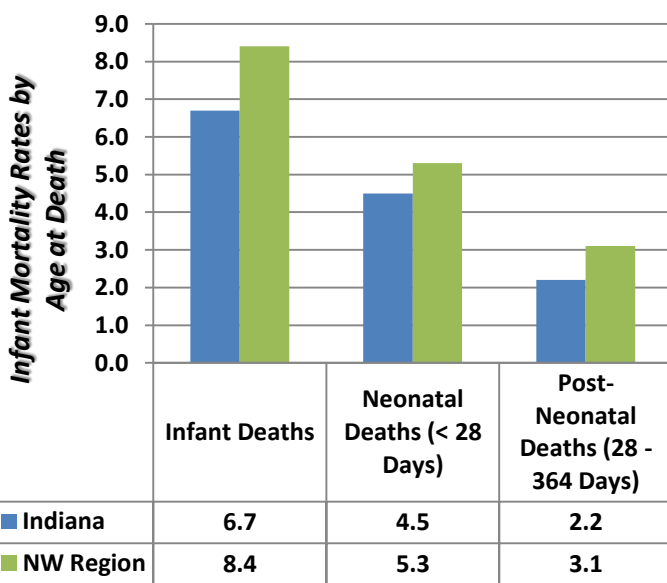


INFANT MORTALITY FACTS

- Infant mortality is defined as the death of a baby before his or her first birthday
- The infant mortality rate (IMR) is the number of babies who die in the first year of life, per 1,000 live births
- Of the 556 Indiana infant deaths in 2012, 65 occurred in the Northwestern Region
- Black infants are 2.7 times more likely to die than white infants in Indiana and 1.9 times more likely in the Northwestern Region



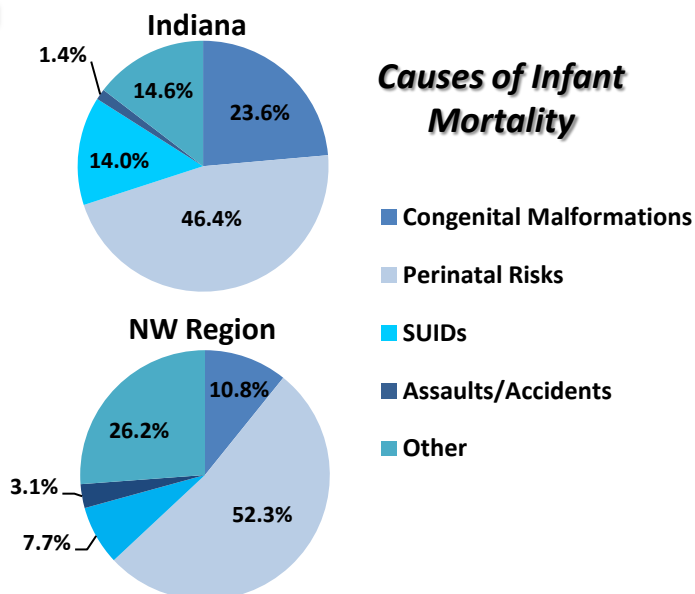
Note: U.S. 2012 rate is *PROVISIONAL*



PRACTICES TO REDUCE INFANT MORTALITY

- Improve overall health for women of child-bearing age
- Promote early & adequate prenatal care
- Decrease early elective deliveries before 39 weeks
- Decrease prenatal smoking & substance abuse
- Promote safe sleep practices
- Increase breastfeeding duration & exclusivity
- Support birth spacing & interconception wellness

Causes of Infant Mortality





BIRTH OUTCOME INDICATORS

NORTHWESTERN HOSPITAL REGION 2012

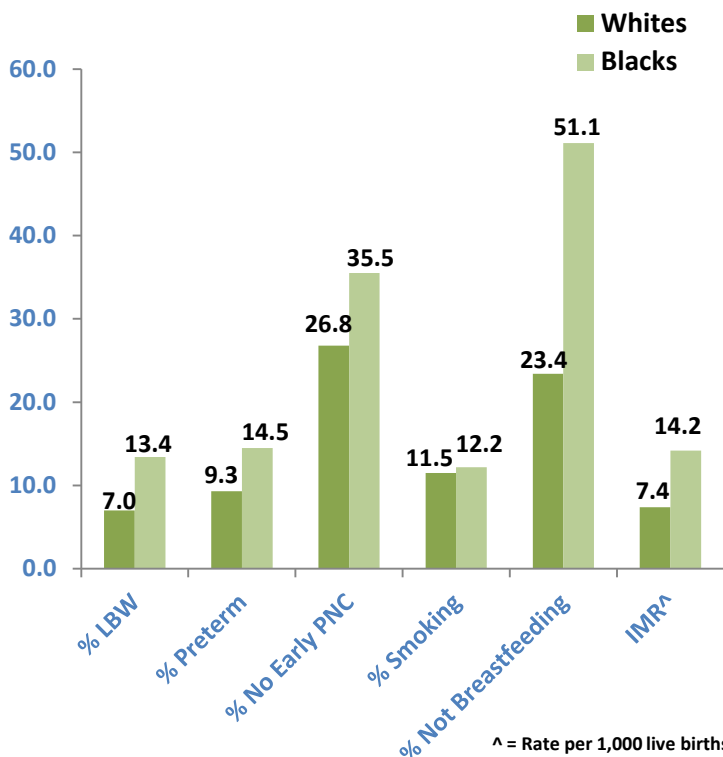
For more information on birth outcomes in your area, please see the Indiana State Department of Health Natality Report, Table 32 (<http://www.in.gov/isdh/reports/natality/2012/toc.htm>)

INDIANA QUICK FACTS

- Smoking rates among pregnant women are always one of the nation's worst
- Almost 1/3 of pregnant women do not receive early PNC
- Black women in Indiana are more likely to have a LBW or preterm baby & not get early PNC
- White women in Indiana are more likely to smoke during pregnancy

NORTHWESTERN REGION QUICK FACTS

- Higher rate of LBW & preterm babies than Indiana
- Higher percentage of women receiving early PNC
- Lower rate of women smoking during pregnancy
- Fewer women breastfeeding at hospital discharge



LBW = Low Birthweight
PNC = Prenatal Care
IMR = Infant Mortality Rate

	% LBW (< 2,500 G)	% PRETERM (< 37 WKS GESTATION)	% NO EARLY PNC (1 ST TRIMESTER)	% SMOKING	% NOT BREASTFEEDING
LAKE	8.8 11.4% Higher	10.9 13.5% Higher	32.2 1.9% Higher	10.7 35.2% Lower	35.3 44.7% Higher
PORTER	7.5 5.1% Lower	9.8 2.1% Higher	22.8 27.8% Lower	11.4 30.9% Lower	18.1 25.8% Lower
NORTHWESTERN REGION	8.5 7.6% Higher	10.6 10.4% Higher	30.1 4.7% Lower	10.9 33.9% Lower	31.3 28.3% Higher
INDIANA	7.9	9.6	31.6	16.5	24.4

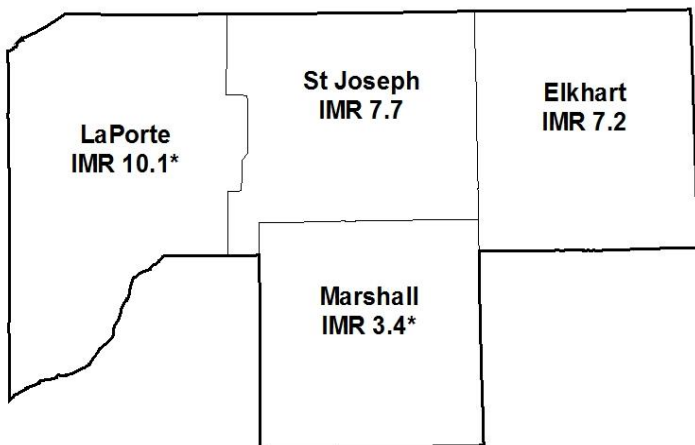
•Bottom number is percent difference from State



INFANT MORTALITY

NORTHERN HOSPITAL REGION 2012

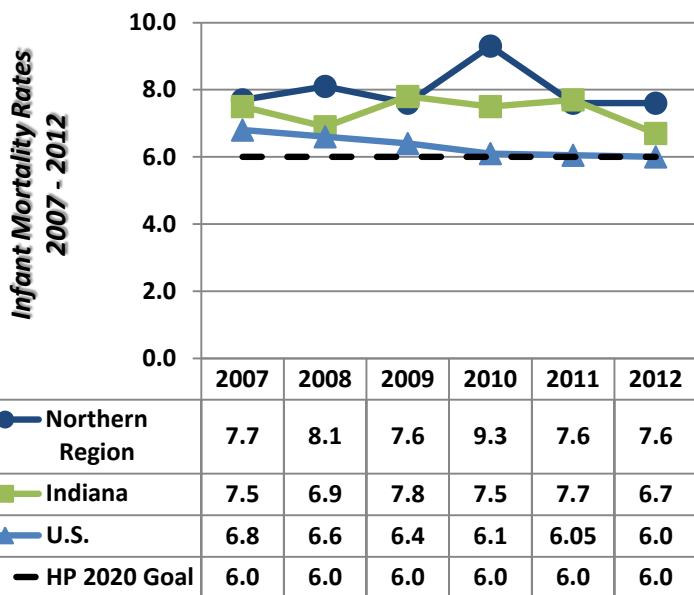
For more information on infant mortality in your area, please see the Indiana State Department of Health Mortality Report, Tables 2 and 8 (<http://www.in.gov/isdh/reports/mortality/2012/toc.htm>)



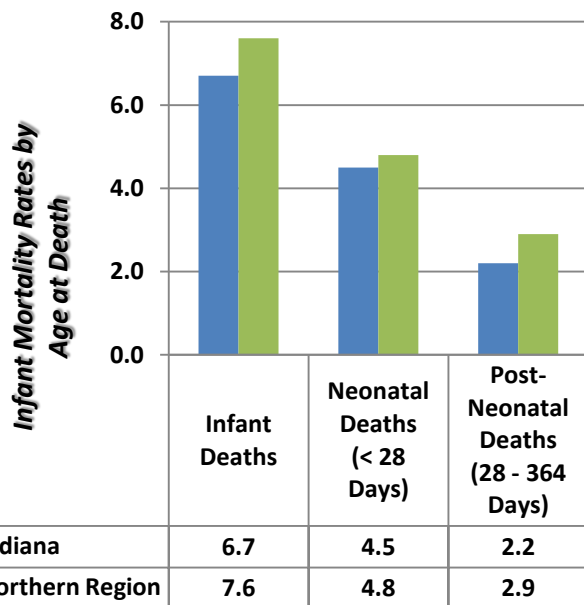
*Numerator less than 20, rate unstable.

INFANT MORTALITY FACTS

- Infant mortality is defined as the death of a baby before his or her first birthday
- The infant mortality rate (IMR) is the number of babies who die in the first year of life, per 1,000 live births
- Of the 556 Indiana infant deaths in 2012, 64 occurred in the Northern Region
- Black infants are 2.7 times more likely to die than white infants in Indiana & 4.1 times more likely in the Northern Region



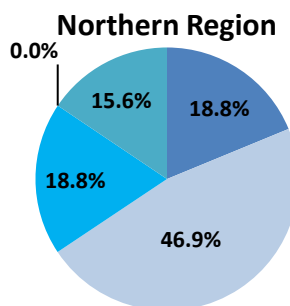
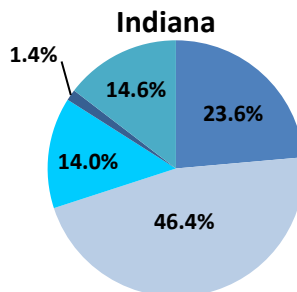
Note: U.S. 2012 rate is *PROVISIONAL*



PRACTICES TO REDUCE INFANT MORTALITY

- Improve overall health for women of child-bearing age
- Promote early & adequate prenatal care
- Decrease early elective deliveries before 39 weeks
- Decrease prenatal smoking & substance abuse
- Promote safe sleep practices
- Increase breastfeeding duration & exclusivity
- Support birth spacing & interconception wellness

Causes of Infant Mortality



- Congenital Malformations
- Perinatal Risks
- SUIDs
- Assaults/Accidents
- Other



BIRTH OUTCOME INDICATORS

NORTHERN HOSPITAL REGION 2012

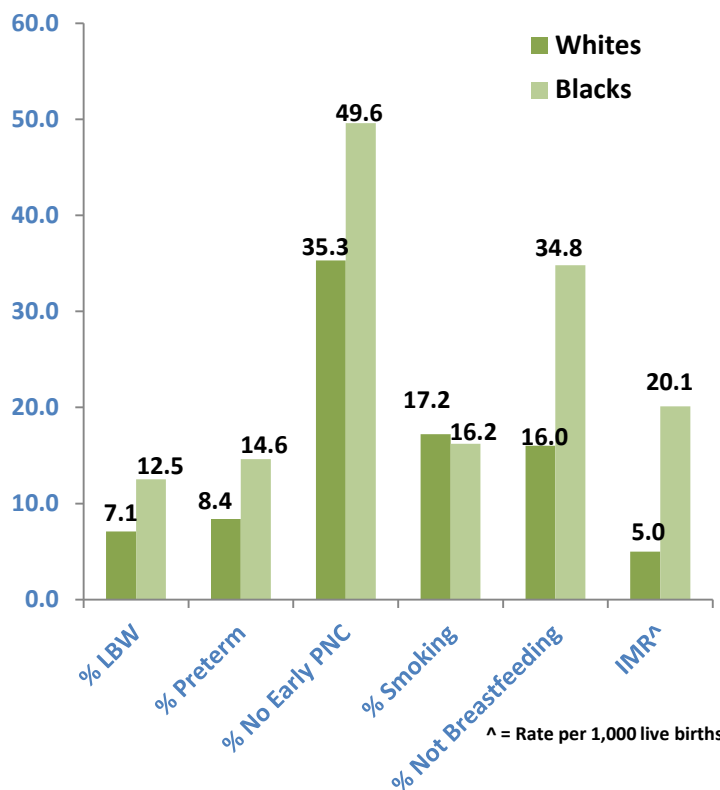
For more information on birth outcomes in your area, please see the Indiana State Department of Health Natality Report, Table 32 (<http://www.in.gov/isdh/reports/natality/2012/toc.htm>)

INDIANA QUICK FACTS

- Smoking rates among pregnant women are always one of the nation's worst
- Almost 1/3 of pregnant women do not receive early PNC
- Black women in Indiana are more likely to have a LBW or preterm baby & not get early PNC
- White women in Indiana are more likely to smoke during pregnancy

NORTHERN REGION QUICK FACTS

- Lower percentage of LBW and Preterm babies than Indiana
- Fewer women receiving early PNC
- Similar % of women smoking during pregnancy
- More women breastfeeding at hospital discharge



LBW = Low Birthweight
PNC = Prenatal Care
IMR = Infant Mortality Rate

	% LBW (< 2,500 G)	% PRETERM (< 37 WKS GESTATION)	% NO EARLY PNC (1 ST TRIMESTER)	% SMOKING	% NOT BREASTFEEDING
ELKHART	7.6 3.8% Lower	8.7 9.4% Lower	39.3 24.4% Higher	13.5 18.2% Lower	15.3 37.3% Lower
LAPORTE	9.3 17.7% Higher	11.0 14.6% Higher	41.8 32.3% Higher	31.0 87.9% Higher	30.8 26.2% Higher
MARSHALL	6.2 21.5% Lower	7.0 27.1% Lower	39.6 25.3% Higher	21.1 27.9% Higher	20.0 18.0% Lower
ST. JOSEPH	7.5 5.1% Lower	9.2 4.2% Lower	34.3 8.5% Higher	12.7 23.0% Lower	15.6 36.1% Lower
NORTHERN REGION	7.7 2.5% Lower	9.2 4.2% Lower	37.6 19.0% Higher	16.4 0.6% Lower	18.1 25.8% Lower
INDIANA	7.9	9.6	31.6	16.5	24.4

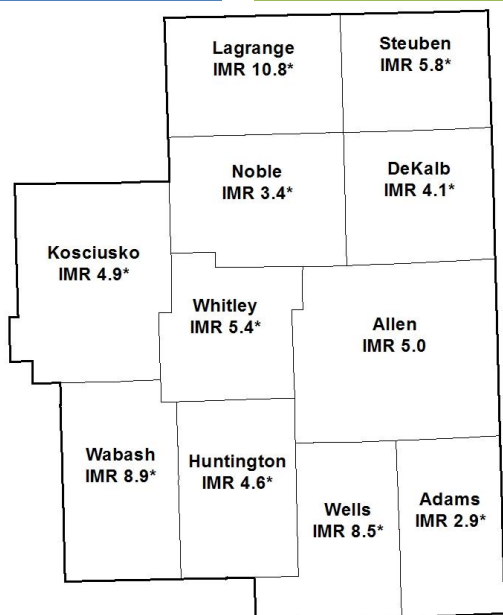
•Bottom number is percent difference from State



INFANT MORTALITY

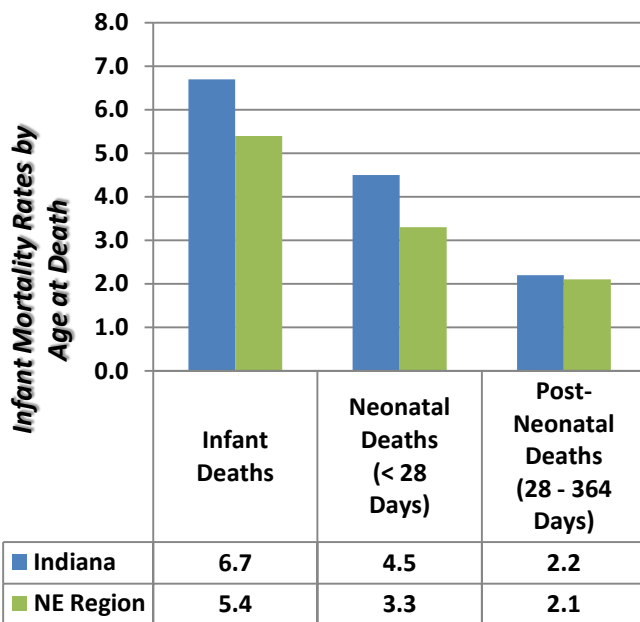
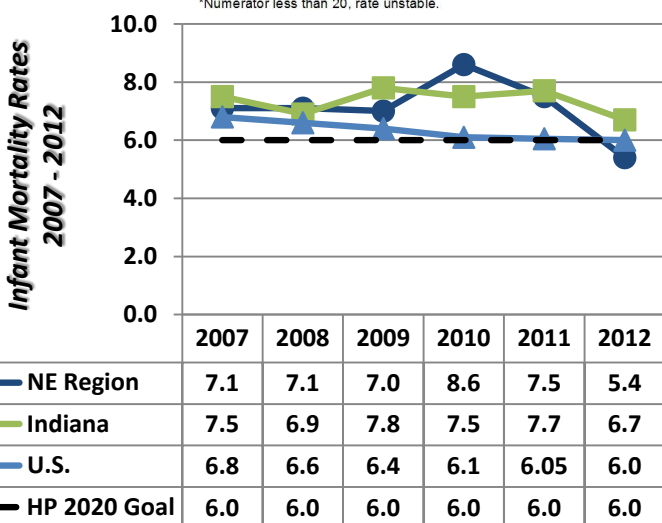
NORTHEASTERN HOSPITAL REGION 2012

For more information on infant mortality in your area, please see the Indiana State Department of Health Mortality Report, Tables 2 and 8 (<http://www.in.gov/isdh/reports/mortality/2012/toc.htm>)



INFANT MORTALITY FACTS

- Infant mortality is defined as the death of a baby before his or her first birthday
- The infant mortality rate (IMR) is the number of babies who die in the first year of life, per 1,000 live births
- Of the 556 Indiana infant deaths in 2012, 57 occurred in the Northeastern Region
- Black infants are 2.7 times more likely to die than white infants in Indiana & 4.9 times more likely in the Northeastern Region

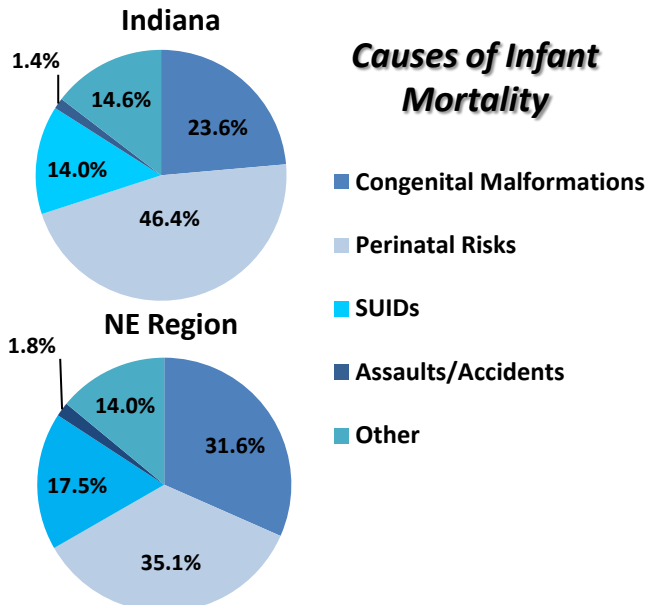


Note: U.S. 2012 rate is *PROVISIONAL*

PRACTICES TO REDUCE INFANT MORTALITY

- Improve overall health for women of child-bearing age
- Promote early & adequate prenatal care
- Decrease early elective deliveries before 39 weeks
- Decrease prenatal smoking & substance abuse
- Promote safe sleep practices
- Increase breastfeeding duration & exclusivity
- Support birth spacing & interconception wellness

Causes of Infant Mortality





BIRTH OUTCOME INDICATORS

NORTHEASTERN HOSPITAL REGION 2012

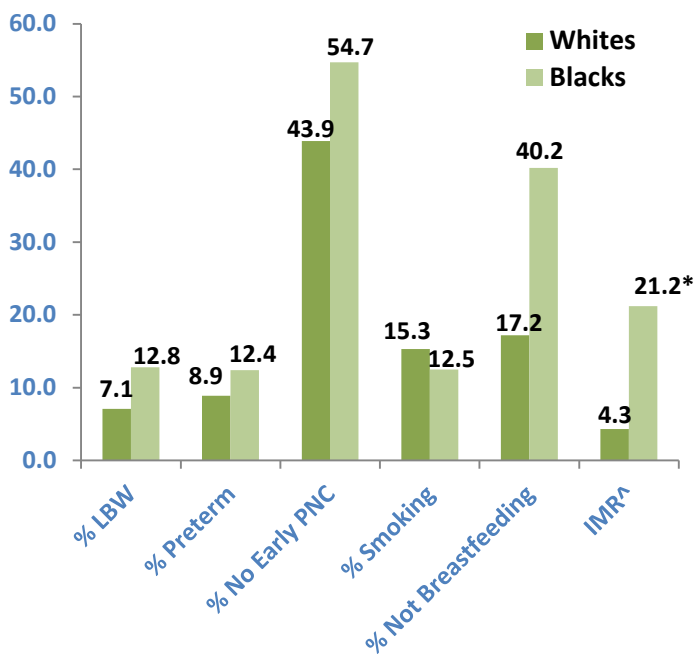
For more information on birth outcomes in your area, please see the Indiana State Department of Health Natality Report, Table 32 (<http://www.in.gov/isdh/reports/natality/2012/toc.htm>)

INDIANA QUICK FACTS

- Smoking rates among pregnant women are always one of the nation's worst
- Almost 1/3 of pregnant women do not receive early PNC
- Black women in Indiana are more likely to have a LBW or preterm baby & not get early PNC
- White women in Indiana are more likely to smoke during pregnancy

NORTHEASTERN REGION QUICK FACTS

- Lower % of LBW and preterm babies than Indiana
- Fewer women receiving early PNC
- Lower % of women smoking during pregnancy
- Higher rate of women breastfeeding at hospital discharge



LBW = Low Birthweight PNC = Prenatal Care IMR = Infant Mortality Rate ^ = Rate per 1,000 live births * Numerator less than 20, rate unstable.

	% LBW (< 2,500 G)	% PRETERM (< 37 WKS GESTATION)	% NO EARLY PNC (1 ST TRIMESTER)	% SMOKING	% NOT BREASTFEEDING
ADAMS	8.0 1.3% Higher	7.4 22.9% Lower	58.3 84.5% Higher	6.4 61.2% Lower	10.6 56.6% Lower
ALLEN	8.5 7.6% Higher	9.9 3.1% Higher	45.6 44.3% Higher	11.7 29.1% Lower	20.1 17.6% Lower
DEKALB	4.7 40.5% Lower	9.7 1.0% Higher	34.6 9.5% Higher	20.4 23.6% Higher	19.8 18.9% Lower
HUNTINGTON	8.5 7.6% Higher	10.1 5.2% Higher	26.9 14.9% Lower	21.6 30.9% Higher	28.5 16.8% Higher
KOSCIUSKO	7.0 11.4% Lower	9.6 No difference	61.6 94.9% Higher	16.5 No difference	18.4 24.6% Lower
LAGRANGE	4.7 40.5% Lower	6.1 36.5% Lower	59.8 89.2% Higher	8.3 49.7% Lower	10.9 55.3% Lower
NOBLE	6.8 13.9% Lower	8.0 16.7% Lower	37.5 18.7% Higher	20.5 24.2% Higher	20.1 17.6% Lower
STEBEN	7.5 5.1% Lower	9.8 2.1% Higher	27.7 12.3% Lower	24.8 50.3% Higher	23.3 4.5% Lower
WABASH	7.7 2.5% Lower	9.5 1.0% Lower	29.5 6.6% Lower	29.8 80.6% Higher	33.9 38.9% Higher
WELLS	7.9 No difference	8.5 11.5% Lower	38.3 21.2% Higher	18.3 10.9% Higher	15.5 36.5% Lower
WHITLEY	7.6 3.8% Lower	9.2 4.2% Lower	32.4 2.5% Higher	18.6 12.7% Higher	16.7 31.6% Lower
NORTHEASTERN REGION	7.7 2.5% Lower	9.2 4.2% Lower	45.5 44.0% Higher	14.3 13.3% Lower	19.2 21.3% Lower
INDIANA	7.9	9.6	31.6	16.5	24.4

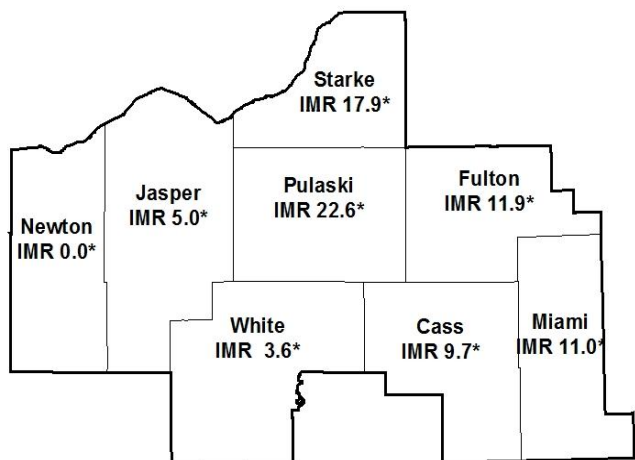
*Bottom number is percent difference from State



INFANT MORTALITY

MIDWESTERN HOSPITAL REGION 2012

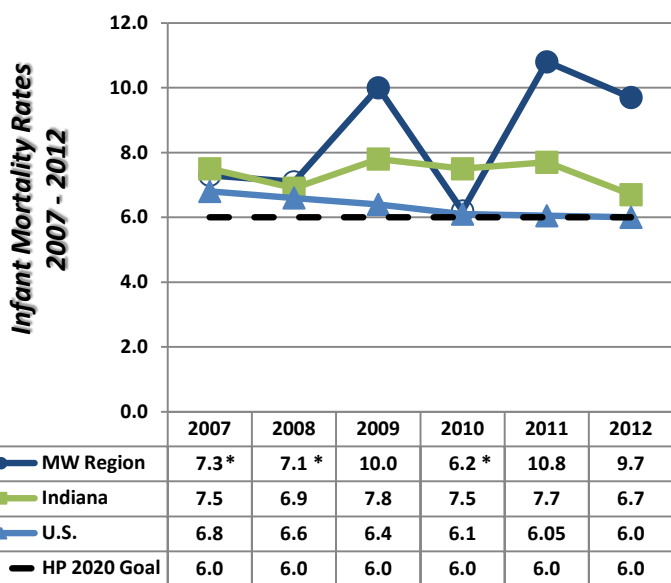
For more information on infant mortality in your area, please see the Indiana State Department of Health Mortality Report, Tables 2 and 8 (<http://www.in.gov/isdh/reports/mortality/2012/toc.htm>)



*Numerator less than 20, rate unstable.

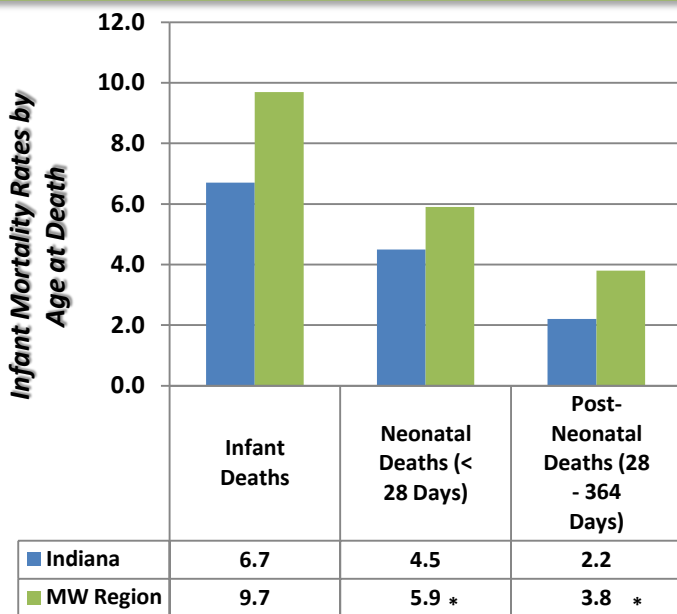
INFANT MORTALITY FACTS

- Infant mortality is defined as the death of a baby before his or her first birthday
- The infant mortality rate (IMR) is the number of babies who die in the first year of life, per 1,000 live births
- Of the 556 Indiana infant deaths in 2012, 23 occurred in the Midwestern Region
- Black infants are 2.7 times more likely to die than white infants in Indiana and 12 times more likely in the Midwestern Region



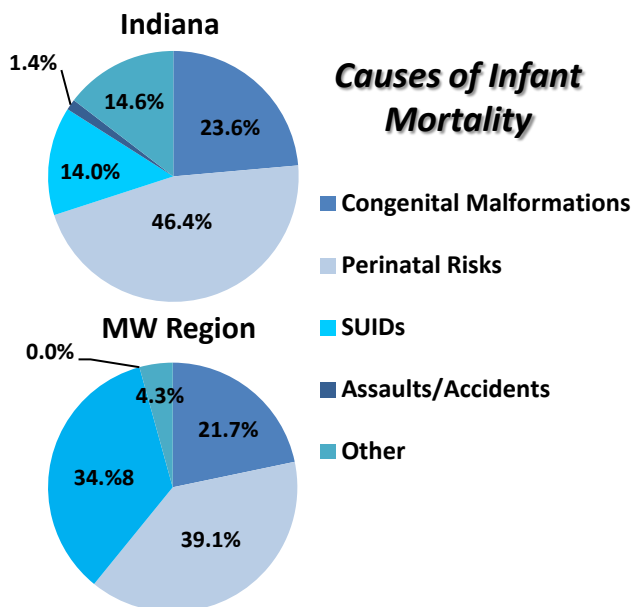
*Numerator less than 20, rate unstable.

Note: U.S. 2012 rate is PROVISIONAL



PRACTICES TO REDUCE INFANT MORTALITY

- Improve overall health for women of child-bearing age
- Promote early & adequate prenatal care
- Decrease early elective deliveries before 39 weeks
- Decrease prenatal smoking & substance abuse
- Promote safe sleep practices
- Increase breastfeeding duration & exclusivity
- Support birth spacing & interconception wellness





BIRTH OUTCOME INDICATORS

MIDWESTERN HOSPITAL REGION 2012

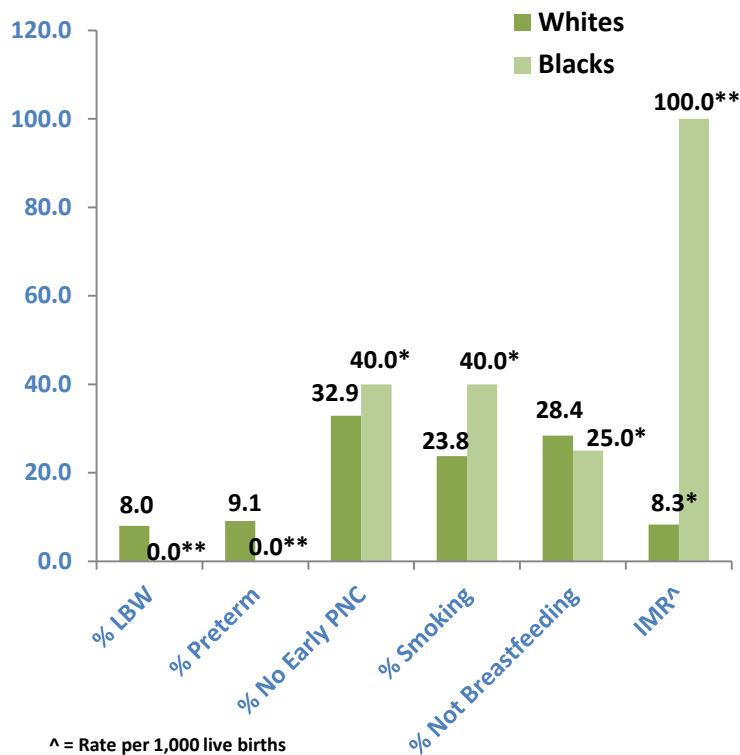
For more information on birth outcomes in your area, please see the Indiana State Department of Health Natality Report, Table 32 (<http://www.in.gov/isdh/reports/natality/2012/toc.htm>)

INDIANA QUICK FACTS

- Smoking rates among pregnant women are always one of the nation's worst
- Almost 1/3 of pregnant women do not receive early PNC
- Black women in Indiana are more likely to have a LBW or preterm baby & not get early PNC
- White women in Indiana are more likely to smoke during pregnancy

MIDWESTERN REGION QUICK FACTS

- Lower percentage of preterm babies than Indiana
- Fewer women receiving early PNC
- Higher percentage of women smoking during pregnancy
- Higher percentage of women NOT breastfeeding at hospital discharge



[^] = Rate per 1,000 live births

* Numerator less than 20, rate unstable.

** Less than 5 birth outcomes, rate unstable.

LBW = Low Birthweight

PNC = Prenatal Care

IMR = Infant Mortality Rate

	% LBW (<2,500 G)	% PRETERM (<37 WKS GESTATION)	% NO EARLY PNC (1 ST TRIMESTER)	% SMOKING	% NOT BREASTFEEDING
CASS	9.9 25.3% Higher	9.9 3.1% Higher	39.5 25.0% Higher	18.9 14.5% Higher	31.3 28.3% Higher
FULTON	6.3*	7.9 17.7% Lower	40.3 27.5% Higher	29.3 77.6% Higher	32.8 34.4% Higher
JASPER	6.0 24.1% Lower	8.0 16.7% Lower	27.1 14.2% Lower	19.8 20.0% Higher	20.8 14.8% Lower
MIAMI	9.6 21.5% Higher	11.8 22.9% Higher	25.3 19.9% Lower	23.6 43.0% Higher	32.1 31.6% Higher
NEWTON	6.5*	8.4*	37.4 18.4% Higher	25.2 52.7% Higher	32.9 34.8% Higher
PULASKI	6.0*	6.8*	33.1 4.7% Higher	23.3 41.2% Higher	30.1 23.4% Higher
STARKE	5.7*	6.4*	36.1 14.2% Higher	27.1 64.2% Higher	23.6 3.3% Lower
WHITE	10.0 26.6% Higher	10.0 4.2% Higher	30.0 5.1% Lower	26.4 60.0% Higher	26.4 8.2% Higher
MIDWESTERN REGION	7.9 No difference	9.0 6.3% Lower	33.3 5.4% Higher	23.4 41.8% Higher	28.4 16.4% Higher
INDIANA	7.9	9.6	31.6	16.5	24.4

* = Unstable rate due to fewer than 20 birth outcomes.

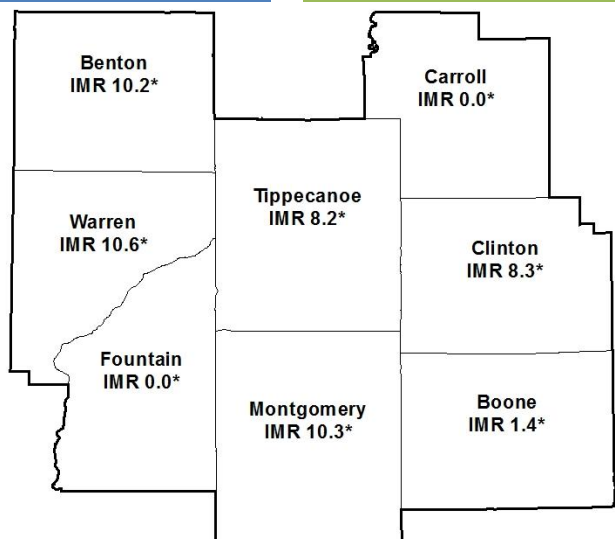
• Bottom number is percent difference from State.



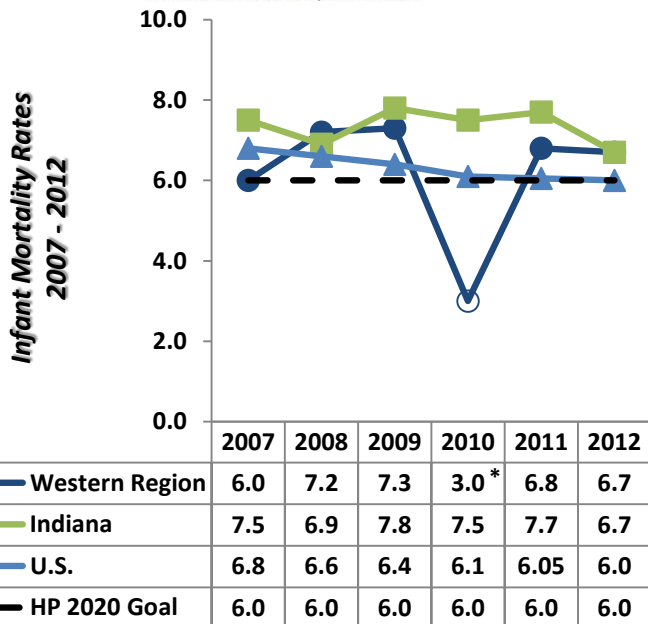
INFANT MORTALITY

WESTERN HOSPITAL REGION 2012

For more information on infant mortality in your area, please see the Indiana State Department of Health Mortality Report, Tables 2 and 8 (<http://www.in.gov/isdh/reports/mortality/2012/toc.htm>)



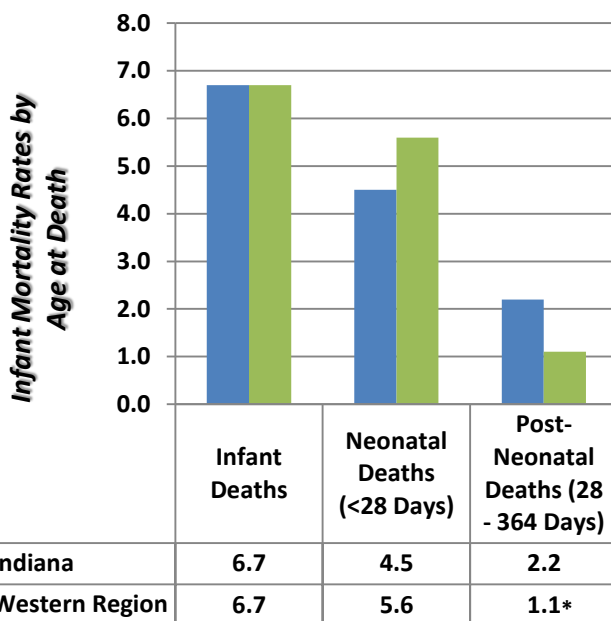
*Numerator less than 20, rate unstable.



*Numerator less than 20, rate unstable.
Note: U.S. 2012 rate is *PROVISIONAL*

INFANT MORTALITY FACTS

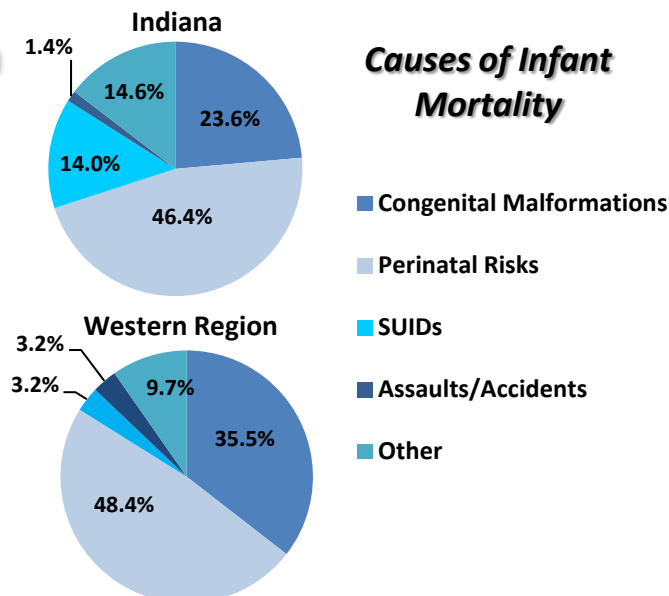
- Infant mortality is defined as the death of a baby before his or her first birthday
- The infant mortality rate (IMR) is the number of babies who die in the first year of life, per 1,000 live births
- Of the 556 Indiana infant deaths in 2012, 31 occurred in the Western Region
- Black infants are 2.7 times more likely to die than white infants in Indiana & 6.6 times more likely in the Western Region



PRACTICES TO REDUCE INFANT MORTALITY

- Improve overall health for women of child-bearing age
- Promote early & adequate prenatal care
- Decrease early elective deliveries before 39 weeks
- Decrease prenatal smoking & substance abuse
- Promote safe sleep practices
- Increase breastfeeding duration & exclusivity
- Support birth spacing & interconception wellness

Causes of Infant Mortality





BIRTH OUTCOME INDICATORS

WESTERN HOSPITAL REGION 2012

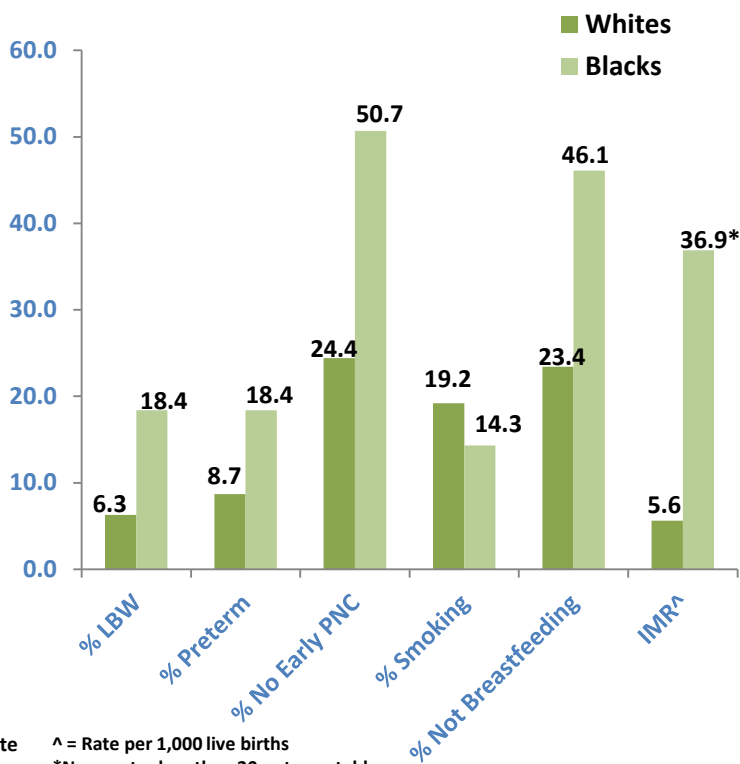
For more information on birth outcomes in your area, please see the Indiana State Department of Health Natality Report, Table 32 (<http://www.in.gov/isdh/reports/natality/2012/toc.htm>)

INDIANA QUICK FACTS

- Smoking rates among pregnant women are always one of the nation's worst
- Almost 1/3 of pregnant women do not receive early PNC
- Black women in Indiana are more likely to have a LBW or preterm baby & not get early PNC
- White women in Indiana are more likely to smoke during pregnancy

WESTERN REGION QUICK FACTS

- Lower percentages of LBW and preterm babies than Indiana
- Larger percentage of women receiving PNC
- More women smoking during pregnancy than Indiana
- Higher rate of women breastfeeding at hospital discharge



LBW = Low Birthweight PNC = Prenatal Care IMR = Infant Mortality Rate

^ = Rate per 1,000 live births
* Numerator less than 20, rate unstable.

	% LBW (<2,500 G)	% PRETERM (<37 WKS GESTATION)	% NO EARLY PNC (1 ST TRIMESTER)	% SMOKING	% NOT BREASTFEEDING
BENTON	2.0*	7.1*	23.5 25.6% Lower	17.4*	17.4 28.7% Lower
BOONE	6.9 12.7% Lower	9.1 5.2% Lower	15.7 50.3% Lower	11.7 29.1% Lower	15.5 36.5% Lower
CARROLL	8.5 7.6% Higher	10.6 10.4% Higher	28.4 10.1% Lower	23.3 41.2% Higher	26.3 7.8% Higher
CLINTON	6.6 16.5% Lower	12.0 25.0% Higher	33.5 6.0% Higher	21.1 27.9% Higher	30.6 25.4% Higher
FOUNTAIN	6.1*	7.8*	37.8 19.6% Higher	23.3 41.2% Higher	28.3 16.0% Higher
MONTGOMERY	7.4 6.3% Lower	9.3 3.1% Lower	28.9 8.5% Lower	26.6 61.2% Higher	28.0 14.8% Higher
TIPPECANOE	7.0 11.4% Lower	8.3 13.5% Lower	25.5 19.3% Lower	15.7 4.8% Lower	22.8 6.6% Lower
WARREN	5.3*	10.6*	27.7 12.3% Lower	30.9 87.3% Higher	33.0 35.2% Higher
WESTERN REGION	6.9 12.7% Lower	9.0 6.3% Lower	25.8 18.4% Lower	17.8 7.9% Higher	23.5 3.7% Lower
INDIANA	7.9	9.6	31.6	16.5	24.4

*= Unstable rate due to fewer than 20 birth outcomes.

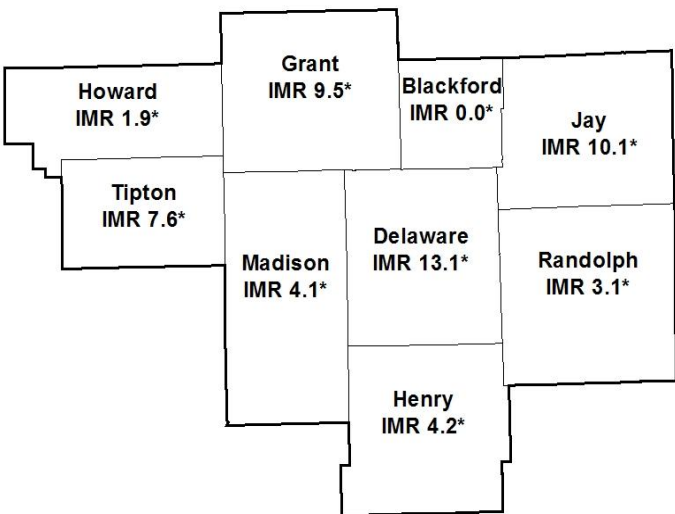
• Bottom number is percent difference from State



INFANT MORTALITY

EASTERN HOSPITAL REGION 2012

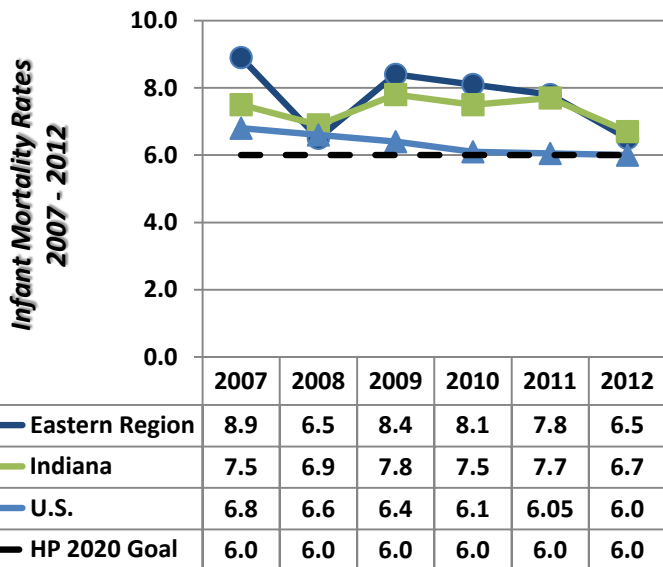
For more information on infant mortality in your area, please see the Indiana State Department of Health Mortality Report, Tables 2 and 8 (<http://www.in.gov/isdh/reports/mortality/2012/toc.htm>)



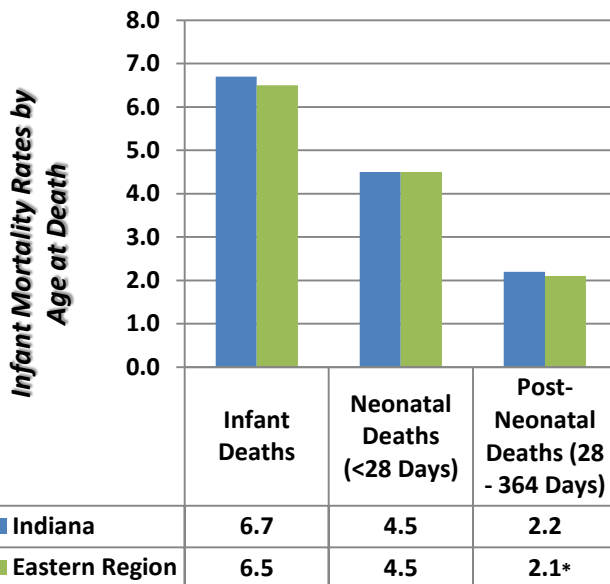
*Numerator less than 20, rate unstable.

INFANT MORTALITY FACTS

- Infant mortality is defined as the death of a baby before his or her first birthday
- The infant mortality rate (IMR) is the number of babies who die in the first year of life, per 1,000 live births
- Of the 556 Indiana infant deaths in 2012, 38 occurred in the Eastern Region
- Black infants are 2.7 times more likely to die than white infants in Indiana and twice as more likely in the Eastern Region



Note: U.S. 2012 rate is *PROVISIONAL*

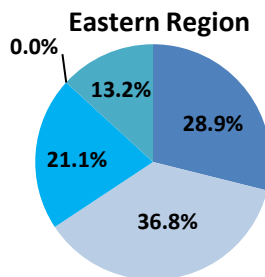
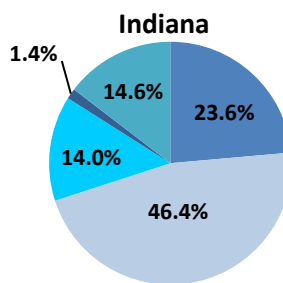


* Numerator less than 20, rate unstable.

PRACTICES TO REDUCE INFANT MORTALITY

- Improve overall health for women of child-bearing age
- Promote early & adequate prenatal care
- Decrease early elective deliveries before 39 weeks
- Decrease prenatal smoking & substance abuse
- Promote safe sleep practices
- Increase breastfeeding duration & exclusivity
- Support birth spacing & interconception wellness

Causes of Infant Mortality



- Congenital Malformations
- Perinatal Risks
- SUIDs
- Assaults/Accidents
- Other



BIRTH OUTCOME INDICATORS

EASTERN HOSPITAL REGION 2012

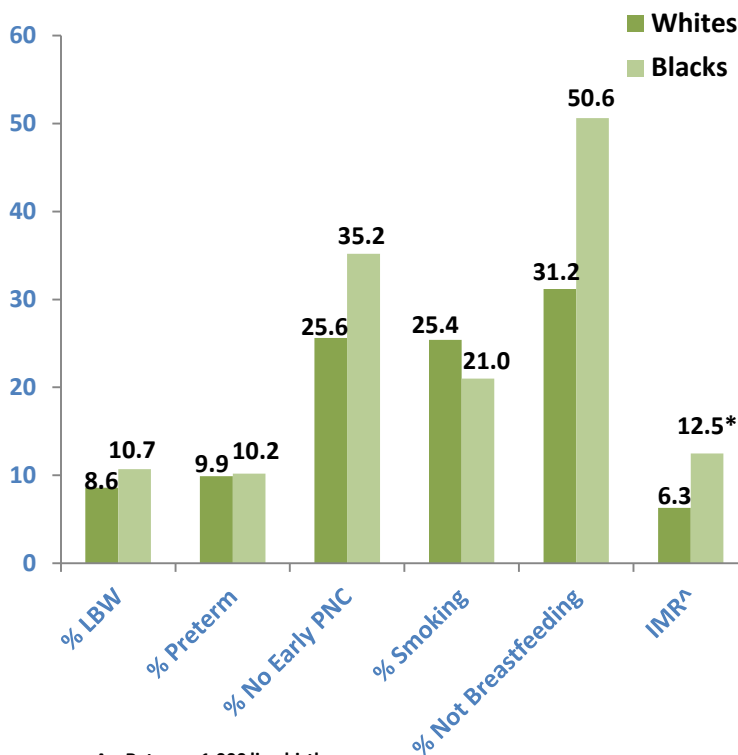
For more information on birth outcomes in your area, please see the Indiana State Department of Health Natality Report, Table 32 (<http://www.in.gov/isdh/reports/natality/2012/toc.htm>)

INDIANA QUICK FACTS

- Smoking rates among pregnant women are always one of the nation's worst
- Almost 1/3 of pregnant women do not receive early PNC
- Black women in Indiana are more likely to have a LBW or preterm baby & not get early PNC
- White women in Indiana are more likely to smoke during pregnancy

EASTERN REGION QUICK FACTS

- More LBW and Preterm babies than Indiana
- Higher percentage of women receiving early PNC
- Higher percentage of women smoking during pregnancy
- Lower rate of women breastfeeding at hospital discharge



[^] = Rate per 1,000 live births

*Numerator less than 20, rate unstable.

LBW = Low Birthweight PNC = Prenatal Care IMR = Infant Mortality Rate

	% LBW (<2,500 G)	% PRETERM (<37 WKS GESTATION)	% NO EARLY PNC (1 ST TRIMESTER)	% SMOKING	% NOT BREASTFEEDING
BLACKFORD	7.1*	10.0*	31.4 0.6% Lower	27.9 69.1% Higher	36.4 49.2% Higher
DELAWARE	9.8 24.1% Higher	10.5 9.4% Higher	19.8 37.3% Lower	23.7 43.6% Higher	29.6 21.3% Higher
GRANT	10.2 29.1% Higher	11.3 17.7% Higher	34.3 8.5% Higher	31.1 88.5% Higher	36.2 48.4% Higher
HENRY	8.4 6.3% Higher	10.3 7.3% Higher	21.4 32.3% Lower	30.0 81.8% Higher	26.3 7.8% Higher
HOWARD	6.5 17.7% Lower	8.3 13.5% Lower	28.9 8.5% Lower	20.6 24.8% Higher	34.5 41.4% Higher
JAY	12.8 62.0% Higher	12.8 33.3% Higher	43.6 38.0% Higher	21.3 29.1% Higher	24.3 0.4% Lower
MADISON	8.7 10.1% Higher	9.2 4.2% Lower	25.4 19.6% Lower	24.6 49.1% Higher	35.0 43.4% Higher
RANDOLPH	6.9 12.7% Lower	10.4 8.3% Higher	26.4 16.5% Lower	25.5 54.5% Higher	31.8 30.3% Higher
TIPTON	6.1*	9.9*	18.3 42.1% Lower	12.2*	25.2 3.3% Higher
EASTERN REGION	8.7 10.1% Higher	9.9 3.1% Higher	26.6 15.8% Lower	24.7 49.7% Higher	32.3 32.4% Higher
INDIANA	7.9	9.6	31.6	16.5	24.4

*= Unstable rate due to fewer than 20 birth outcomes.

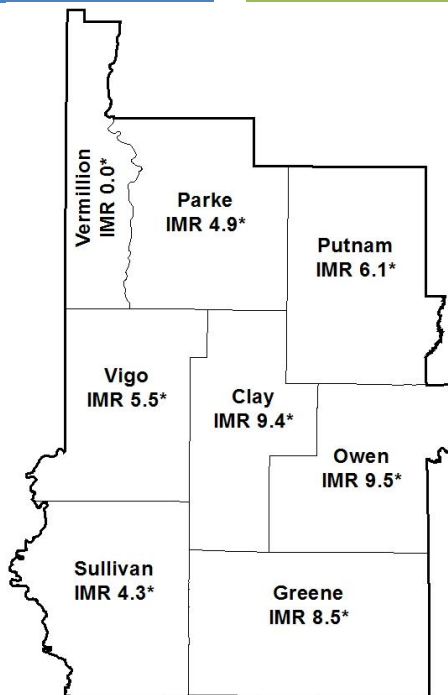
•Bottom number is percent difference from State.



INFANT MORTALITY

CENTRAL SOUTHWESTERN HOSPITAL REGION 2012

For more information on infant mortality in your area, please see the Indiana State Department of Health Mortality Report, Tables 2 and 8 (<http://www.in.gov/isdh/reports/mortality/2012/toc.htm>)

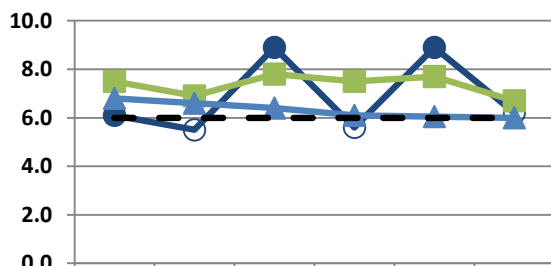


*Numerator less than 20, rate unstable.

INFANT MORTALITY FACTS

- Infant mortality is defined as the death of a baby before his or her first birthday
- The infant mortality rate (IMR) is the number of babies who die in the first year of life, per 1,000 live births
- Of the 556 Indiana infant deaths in 2012, 19 occurred in the Central Southwestern Region
- Black infants are 2.7 times more likely to die than white infants in Indiana and 5.4 times more likely in the Central Southwestern region.

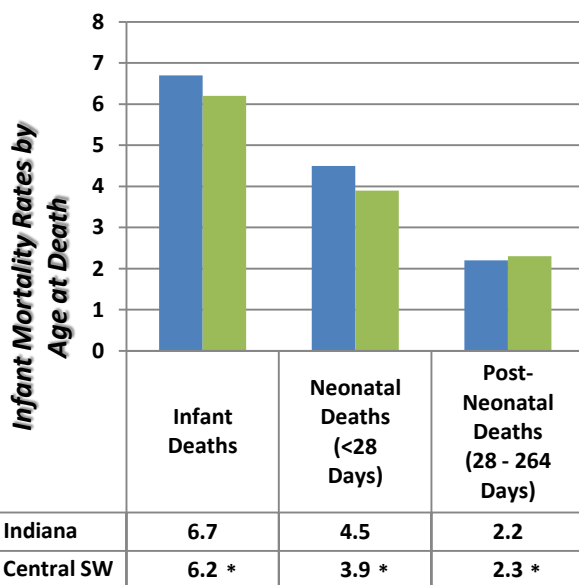
Infant Mortality Rates
2007 - 2012



	2007	2008	2009	2010	2011	2012
Central SW Region	6.1	5.5*	8.9	5.6*	8.9	6.2*
Indiana	7.5	6.9	7.8	7.5	7.7	6.7
U.S.	6.8	6.6	6.4	6.1	6.05	6.0
HP 2020 Goal	6.0	6.0	6.0	6.0	6.0	6.0

*Numerator less than 20, rate unstable.

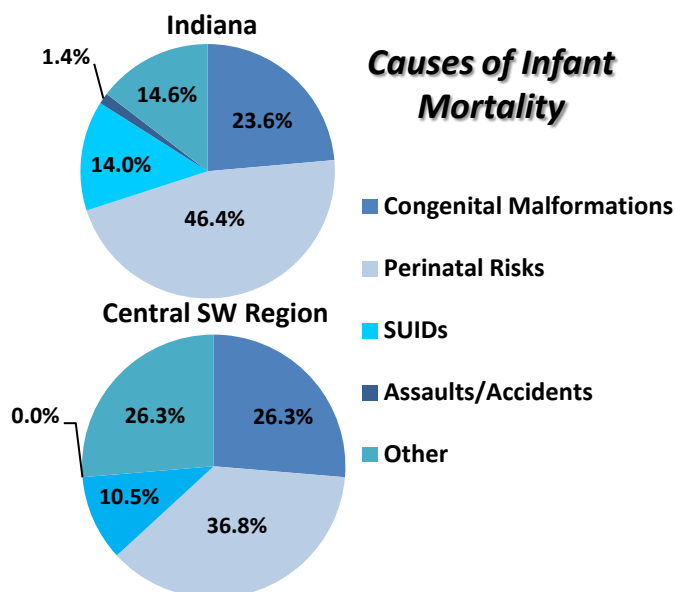
Note: U.S. 2012 rate is PROVISIONAL



PRACTICES TO REDUCE INFANT MORTALITY

- Improve overall health for women of child-bearing age
- Promote early & adequate prenatal care
- Decrease early elective deliveries before 39 weeks
- Decrease prenatal smoking & substance abuse
- Promote safe sleep practices
- Increase breastfeeding duration & exclusivity
- Support birth spacing & interconception wellness

Causes of Infant Mortality





BIRTH OUTCOME INDICATORS

CENTRAL SOUTHWESTERN HOSPITAL REGION 2012

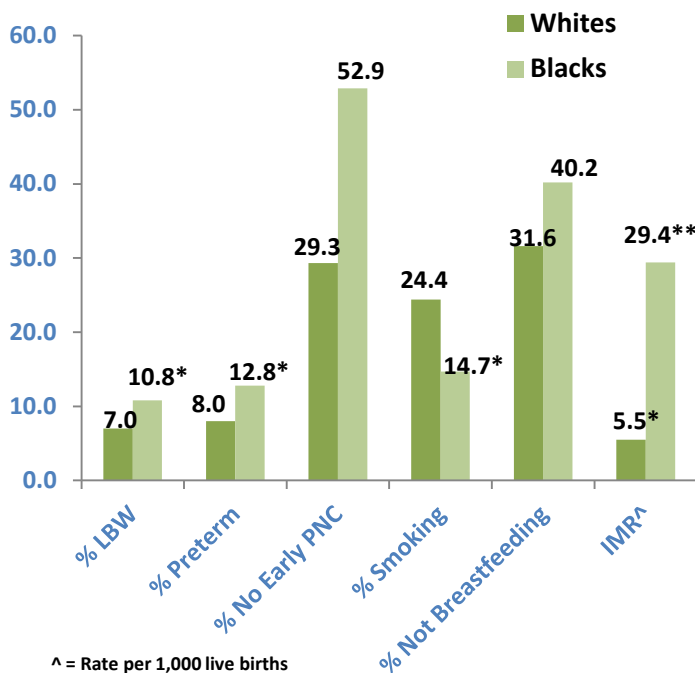
For more information on birth outcomes in your area, please see the Indiana State Department of Health Natality Report, Table 32 (<http://www.in.gov/isdh/reports/natality/2012/toc.htm>)

INDIANA QUICK FACTS

- Smoking rates among pregnant women are always one of the nation's worst
- Almost 1/3 of pregnant women do not receive early PNC
- Black women in Indiana are more likely to have a LBW or preterm baby & not get early PNC
- White women in Indiana are more likely to smoke during pregnancy

CENTRAL SOUTHWESTERN REGION QUICK FACTS

- Lower percentage of LBW and preterm babies when compared to Indiana
- More women receiving early PNC
- Higher percentage of women who smoke during pregnancy
- Fewer women breastfeeding at hospital discharge



^ = Rate per 1,000 live births

* Numerator less than 20, rate unstable.

** Less than 5 birth outcomes, rate unstable.

LBW = Low Birthweight PNC = Prenatal Care IMR = Infant Mortality Rate

	% LBW (<2,500 G)	% PRETERM (<37 WKS GESTATION)	% NO EARLY PNC (1 ST TRIMESTER)	% SMOKING	% NOT BREASTFEEDING
CLAY	8.8 11.4% Higher	11.3 17.7% Higher	25.9 18.0% Lower	27.8 68.5% Higher	33.8 38.5% Higher
GREENE	6.8 13.9% Lower	8.8 8.3% Lower	25.5 19.3% Lower	27.2 64.8% Higher	29.8 22.1% Higher
OWEN	5.7*	9.5 1.0% Lower	29.5 6.6% Lower	32.4 96.4% Higher	23.3 4.5% Lower
PARKE	8.3*	7.4*	42.2 33.5% Higher	22.6 37.0% Higher	28.9 18.4% Higher
PUTNAM	7.6 3.8% Lower	5.2*	23.2 26.6% Lower	18.9 14.5% Higher	26.8 9.8% Higher
SULLIVAN	6.5*	9.9 3.1% Higher	25.9 18.0% Lower	24.1 46.1% Higher	35.8 46.7% Higher
VERMILLION	7.6*	6.3*	28.5 9.8% Lower	21.5 30.3% Higher	41.8 71.3% Higher
VIGO	6.6 16.5% Lower	7.7 19.8% Lower	33.7 6.6% Higher	21.8 32.1% Higher	32.5 33.2% Higher
CENTRAL SW REGION	7.1 10.1% Lower	8.1 15.6% Lower	30.3 4.1% Lower	23.7 43.6% Higher	31.6 29.5% Higher
INDIANA	7.9	9.6	31.6	16.5	24.4

* = Unstable rate due to fewer than 20 birth outcomes.

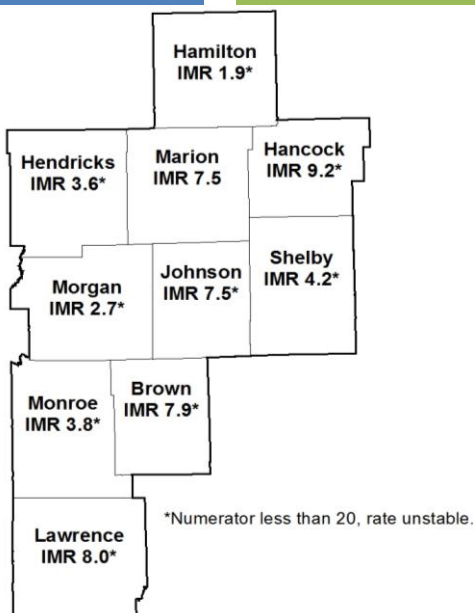
• Bottom number is percent difference from State.



INFANT MORTALITY

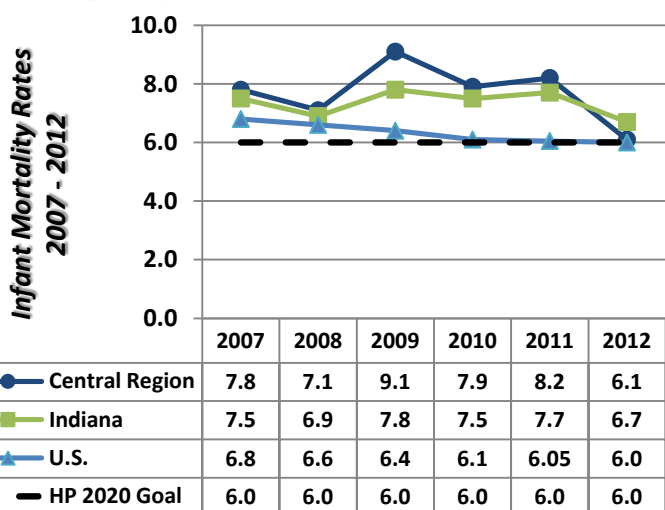
CENTRAL HOSPITAL REGION 2012

For more information on infant mortality in your area, please see the Indiana State Department of Health Mortality Report, Tables 2 and 8 (<http://www.in.gov/isdh/reports/mortality/2012/toc.htm>)

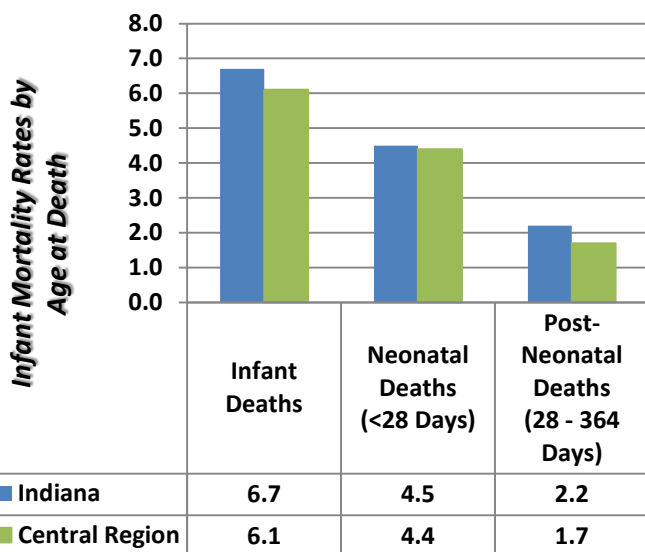


INFANT MORTALITY FACTS

- Infant mortality is defined as the death of a baby before his or her first birthday
- The infant mortality rate (IMR) is the number of babies who die in the first year of life, per 1,000 live births
- Of the 556 Indiana infant deaths in 2012, 157 occurred in the Central Region
- Black infants are 2.7 times more likely to die than white infants in Indiana & 2.5 times more likely in the Central Region

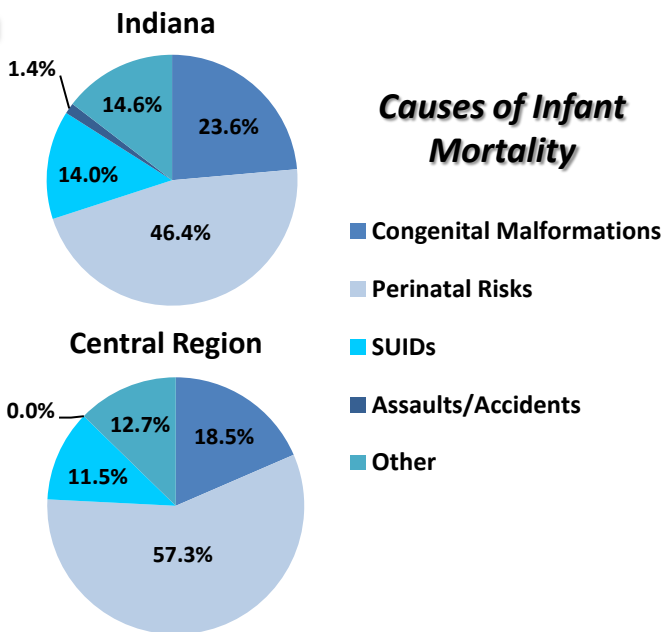


Note: U.S. 2012 rate is *PROVISIONAL*



PRACTICES TO REDUCE INFANT MORTALITY

- Improve overall health for women of child-bearing age
- Promote early & adequate prenatal care
- Decrease early elective deliveries before 39 weeks
- Decrease prenatal smoking & substance abuse
- Promote safe sleep practices
- Increase breastfeeding duration & exclusivity
- Support birth spacing & interconception wellness



Causes of Infant Mortality

- Congenital Malformations
- Perinatal Risks
- SUIDs
- Assaults/Accidents
- Other



BIRTH OUTCOME INDICATORS

CENTRAL HOSPITAL REGION 2012

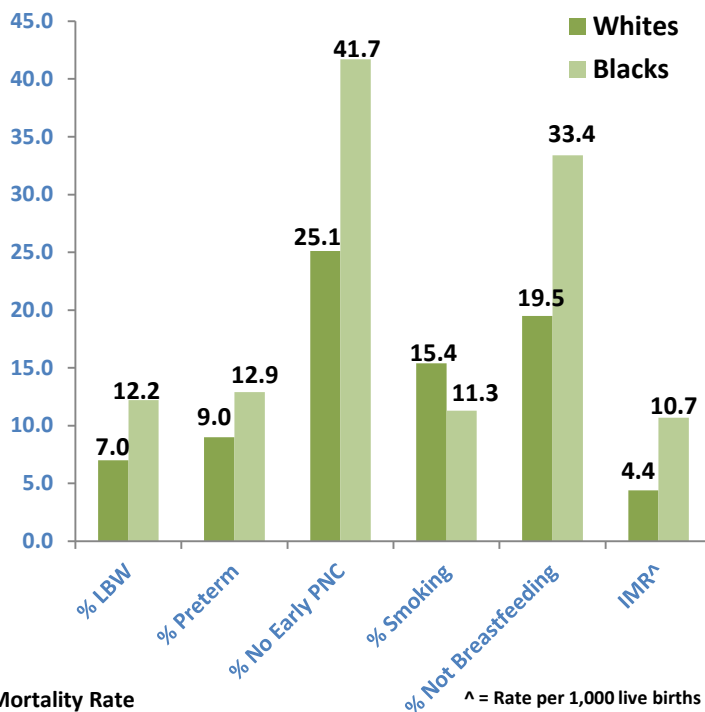
For more information on birth outcomes in your area, please see the Indiana State Department of Health Natality Report, Table 32 (<http://www.in.gov/isdh/reports/natality/2012/toc.htm>)

INDIANA QUICK FACTS

- Smoking rates among pregnant women are always one of the nation's worst
- Almost 1/3 of pregnant women do not receive early PNC
- Black women in Indiana are more likely to have a LBW or preterm baby & not get early PNC
- White women in Indiana are more likely to smoke during pregnancy

CENTRAL REGION QUICK FACTS

- Higher rate of LBW & preterm babies than Indiana
- Higher percentage of women receiving early PNC
- Lower rate of women smoking during pregnancy
- Higher rate of women breastfeeding at hospital discharge



LBW = Low Birthweight PNC = Prenatal Care IMR = Infant Mortality Rate

^ = Rate per 1,000 live births

	% LBW (< 2,500 G)	% PRETERM (< 37 WKS GESTATION)	% NO EARLY PNC (1 ST TRIMESTER)	% SMOKING	% NOT BREASTFEEDING
BROWN	7.1*	7.9*	31.8 0.6% Higher	22.2 34.5% Higher	13.5 44.7% Lower
HAMILTON	6.3 20.3% Lower	8.6 10.4% Lower	15.6 50.6% Lower	3.9 76.4% Lower	9.4 61.5% Lower
HANCOCK	6.5 17.7% Lower	9.1 5.2% Lower	21.6 31.6% Lower	12.1 26.7% Lower	16.2 33.6% Lower
HENDRICKS	6.4 19.0% Lower	9.4 2.1% Lower	18.1 42.7% Lower	10.1 38.8% Lower	19.0 22.1% Lower
JOHNSON	7.4 6.3% Lower	8.6 10.4% Lower	31.9 0.9% Higher	17.2 4.2% Higher	20.6 15.6% Lower
LAWRENCE	7.2 8.9% Lower	9.7 1.0% Higher	25.7 18.7% Lower	29.4 78.2% Higher	25.1 2.9% Higher
MARION	8.9 12.7% Higher	10.3 7.3% Higher	35.3 11.7% Higher	14.2 13.9% Lower	25.6 4.9% Higher
MONROE	7.2 8.9% Lower	9.7 1.0% Higher	20.1 36.4% Lower	16.1 2.4% Lower	10.7 56.1% Lower
MORGAN	7.8 1.3% Lower	8.4 12.5% Lower	31.1 1.6% Lower	26.1 58.2% Higher	31.3 28.3% Higher
SHELBY	6.5 17.7% Lower	9.5 1.0% Lower	25.1 20.6% Lower	24.9 50.9% Higher	32.9 34.8% Higher
CENTRAL REGION	8.0 1.3% Higher	9.7 1.0% Higher	29.5 6.6% Lower	13.6 17.6% Lower	21.7 11.1% Lower
INDIANA	7.9	9.6	31.6	16.5	24.4

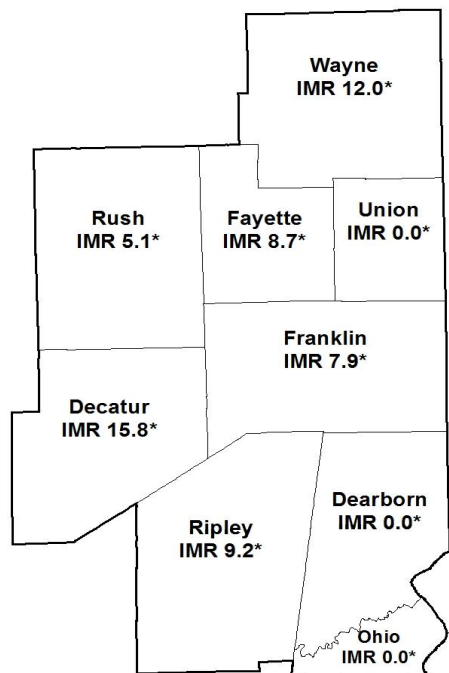
* = Unstable rate due to fewer than 20 birth outcomes.
• Bottom number is percent difference from State



INFANT MORTALITY

SOUTHEASTERN HOSPITAL REGION 2012

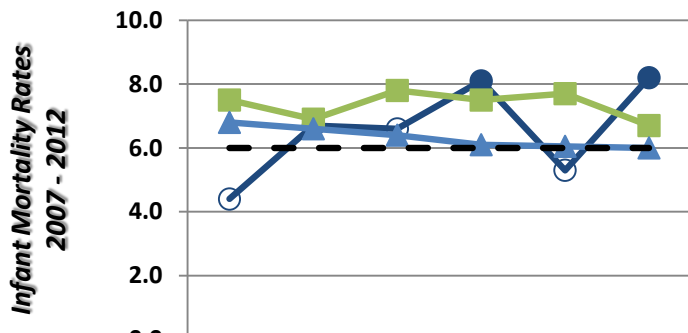
For more information on infant mortality in your area, please see the Indiana State Department of Health Mortality Report, Tables 2 and 8 (<http://www.in.gov/isdh/reports/mortality/2012/toc.htm>)



*Numerator less than 20, rate unstable.

INFANT MORTALITY FACTS

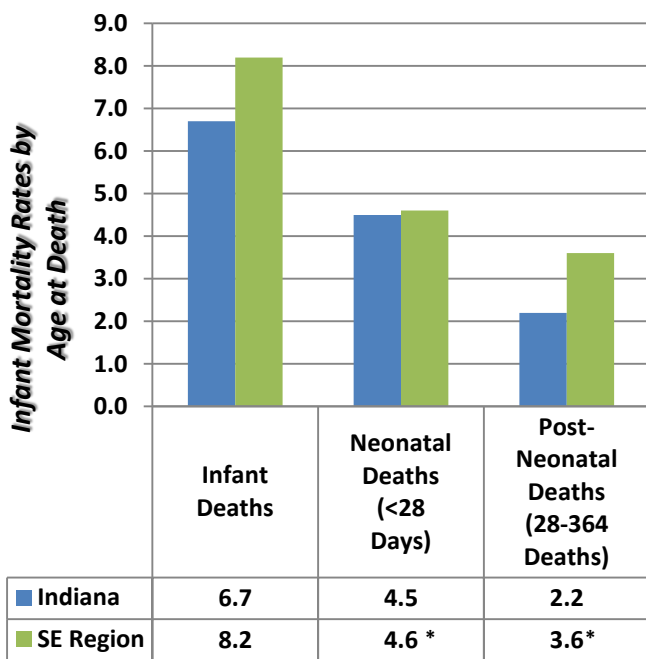
- Infant mortality is defined as the death of a baby before his or her first birthday
- The infant mortality rate (IMR) is the number of babies who die in the first year of life, per 1,000 live births
- Of the 556 Indiana infant deaths in 2012, 23 occurred in the Southeastern Region
- Black infants are 2.7 times more likely to die than white infants in Indiana and 8.6 times more likely in the Southeastern Region



	2007	2008	2009	2010	2011	2012
SE Region	4.4*	6.7	6.6*	8.1	5.3*	8.2
Indiana	7.5	6.9	7.8	7.5	7.7	6.7
U.S.	6.8	6.6	6.4	6.1	6.05	6.0
HP 2020 Goal	6.0	6.0	6.0	6.0	6.0	6.0

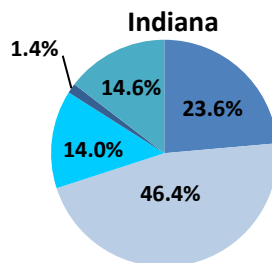
*Numerator less than 20, rate unstable.

Note: U.S. 2012 rate is PROVISIONAL



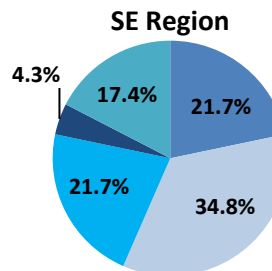
PRACTICES TO REDUCE INFANT MORTALITY

- Improve overall health for women of child-bearing age
- Promote early & adequate prenatal care
- Decrease early elective deliveries before 39 weeks
- Decrease prenatal smoking & substance abuse
- Promote safe sleep practices
- Increase breastfeeding duration & exclusivity
- Support birth spacing & interconception wellness



Causes of Infant Mortality

- Congenital Malformations
- Perinatal Risks
- SUIDs
- Assaults/Accidents
- Other





BIRTH OUTCOME INDICATORS

SOUTHEASTERN HOSPITAL REGION 2012

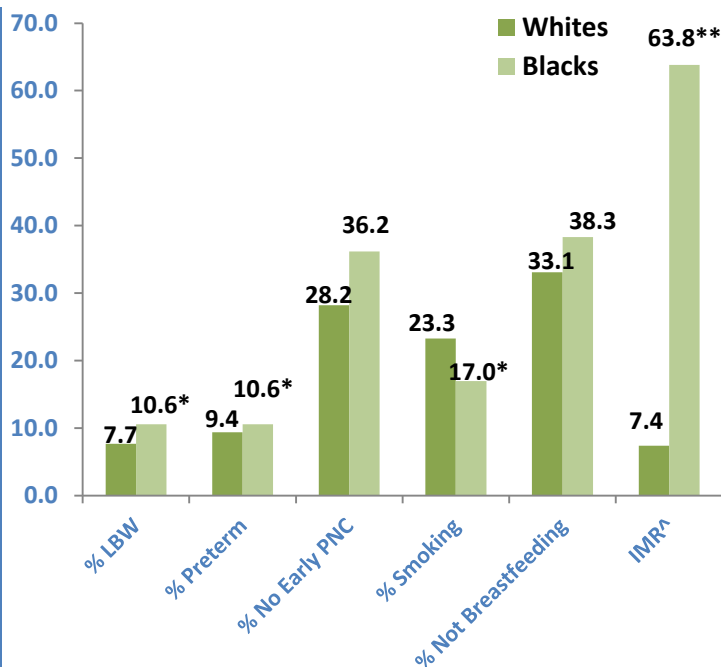
For more information on birth outcomes in your area, please see the Indiana State Department of Health Natality Report, Table 32 (<http://www.in.gov/isdh/reports/natality/2012/toc.htm>)

INDIANA QUICK FACTS

- Smoking rates among pregnant women are always one of the nation's worst
- Almost 1/3 of pregnant women do not receive early PNC
- Black women in Indiana are more likely to have a LBW or preterm baby & not get early PNC
- White women in Indiana are more likely to smoke during pregnancy

SOUTHEASTERN REGION QUICK FACTS

- Lower percentage of LBW and preterm babies than Indiana
- Higher percentage of women receiving early PNC
- Higher percentage of women smoking during pregnancy
- Fewer women breastfeeding at hospital discharge



[^] = Rate per 1,000 live births

* Numerator less than 20, rate unstable.

** Less than 5 birth outcomes, rate unstable.

LBW = Low Birthweight PNC = Prenatal Care IMR = Infant Mortality Rate

	% LBW ($< 2,500$ G)	% PRETERM (< 37 WKS GESTATION)	% NO EARLY PNC (1 ST TRIMESTER)	% SMOKING	% NOT BREASTFEEDING
DEARBORN	7.7 2.5% Lower	9.8 2.1% Higher	22.3 29.4% Lower	21.7 31.5% Higher	34.9 43.0% Higher
DECATUR	9.2 16.5% Higher	9.5 1.0% Lower	35.0 10.8% Higher	22.1 33.9% Higher	29.3 20.1% Higher
FAYETTE	8.3*	10.9 13.5% Higher	31.0 1.9% Lower	26.6 61.2% Higher	39.7 62.7% Higher
FRANKLIN	8.7 10.1% Higher	8.3 13.5% Lower	29.6 6.3% Lower	24.9 50.9% Higher	36.0 47.5% Higher
OHIO	4.4*	8.8*	20.6 34.8% Lower	17.7*	33.8 38.5% Higher
RIPLEY	6.2 21.5% Lower	8.3 13.5% Lower	25.2 20.3% Lower	26.8 62.4% Higher	35.7 46.3% Higher
RUSH	7.1*	7.1*	19.2 39.2% Lower	23.7 43.6% Higher	31.8 30.3% Higher
UNION	7.4*	7.4*	32.4 2.5% Higher	22.1*	27.9 14.3% Higher
WAYNE	7.5 5.1% Lower	9.9 3.1% Higher	32.9 4.1% Higher	20.3 23.0% Higher	29.3 20.1% Higher
SOUTHEASTERN REGION	7.6 3.8% Lower	9.3 3.1% Lower	28.6 9.5% Lower	22.7 37.6% Higher	32.8 34.4% Higher
INDIANA	7.9	9.6	31.6	16.5	24.4

* = Unstable rate due to fewer than 20 birth outcomes.

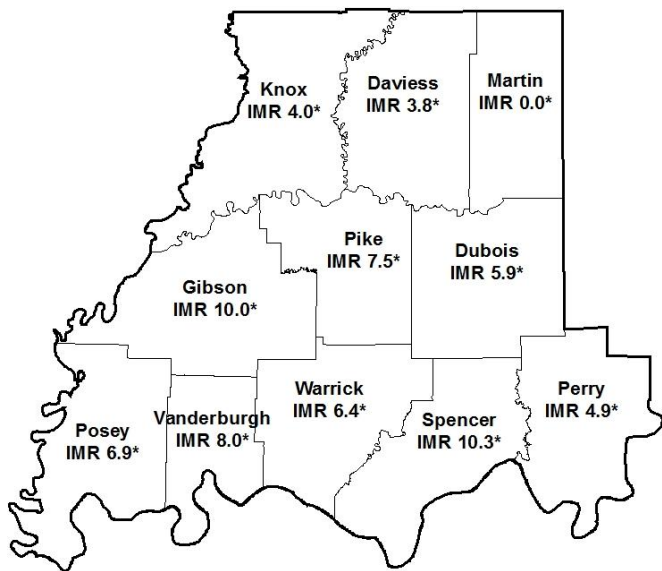
• Bottom number is percent difference from State.



INFANT MORTALITY

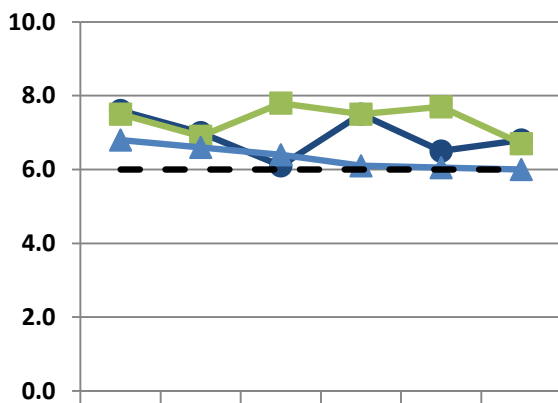
SOUTHWESTERN HOSPITAL REGION 2012

For more information on infant mortality in your area, please see the Indiana State Department of Health Mortality Report, Tables 2 and 8 (<http://www.in.gov/isdh/reports/mortality/2012/toc.htm>)



*Numerator less than 20, rate unstable.

Infant Mortality Rates 2007 - 2012

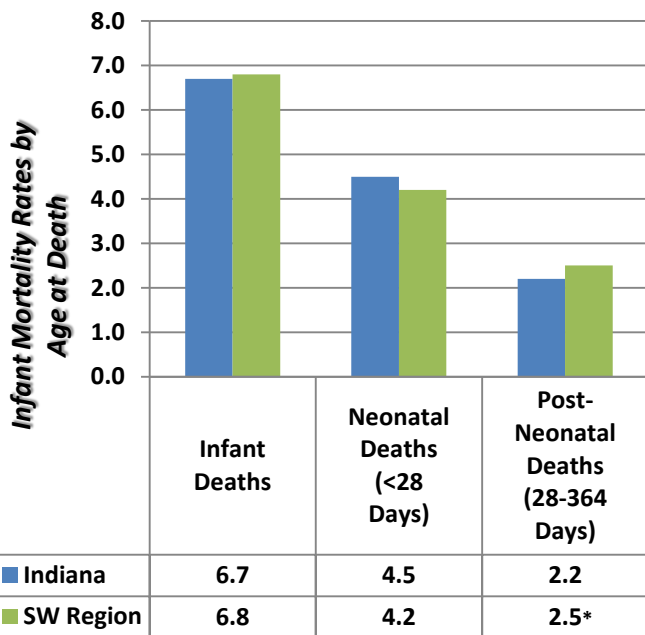


	2007	2008	2009	2010	2011	2012
SW Region	7.6	7.0	6.1	7.5	6.5	6.8
Indiana	7.5	6.9	7.8	7.5	7.7	6.7
U.S.	6.8	6.6	6.4	6.1	6.05	6.0
HP2020 Goal	6.0	6.0	6.0	6.0	6.0	6.0

Note: U.S. 2012 rate is *PROVISIONAL*

INFANT MORTALITY FACTS

- Infant mortality is defined as the death of a baby before his or her first birthday
- The infant mortality rate (IMR) is the number of babies who die in the first year of life, per 1,000 live births
- Of the 556 Indiana infant deaths in 2012, 40 occurred in the Southwestern Region
- Black infants are 2.7 times more likely to die than white infants in Indiana and 1.5 times more likely in the Southwestern Region

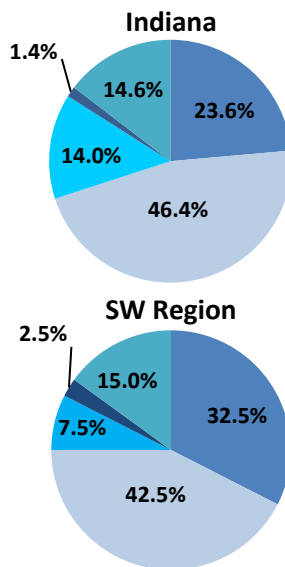


*Numerator less than 20, rate unstable.

PRACTICES TO REDUCE INFANT MORTALITY

- Improve overall health for women of child-bearing age
- Promote early & adequate prenatal care
- Decrease early elective deliveries before 39 weeks
- Decrease prenatal smoking & substance abuse
- Promote safe sleep practices
- Increase breastfeeding duration & exclusivity
- Support birth spacing & interconception wellness

Causes of Infant Mortality



- Congenital Malformations
- Perinatal Risks
- SUIDs
- Assaults/Accidents
- Other



BIRTH OUTCOME INDICATORS

SOUTHWESTERN HOSPITAL REGION 2012

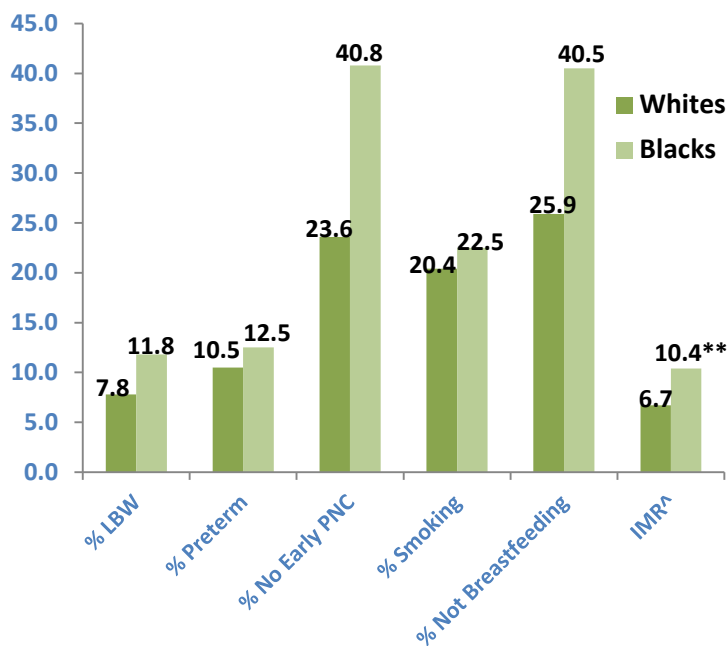
For more information on birth outcomes in your area, please see the Indiana State Department of Health Natality Report, Table 32 (<http://www.in.gov/isdh/reports/natality/2012/toc.htm>)

INDIANA QUICK FACTS

- Smoking rates among pregnant women are always one of the nation's worst
- Almost 1/3 of pregnant women do not receive early PNC
- Black women in Indiana are more likely to have a LBW or preterm baby & not get early PNC
- White women in Indiana are more likely to smoke during pregnancy

SOUTHWESTERN REGION QUICK FACTS

- Higher percentages of LBW and preterm babies than Indiana
- Larger percentage of women receiving early PNC
- Higher percentage of women smoking during pregnancy
- Lower rate of women breastfeeding at hospital discharge



[^] = Rate per 1,000 live births

* Numerator less than 20, rate unstable.

** Less than 5 birth outcomes, rate unstable.

LBW = Low Birthweight PNC = Prenatal Care IMR = Infant Mortality Rate

	% LBW (< 2,500 G)	% PRETERM (< 37 WKS GESTATION)	% NO EARLY PNC (1 ST TRIMESTER)	% SMOKING	% NOT BREASTFEEDING
DAVISS	6.6 16.5% Lower	11.6 20.8% Higher	36.7 16.1% Higher	12.6 23.6% Lower	24.5 0.4% Higher
DUBOIS	8.1 2.5% Higher	12.4 29.2% Higher	25.0 20.9% Lower	13.6 17.6% Lower	22.4 8.2% Lower
GIBSON	7.7 2.5% Lower	9.7 1.0% Higher	18.7 40.8% Lower	21.4 29.7% Higher	25.1 2.9% Higher
KNOX	6.7 15.2% Lower	9.1 5.2% Lower	18.6 41.1% Lower	30.7 86.1% Higher	38.6 58.2% Higher
MARTIN	7.1*	11.4*	29.8 5.7% Lower	22.0 33.3% Higher	34.8 42.6% Higher
PERRY	5.8*	6.3*	22.3 29.4% Lower	26.7 61.8% Higher	37.9 55.3% Higher
PIKE	11.3*	12.8*	24.1 23.7% Lower	33.1 100.6% Higher	31.6 29.5% Higher
POSEY	7.2 8.9% Lower	6.9 28.1% Lower	19.0 39.9% Lower	21.7 31.5% Higher	23.5 3.7% Lower
SPENCER	3.6*	8.8*	20.6 34.8% Lower	15.5 6.1% Lower	34.5 41.4% Higher
VANDERBURG	8.9 12.7% Higher	11.0 14.6% Higher	27.3 13.6% Lower	19.9 20.6% Higher	23.9 2.0% Lower
WARRICK	8.6 8.9% Higher	10.6 10.4% Higher	19.0 39.9% Lower	15.2 7.9% Lower	22.4 8.2% Lower
SOUTHWESTERN REGION	8.0 1.3% Higher	10.5 9.4% Higher	24.9 21.2% Lower	19.8 20.0% Higher	26.3 7.8% Higher
INDIANA	7.9	9.6	31.6	16.5	24.4

* = Unstable rate due to fewer than 20 birth outcomes.

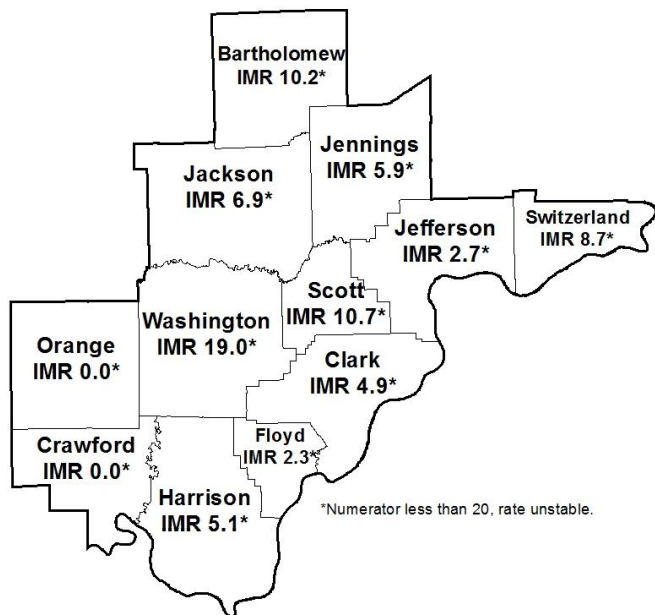
• Bottom number is percent difference from State.



INFANT MORTALITY

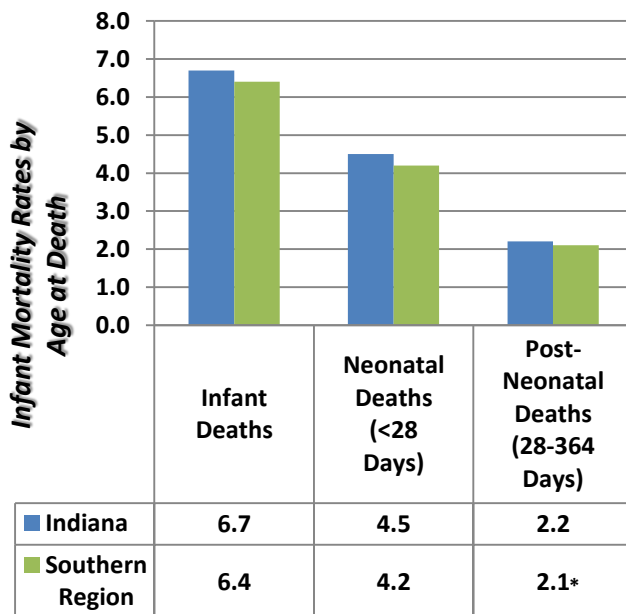
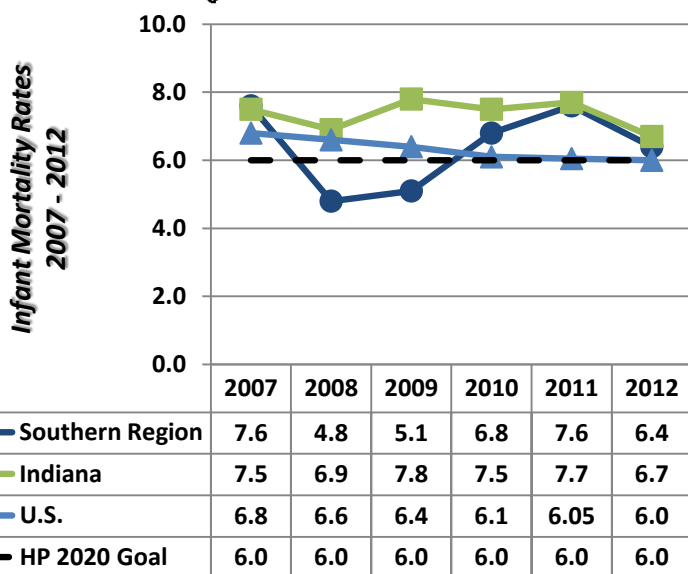
SOUTHERN HOSPITAL REGION 2012

For more information on infant mortality in your area, please see the Indiana State Department of Health Mortality Report, Tables 2 and 8 (<http://www.in.gov/isdh/reports/mortality/2012/toc.htm>)



INFANT MORTALITY FACTS

- Infant mortality is defined as the death of a baby before his or her first birthday
- The infant mortality rate (IMR) is the number of babies who die in the first year of life, per 1,000 live births
- Of the 556 Indiana infant deaths in 2012, 39 occurred in the Southern Region
- Black infants are 2.7 times more likely to die than white infants in Indiana and 1.6 times more likely in the Southern Region



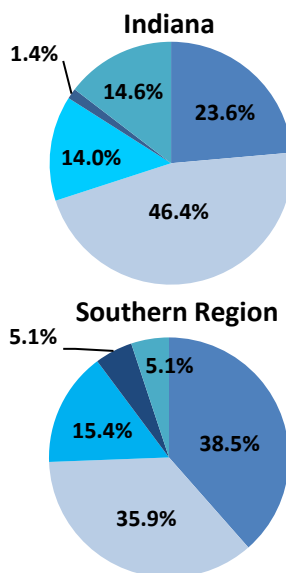
* Numerator less than 20, rate unstable.

Note: U.S. 2012 rate is *PROVISIONAL*

PRACTICES TO REDUCE INFANT MORTALITY

- Improve overall health for women of child-bearing age
- Promote early & adequate prenatal care
- Decrease early elective deliveries before 39 weeks
- Decrease prenatal smoking & substance abuse
- Promote safe sleep practices
- Increase breastfeeding duration & exclusivity
- Support birth spacing & interconception wellness

Causes of Infant Mortality



- Congenital Malformations
- Perinatal Risks
- SUIDs
- Assaults/Accidents
- Other



BIRTH OUTCOME INDICATORS

SOUTHERN HOSPITAL REGION 2012

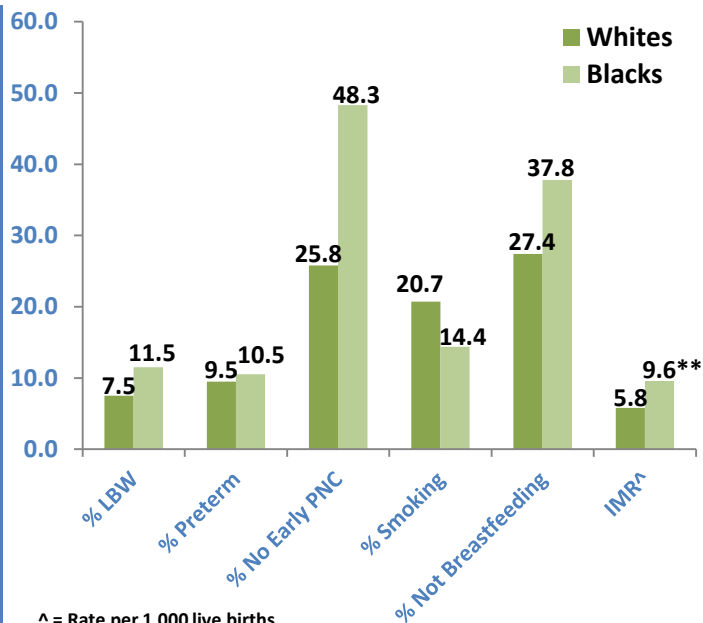
For more information on birth outcomes in your area, please see the Indiana State Department of Health Natality Report, Table 32 (<http://www.in.gov/isdh/reports/natality/2012/toc.htm>)

INDIANA QUICK FACTS

- Smoking rates among pregnant women are always one of the nation's worst
- Almost 1/3 of pregnant women do not receive early PNC
- Black women in Indiana are more likely to have a LBW or preterm baby & not get early PNC
- White women in Indiana are more likely to smoke during pregnancy

SOUTHERN REGION QUICK FACTS

- Lower percentage of LBW and preterm babies than Indiana
- Higher percentage of women receiving early PNC
- Higher percentage of women smoking during pregnancy
- Lower rate of women breastfeeding at hospital discharge



^ = Rate per 1,000 live births

* Numerator less than 20, rate unstable.

** Less than 5 birth outcomes, rate unstable.

LBW = Low Birthweight PNC = Prenatal Care IMR = Infant Mortality Rate

	% LBW (< 2,500 G)	% PRETERM (< 37 WKS GESTATION)	% NO EARLY PNC (1 ST TRIMESTER)	% SMOKING	% NOT BREASTFEEDING
BARTHOLOMEW	7.8 1.3% Lower	8.8 8.3% Lower	34.2 8.2% Higher	13.8 16.4% Lower	21.1 13.5% Lower
CLARK	8.2 3.8% Higher	10.4 8.3% Higher	27.0 14.6% Lower	17.1 3.6% Higher	26.1 7.0% Higher
CRAWFORD	5.8* 10.1% Higher	9.2* 7.3% Higher	29.2 7.6% Lower	26.7 61.8% Higher	32.5 33.2% Higher
FLOYD	8.7 10.1% Higher	10.3 7.3% Higher	26.4 16.5% Lower	11.9 27.9% Lower	22.2 9.0% Lower
HARRISON	4.9* 19.8% Lower	7.7 19.8% Lower	14.9 52.8% Lower	21.0 27.3% Higher	25.4 4.1% Higher
JACKSON	7.2 8.9% Lower	8.6 10.4% Lower	22.3 29.4% Lower	23.5 42.4% Higher	28.1 15.2% Higher
JEFFERSON	9.0 13.9% Higher	9.3 3.1% Lower	16.5 47.8% Lower	23.9 44.8% Higher	27.1 11.1% Higher
JENNINGS	7.9 No difference	9.7 1.0% Higher	32.8 3.8% Higher	27.9 69.1% Higher	32.0 31.1% Higher
ORANGE	6.6* 12.7% Higher	8.1* 8.3% Higher	29.9 5.4% Lower	28.4 72.1% Higher	32.2 32.0% Higher
SCOTT	8.9 12.7% Higher	10.4 8.3% Higher	38.2 20.9% Higher	31.1 88.5% Higher	47.5 94.7% Higher
SWITZERLAND	2.6* 13.0% Higher	7.8* 13.0% Higher	35.7 13.0% Higher	33.9 105.5% Higher	40.0 63.9% Higher
WASHINGTON	8.2 3.8% Higher	10.8 12.5% Higher	31.0 1.9% Lower	18.7 13.3% Higher	26.0 6.6% Higher
SOUTHERN REGION	7.8 1.3% Lower	9.5 1.0% Lower	27.7 12.3% Lower	19.2 16.4% Higher	26.8 9.8% Higher
INDIANA	7.9	9.6	31.6	16.5	24.4

*= Unstable rate due to fewer than 20 birth outcomes.

•Bottom number is percent difference from State.



Appendix G: Finance Initiatives



**Indiana Perinatal Quality Improvement Collaborative (IPQIC)
The Finance Committee**

**Potential Payment Innovation /Reimbursement Strategies
Recommendation: Social Impact Bonds (SIBs)
Endorsed by the IPQIC Governing Council November 18, 2014**

Summary of Issue:

Each year, governments spend hundreds of billions of dollars addressing social problems. But in most cases, we have no idea how effective this spending is. Measurement tends to focus on tracking the number of people served and the amount of service provided rather than the outcomes that are achieved. At the same time, tight budgets cause us to under-invest in prevention, even when we know that doing so will lead to greater expenditures on remediation down the road. Our fiscal predicament also threatens to stifle innovation— how can we come up with the resources to test promising new ideas when we can't even afford to pay for what we are already doing? And we are simply not making rapid enough progress in addressing social problems. From recidivism to school readiness, and obesity to workforce development and poor birth outcomes, we lack proven, cost-effective, scalable strategies.ⁱ

A business case is being made by public and private sectors leaders that investment in evidence-based programs earlier in life – prenatally to age 5 – will provide a greater return on investment to government and philanthropic organizations.ⁱⁱ

Background& Analysis:

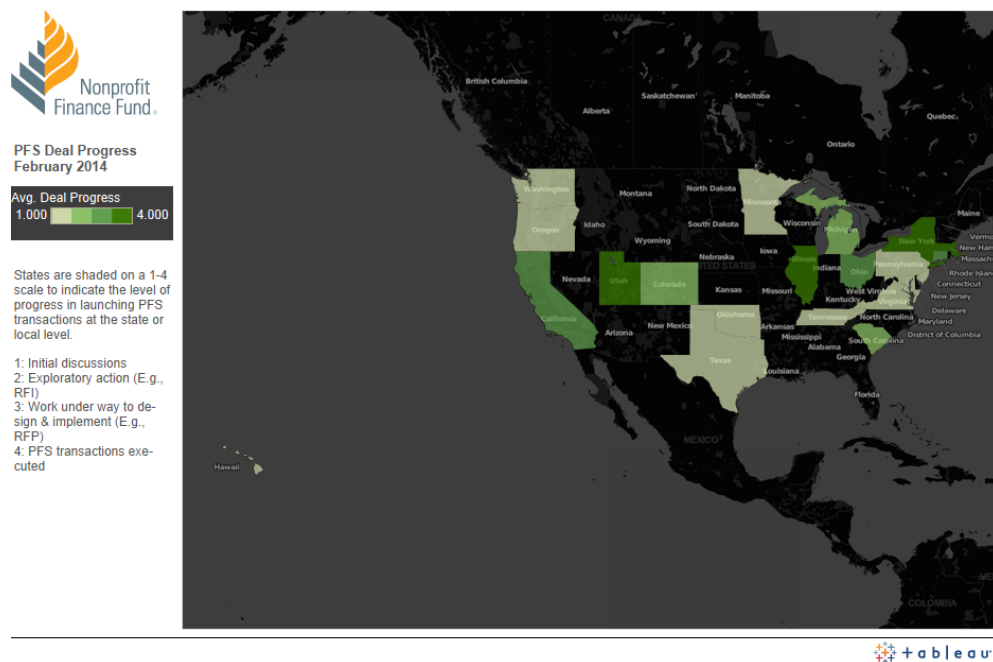
Social Impact Bonds are an arrangement between one or more government agencies and an external service organization where the government specifies an outcome(s) and promises to pay the external organization a pre-agreed sum(s) if it is able to accomplish the outcome(s). In addition, SIBs require government to place few, if any, controls on the way that the external organization accomplishes the outcome, to cooperate with the service organization so that it is able to take the actions necessary to achieve the outcome, and provide a clearly defined population and clarity on what a “successful outcome” would be.

All payments are contingent on the outcome being achieved. If outcomes are not achieved, the government pays nothing. Therefore, risk is transferred from the government to the external organization and/or its investors. The relationship is between government and the external service organization committed to accomplishing the outcome. While there may be other players present to monitor and measure outcomes independently, they are not essential to the concept, and they generally do not have a direct relationship with government. While SIBs are likely to be particularly useful in areas where accomplishing outcomes results in direct savings for government, not all SIBs have to result in government savings.

The study and implementation of social impact bonds in the U.S. to fund evidence-based health, education and social programs is rapidly expanding. Social Finance, an internationally recognized leader in Social Impact Bond development and deployment, believes the true innovation of SIBs lies in unlocking pools of investment capital to provide governments flexibility to support preventive services during tough budget times, offering social service organizations the stability of long-term funding sources to enable growth and focus on results-oriented services, and providing private investors the opportunity to earn social and financial return on their investment.

The SIB concept generally enjoys bipartisan support: Conservatives embrace its focus on government efficiency, while progressives laud its ability to serve more at-risk individuals. This support, however, has not generally translated into actionable policy. Most states lag far behind in developing a legislative framework to facilitate SIBs. Also, some governments at the state and local levels are wary of the optics of SIB deals; they may face criticism for using taxpayer money to repay wealthy investors. In addition, launching a SIB is time consuming and complex for governments at this early stage.ⁱⁱⁱ

The Nonprofit Finance Fund maintains an interactive website (U.S. map) showing the SIB projects under development and implemented in the United States. [SIB Project Interactive Map Link](#) This website maintains an inventory of projects and provides technical assistance for governments and organizations exploring the development of social impact bonds. The five active SIB projects in states shown in dark green are pre-K (Utah), workforce development/recidivism (NY & MA) and child welfare (IL) programs.



Recommendation:

- Due to the novelty of social impact bonds in the U.S. and the only recently developed interest by public and private sector leaders in Indiana, the IPQIC Finance Committee recommends that state government takes a more coordinated approach on SIB

development as a financing option. It would be prudent to first understand the level of interest by various government agencies, the legislature and private sector leaders in the community. Therefore,

- A low cost approach to increase this understanding and generate useful information on SIBs as a viable financing opportunity for Indiana would be for the Indiana Office of Management and Budget to release a Request for Information (RFI). This RFI approach would help state government gain a more complete perspective on the current landscape in Indiana with regards to service provider and potential investor interest in SIB financing.
 - An example of a recently released RFI in Illinois is included as reference.
- Examples of SIB outcomes and projects relevant to IPQIC objectives are shown in Table 1.

Table 1: EXAMPLES OF IPQIC HEALTH OUTCOMES SUITABLE FOR PROJECTS FINANCED BY SOCIAL IMPACT BONDS

Reduction in infant and maternal mortality and morbidity rates
Reduction in low and very low birth weight babies
Reduction in preterm births
Reductions in tobacco use and substance abuse in pregnant women
Reduction in NICU admission rates
Improved child development and behavioral conditions
Reduction in unexpected newborn complications/infections
Increase in pregnancy intervals/ birth spacing
Improved breastfeeding rates
Reduction in teen pregnancy rate
Potential projects to achieve collective impact of the outcome examples shown above
● Perinatal Centers of Excellence
● Perinatal Care Coordination Programs such as Centering Pregnancy, Pregnancy Medical Home Program, and Home Visiting.
● Targeted High Risk Programs addressing complex health issues such as Neonatal Abstinence Syndrome

Key Participants

- Office of Management and Budget
- Department of Health, Family & Social Services Administration
- Private Investors
- Service Organizations

ⁱ Liebman and Sellman, Social Impact Bonds, A Guide for State and Local Governments, Harvard Kennedy School, June 2013, page 6: “We Need a New Approach”

ⁱⁱ Ready Nation, Business Case for Early Childhood Investment, www.readynation.org, 2014

ⁱⁱⁱ Palandjian and Hughes, A Strong Field Framework for SIBs, Stanford Social Innovation Review, July 2, 2014, page 6.



**Indiana Perinatal Quality Improvement Collaborative (IPQIC)
The Finance Committee
Potential Payment Innovation /Reimbursement Strategies
Recommendation: Long-Acting Reversible Contraception (LARC)
Endorsed by the IPQIC Governing Council September 24, 2014**

Summary of Issue:

Long-acting reversible contraception, intrauterine device (IUD) or implant is a reliable form of contraception that is clinically appropriate for placement in the immediate postpartum period. Providing women with easy access to LARC methods greatly reduces the risk of unplanned pregnancies, and improves the health of newborns by facilitating healthy spacing between pregnancies. This is particularly important for adolescents where rapid repeat pregnancies occur too often. The adolescent birth rate for the state of Indiana is estimated to be 37.3 births per 1,000. For all 15-19 year-old women who have had an adolescent pregnancy, 17.1% have a second pregnancy within 12 months and 22.5% percent have another pregnancy within 18 months.

Currently, a significant barrier to providing post-partum LARC is related to facility reimbursement. In the Diagnosis Related Group (DRG) reimbursement system, which is widely used for inpatient payments, it is believed there is no additional reimbursement for the LARC as it is bundled into the facility payment for the admission in certain cases, and in other cases the reimbursement may be insufficient to cover the cost of the device. Given the cost of a device, it is seldom, if ever, used in the immediate postpartum period and the patient often leaves the hospital unprotected. This is a missed opportunity to provide reliable family planning while extending the interpregnancy interval, decreasing the risk of subsequent preterm birth. Although insertion may occur at a later post-partum visit, the likelihood of a new mother receiving this service falls dramatically if she leaves the hospital without it.

Background & Analysis:

- LARC is widely acknowledged as safe and highly effective. ACOG strongly supports the use of LARCs. ACOG has created and promotes their LARC Program which includes Practice Bulletins, clinical guidelines, educational materials and training opportunities, which can be accessed through their website. <http://www.acog.org/About-ACOG/ACOG-Departments/Long-Acting-Reversible-Contraception>

The guidelines state “LARC methods should be offered as first-line contraceptive methods and encouraged as options for most women.”

- An increasing number of state Medicaid programs (e.g. South Carolina, Iowa, New York, Colorado, New Mexico, Louisiana, Georgia), are addressing the reimbursement barriers associated with the use of LARCs in the immediate postpartum period. They have implemented or are in the process of implementing policies allowing for separate reimbursement for the LARC device when provided in the inpatient setting in the immediate postpartum period. In July, in an attempt to prevent unplanned pregnancy and unplanned short interpregnancy intervals, New York health officials went public encouraging health providers to ensure women have access to LARC devices immediately after delivery, calling on private insurers to follow their lead.

States that have recently implemented coverage policies allow for the LARC to be reimbursed separately on an outpatient claim and are reimbursed either by submission of a cost invoice or an established fee. Current IHCP fee schedule amounts for LARCs are as follows:

HCPCS Code	Description	Fee
J7300	Intrauterine copper contraceptive	\$627.90
J7301	Levonorgestrel-Releasing intrauterine contraceptive system (SKYLA)	\$682.84
J7302	Levonorgestrel-releasing intrauterine contraceptive system, 52 m	\$811.28
J7306	Levonorgestrel Implant system, including implants and supplies	\$426.30
J7307	Etonogestrel implant system, including implant and supplies	\$692.39

- The Centers for Medicare and Medicaid Services (CMS) also recently addressed the importance of increasing the use of effective contraceptive methods. Excerpts from a CMS Informational Bulletin dated July 17, 2014 include:
 - In recognizing the urgency presented by our nation’s poor birth outcomes, CMCS is experiencing a unique time in this nation’s history in which the federal and state governments, maternal and infant health advocacy groups and provider groups are working in tandem to improve perinatal outcomes and reduce disparities.
 - After considering the advice of the Expert Panel and partnership opportunities, CMCS has identified two distinct yet interrelated goals for its Maternal and Infant Health Initiative. The initiative leverages existing partnerships and activities to:
 - Increase by 10 percentage points the rate of postpartum visits among pregnant women in Medicaid and CHIP in at least twenty states over a 3-year period; and
 - Increase by 15 percentage points the use of effective methods of contraception in Medicaid and CHIP in at least twenty states over a 3-year period.
 - Reproductive planning which includes access to contraception, either during the immediate postpartum period or during any other time in the reproductive continuum, allows for appropriate birth spacing and improved access to services

that can, in turn, improve perinatal outcomes. One of the key themes that emerged from the Expert Panel is that current public and private reimbursement mechanisms do not align well with achieving good perinatal outcomes. Through the Maternal and Infant Health Initiative, CMCS will promote payment, program and coverage policies that enhance provider service delivery for use of effective contraception and timely postpartum care and enhance the accessibility of these services to women.

- Traditionally, LARC has been provided at the postpartum visit, 4-6 weeks after the delivery. Unfortunately, show rates for postpartum visits tend to be particularly low for adolescents where rapid repeat pregnancy and short interpregnancy intervals are particularly prevalent. Moreover, women who are bottle-feeding or supplementing breastfeeding with formula may resume ovulation as early as 3 weeks postpartum and thus are at-risk for unintended pregnancy if not using reliable contraception.
- There is growing published evidence of the effectiveness of immediate postpartum implant contraceptive devices and that patient's continuation timeframe is longer when compared to control groups. For example, Tocce, et al found that at 6 months, 9.9% of the control participants were pregnant (21/213); there were no immediate postpartum implant (IPI) pregnancies. By 12 months, 18.6% of control participants (38/204) experienced pregnancy vs 2.6% of IPI recipients (4/153; relative risk, 5.0; 95% confidence interval, 1.9–12.7). Implant continuation at 6 months was 96.9% (156/161 participants); at 12 months, the continuation rate was 86.3% (132/153 participants). Consistent contraception use was 99.4% in the IPI group at 6 months after delivery vs 54.9% among control subjects. At 12 months, consistent contraception was 94.3% in the IPI group and 52.3% in the control group. (1)

Cost effectiveness has also been demonstrated. Han, et al, found for every dollar spent on IPIs, \$0.79, \$3.54, and \$6.50 would be saved at 12, 24, and 36 months. Savings in this study were based on participants in an adolescent prenatal-postnatal program that were enrolled in a prospective observational study of IPI insertion (N=171) vs standard contraceptive initiation (N= 225).

- IU School of Medicine conducted a research project to evaluate the impact of immediate postpartum contraception on rapid repeat pregnancies (RRP) in their urban hospital system. The 2013 study focused on adolescents, given the need for specific and effective interventions for this age group.

Results and findings of the IU School of Medicine Research Project included the following:

- Immediate postpartum contraception was used in 28.9% of the adolescents who delivered from January 1, 2010 to July 1, 2012. Of the patients who received immediate postpartum contraception, 16.3% had a RRP, compared to 33.5% of those who did not receive any type immediate postpartum contraception (p-value =

0.005). The RRP rate was lowest for patients who received an immediate postpartum etonorgestrel (ETN) implant (3.7%, 1/27) compared to those that received immediate postpartum depot medroxyprogesterone acetate injection - DMPA (22.6%, 12/53) and those who received no immediate postpartum contraception (33.5%, 66/197; p-value 0.001). Twenty-six of 27 adolescents who had an ETN implant placed in the hospital continued that method during the 18-month study period.

- Missing a postpartum visit was associated with a high rate of RRP. Of note, 48.1% of those RRP missed their postpartum visit; the overall show rate for the postpartum visit in this study patient population was approximately 67%.
- Perhaps the most important aspect of the study highlights that the type of contraception utilized significantly impacts the reduction of RRP rates. ETN implants had the highest benefit in the reduction of RRP rates. This correlates to the Tolle noted above (1) as well as the findings of Simon et. al. that showed that the failure to use the ETN implant during the postpartum period was the strongest predictor of repeat pregnancy during the first 2 postpartum years (3). Furthermore, the use of the ETN implant had a 4 times stronger effect on reduction of RRP than did DMPA (4)

The IU study further demonstrated that immediate postpartum contraception has a significant impact on the reduction of RRP rates and is consistent with the evidence that providing immediate postpartum contraception is essential in decreasing RRP especially in a high-risk population such as adolescent patients.

Recommendation:

- Provide sufficient reimbursement to the professional for LARC (IUD or implant) insertion that encourages providers to perform the procedure in the hospital setting immediately post-delivery.
- Allow adequate reimbursement to facilities for the implant device when provided in the inpatient setting in the immediate postpartum period.
- Encourage educational efforts directed toward providers regarding the provision, coverage, and reimbursement of LARC in the immediate postpartum period.
- Emphasize that LARC insertion is a decision between patient and physician.
- Offer Provider and Consumer Education on clinical guidelines and options.

Key Participants

- Any hospital providing maternity services
- Obstetric providers (Ob/Gyns, FPs, nurse practitioners)
- OMPP, commercial payers
- Consumers

Expected Outcomes & Feasibility:

Expected outcome is increased utilization of LARC which will decrease unplanned pregnancy and increase the interpregnancy interval, leading to decreased preterm birth risk. Cost savings should also be demonstrated. The feasibility of implementation is high.

Outcome measures:

- Track utilization of LARC by Medicaid beneficiaries in the postpartum IP setting
- Track discontinuation rates and time to discontinuation
- Track birth rates pre and post implementation including pregnancy rates by 12 and 18 month intervals after delivery

Notes:

- 1) Tocce KM, Sheeder JL, Teal SB. Rapid repeat pregnancy in adolescents: do immediate postpartum contraceptive implants make a difference? *Am J Obstet Gynecol* 2012;206:481.e1-7.
- 2) Han L, Teal SB, Sheeder J, et al. Preventing repeat pregnancy in adolescents: is immediate postpartum insertion of the contraceptive implant cost effective? *Am J Obstet Gynecol* 2014;211:24.e1-7.
- 3) Neena T. Qasba, M.D., Impact of immediate postpartum contraception on the rate of rapid repeat pregnancy in adolescents in an urban hospital system. Indiana University, Department of OB/GYN, 2014.
- 4) Kelly LS, Sheeder J, Stevens-Simon C. Why lightning strikes twice: Postpartum resumption of sexual activity during adolescence. *J Pediatr Adolesc Gynecol* 2005;18:327e35.
- 5) Tocce K, Sheeder J, Python J, Teal SB. Long acting reversible contraception in postpartum adolescents: Early initiation of etonogestrel implant is superior to IUDs in the outpatient setting. *J Pediatr Adolesc Gynecol*. 2012;25:59-63.



Appendix H: Neonatal Abstinence Syndrome Report

2014

Neonatal Abstinence Syndrome Report

NAS Task Force, October 2014



NAS TASK FORCE RESPONSE TO SB 408

Neonatal Abstinence Syndrome (NAS) is a drug withdrawal syndrome that presents in newborns after birth when transfer of harmful substances from the mother to the fetus abruptly stops at the time of delivery. NAS most frequently is a result of opioid use in the mother but may also occur as a result of exposure to benzodiazepines and alcohol. Fetal exposure most frequently occurs for one of three reasons:

- The pregnant woman is dependent/addicted to opioids, either prescribed or illicit;
- The pregnant woman requires treatment with prescription opioids for another disease process; or
- The pregnant woman is receiving prescribed opiate replacement therapy.

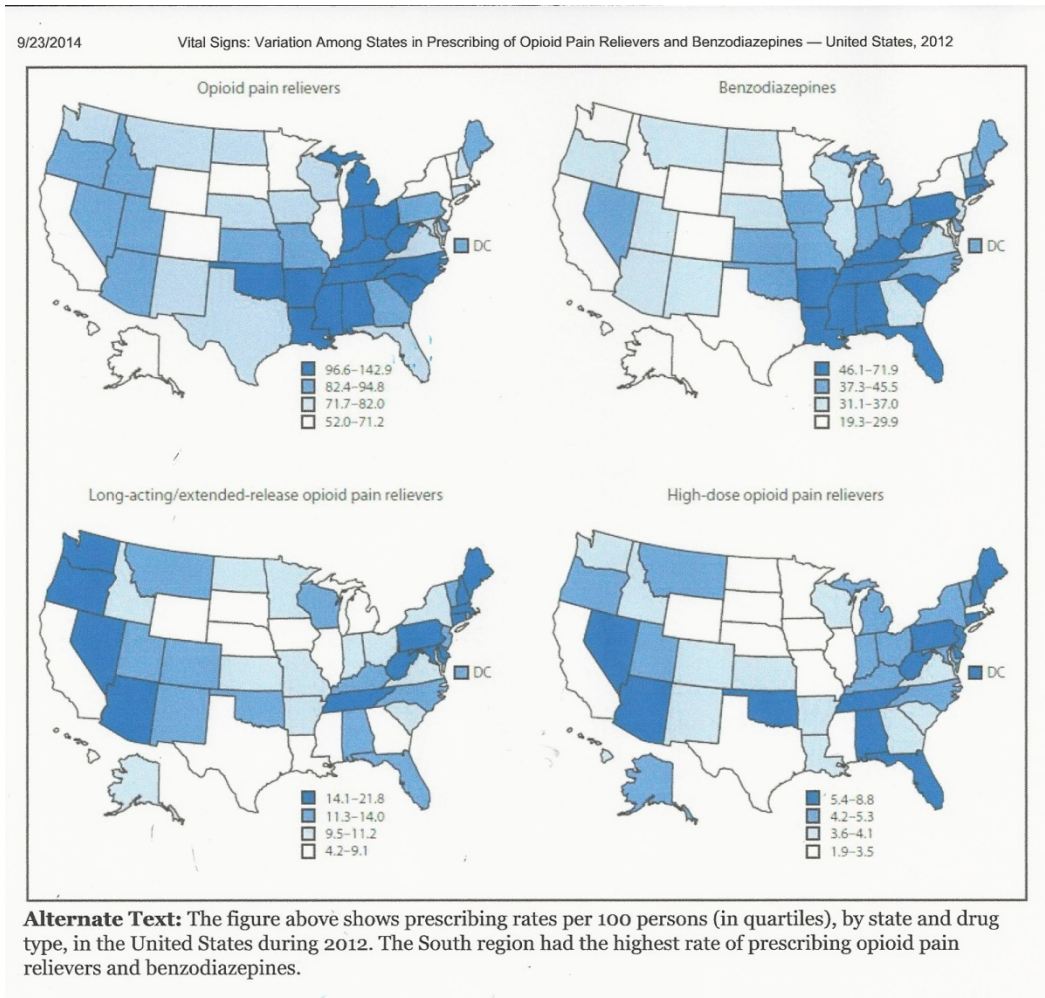
The incidence of NAS has increased significantly over the last fifteen years. In 2000, the rate per 1,000 births was 1.2. In 2009, the rate was 3.39 per 1,000 births. Maternal opiate use has increased even more dramatically. In 2000, the rate was 1.19 per 1000 births per year and in 2009 the rate was 5.63 per 1,000 births per year. The cost of care for infants diagnosed with NAS has also increased from \$190 million in 2000 to \$720 million in 2009.¹

In a report released by the Centers for Disease Control and Prevention (CDC),² prescribers wrote 82.5 Opioid Pain Reliever (OPR) prescriptions and 37.6 benzodiazepine prescriptions per 100 persons in the United States in 2012. The range nationally for OPR was a high of 142.9 per 100 persons for Alabama and a low of 57.0 per 100 persons for California. The range for benzodiazepine prescriptions was a high of 41.5 per 100 persons for Delaware and a low of 34.2 per 100 persons for Illinois. Only eight states had a higher prescribing rate for opioid pain relievers than Indiana's rate of 109.1 per 100 persons and 16 states had a higher prescribing rate for benzodiazepine than Indiana's rate of 42.9 per 100 persons.

¹ Patrick S, Schumacher R, Benneyworth B, *et al.* "Neonatal abstinence syndrome and associated health care expenditures: United States, 2000-2009." *JAMA*. 2012. 307(18):1934-40.

² http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6326a2.htm?s_cid=mm6326a2

The following figure from the CDC report documents that status of states related to prescribing practices.



In 2014, the 118th Indiana General Assembly passed Senate Bill 408 which added Section 244.8 to Indiana Code 16-18-2 stating:

"Neonatal abstinence syndrome" and "NAS", for purposes of IC 16-19-16, refer to the various adverse effects that occur in a newborn infant who was exposed to addictive illegal or prescription drugs while in the mother's womb.

The legislation added IC 16-19-16 which required that the State Department of Health establish a task force that included, at a minimum, representatives from the Indiana Hospital Association, the Indiana Perinatal Network, the Indiana State Medical Association, the Indiana Chapter of the American Academy of Pediatrics, the Indiana Section of the

American Congress of Obstetricians and Gynecologists, and the Indiana Chapter of the March of Dimes. The task force was charged with five deliverables:

- (1) The appropriate standard clinical definition of "Neonatal Abstinence Syndrome";*
- (2) The development of a uniform process of identifying Neonatal Abstinence Syndrome;*
- (3) The estimated time and resources needed to educate hospital personnel in implementing an appropriate and uniform process for identifying Neonatal Abstinence Syndrome;*
- (4) The identification and review of appropriate data reporting options available for the reporting of Neonatal Abstinence Syndrome data to the state department, including recommendations for reporting of Neonatal Abstinence Syndrome using existing data reporting options or new data reporting options; and*
- (5) The identification of whether payment methodologies for identifying Neonatal Abstinence Syndrome and the reporting of Neonatal Abstinence Syndrome data are currently available or needed.*

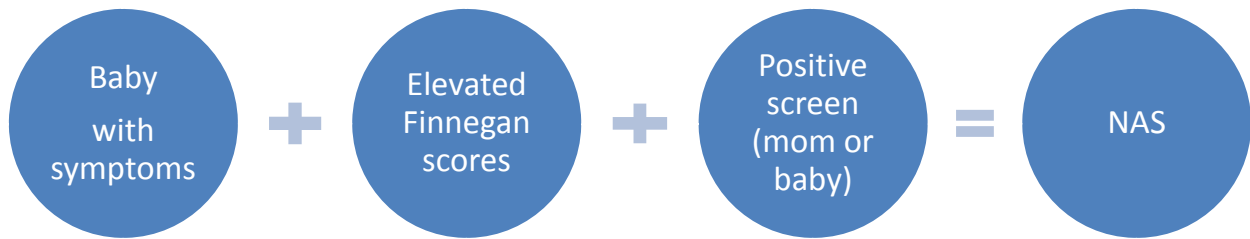
The Task Force was convened in May 2014 with approximately 50 members³ who met monthly to accomplish the deliverables. The committee reviewed national guidelines, relevant literature and practices related to NAS developed by other states in order to fully inform the decision-making process. After completion of the review process and substantive discussion of the issues related to NAS, the following represents the consensus position of the NAS Task Force.

Deliverable 1: The appropriate standard clinical definition of "Neonatal Abstinence Syndrome."

The Task Force has recommended that the diagnosis of NAS should be applied to babies who meet the following criteria:

³ Names and affiliations of the Task Force Members are listed in Appendix A on page 10.

- Symptomatic;
- Have two or three consecutive Modified Finnegan scores equal to or greater than a total of 24; and
- Have one of the following:
 - A positive toxicology test, or
 - A maternal history with a positive verbal screen or toxicology test.



Deliverable 2: The development of a uniform process of identifying Neonatal Abstinence Syndrome.

The Task Force developed a process for both pregnant women and newborns for the purpose of correctly identifying pregnant women at risk for delivering a baby with NAS.

- The **Obstetric Protocol** focuses on two points in time:
 - The first prenatal visit; and
 - Presentation at the hospital/birthing center for delivery.

First Prenatal Visit

At the initial prenatal visit, as part of routine prenatal screening, the primary care provider will conduct a standardized and validated verbal screening process and a urine toxicology screen. The toxicology screen is voluntary and the pregnant woman can opt out of the toxicology screen. At the discretion of the primary care provider, INSPECT and/or repeat verbal and toxicology screenings may be performed at any visit. The toxicology screen is always voluntary on the part of the pregnant woman.

Presentation at the hospital/birthing center for delivery.

When the pregnant woman arrives at the hospital for delivery, hospital personnel will conduct a standardized and validated verbal screening on all women. Medical staff will request that the woman consent to a urine toxicology screening for anyone with a positive screening result at any point during her pregnancy including presentation for delivery. Babies whose mothers had a positive verbal screen or positive toxicology screening results or babies whose mothers did not consent to the toxicology screen will be screened using urine, cord or meconium.

- The **Neonatal Protocol** focuses on three cohorts of babies:
 - Newborns with **no identifiable risk**;
 - Newborns **at risk** for NAS; and
 - Newborns with **unknown risk**.

Mother's status	Level of Risk for infant	Suggested Action
Negative verbal and toxicology screens	Newborn with no identifiable risk	No testing recommended at birth
Positive verbal screen and/or positive toxicology screen at any time	Newborn at risk for NAS	<ul style="list-style-type: none">• Perform urine and meconium or cord toxicology screening at birth• Perform Modified Finnegan scoring• Evaluate maternal support resources
<ul style="list-style-type: none">• No known verbal or toxicology screen during pregnancy• Negative verbal screen but no known toxicology screen	Newborns with unknown risk	<ul style="list-style-type: none">• Perform urine and meconium or cord toxicology screening at birth.• Perform Modified Finnegan scoring

Newborns with no identifiable risk factors are babies whose mothers have had all negative verbal and toxicology screens. There is no recommendation for testing those babies. When

the mother has had a positive verbal screen and/or a positive toxicology screen, a toxicology screen of the infant's urine, cord or meconium will be conducted; additionally, a modified Finnegan scoring will be initiated.

For newborns with unknown risk, meaning that the mother has not had either verbal or toxicology screening during the pregnancy, or the mother had a negative verbal screen but no toxicology screen, the toxicology screen of the infant's urine, cord or meconium will be conducted; additionally, a modified Finnegan scoring will be initiated.

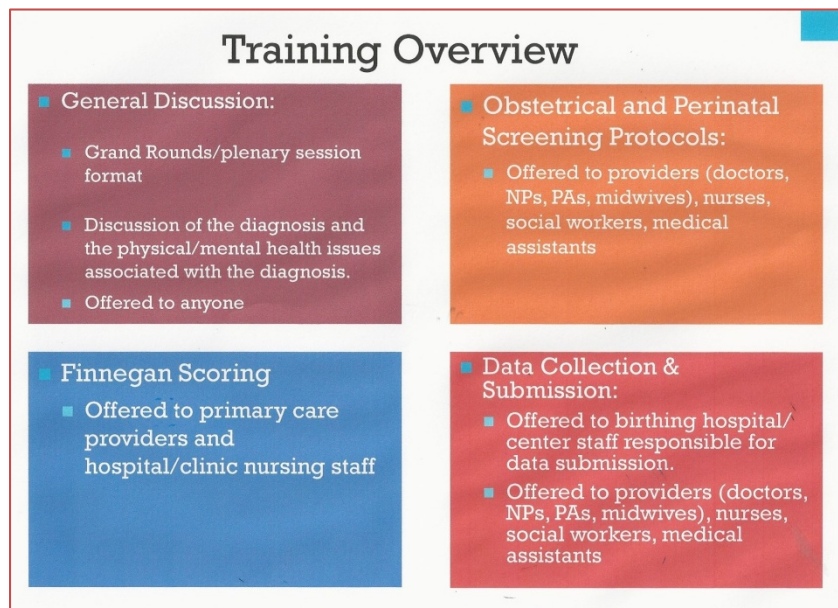
Deliverable 3: The estimated time and resources needed to educate hospital personnel in implementing an appropriate and uniform process for identifying Neonatal Abstinence Syndrome.

The Task Force identified tools and developed a process for educating hospital personnel. In order to identify a cost effective and consistent approach to the identification of NAS, the Task Force recommended that the state employ a "train the trainer" model by conducting a one day training for hospital/birthing center perinatal educators who would then return to their facility and develop a training plan that would ensure that perinatal hospital personnel have the knowledge and skills necessary to properly identify NAS. Incorporating NAS into already designated and budgeted education days limits the fiscal liability to the facilities. Incorporating NAS in future competency evaluations and nursing orientation curricula provides an already established vehicle for ongoing staff education.

Two training programs have been identified to support inter-rater reliability for Finnegan scoring necessary to make the official diagnosis of NAS. The two training modules and their costs are: NeoAdvance from Vanderbilt University (\$120 for the DVD and Manual) and the module developed by Gateway Health in Pennsylvania (\$20 for the DVD and Manual). The Task Force chose to recommend both curricula as some hospitals have already purchased materials and trained their staff.

The Task Force developed and implemented a survey⁴ of the nurse managers of ninety-one Indiana birthing hospitals to determine the extent to which hospitals were currently implementing policies and training related to NAS. The survey was conducted to get a better sense of what was happening in the state and the amount of effort that it would take to get to consistent policy implementation related to NAS. Fifty-one percent (51%) of hospitals responded to the survey. Forty percent (40%) of the respondents did not have a policy related to the diagnosis of NAS and 38% did not have a policy related to the management of NAS. Of the hospitals that indicated they had a policy, 42% indicated that the policy was always followed while an additional 30% indicated that the policy was usually followed. Only 19% of the respondents indicated they were using a recognized training program.

In addition to training hospital staff, a more comprehensive training initiative was recommended by the Task Force members that would extend beyond the initial identification process and beyond hospital personnel. This training initiative would require additional resources to reach the broader audience that is identified.⁵ A more detailed chart is provided in Appendix C.



⁴ The survey questions can be reviewed in Appendix B on page 12.

⁵ The detailed training overview can be reviewed in Appendix C on page 14.

Deliverable 4: The identification and review of appropriate data reporting options available for the reporting of Neonatal Abstinence Syndrome data to the state department, including recommendations for reporting of Neonatal Abstinence Syndrome using existing data reporting options or new data reporting options.

There was significant discussion among Task Force members related to the collection of identified versus de-identified data. While there was a real commitment to get to identified data so that supports and resources can be provided to the woman and her baby, there was real reluctance based on the variation across Indiana counties of whether NAS is addressed as a medical/public health issue or as a criminal/child protection issue. Until this issue is clarified and dealt with universally across counties, the Task Force has recommended that all data collected be de-identified.

ISDH has proposed that the portal used to collect newborn metabolic screening and newborn hearing screening be expanded to add NAS screening data. Hospitals are familiar with the process and a new data sheet to capture NAS data within the existing portal can be developed without additional expense.

The proposed data elements⁶ capture hospital information, maternal and infant basic information and diagnostic information. This minimum information would allow ISDH to obtain data on incidence and on types of drugs identified.

Hospital Information	Maternal Infant Information	Diagnostic Information
<ul style="list-style-type: none"> • Hospital Name • Department <ul style="list-style-type: none"> ○ NICU ○ Newborn Nursery ○ Pediatrics 	<ul style="list-style-type: none"> • Maternal Age • Maternal Residence <ul style="list-style-type: none"> ○ In-state ○ Out-of-State • Third Party Coverage • Infant Gestational Age at Birth • Infant Chronologic Age at Diagnosis 	<ul style="list-style-type: none"> • Method of Diagnosis: <ul style="list-style-type: none"> ○ Maternal ○ Infant • Drugs Identified: <ul style="list-style-type: none"> ○ Mother ○ Baby

⁶ A detailed list of the data elements can be seen in Appendix D on page 16.

Deliverable 5: The identification of whether payment methodologies for identifying Neonatal Abstinence Syndrome and the reporting of Neonatal Abstinence Syndrome data are currently available or needed.

The Task Force reviewed each of the charges identified in SB 408 to determine both the cost of implementation and available reimbursement.

- Toxicology Screening: The cost of toxicology screening will vary based on the composition of the drug panel for which testing is being conducted. The three initial drugs that the Task Force recommends are Opioids, Alcohol, and Benzodiazepines. Both public and private insurance will typically cover the cost of these screenings. However with a universal approach, it is anticipated that there will be an increase in the number of screens and therefore an anticipated increase in cost to third party payors.
- Training: The Task Force is recommending a "train the trainer" model. ISDH would sponsor a one day training bringing in the nurse educators from all 91 birthing hospitals to provide training on NAS identification and modified Finnegan scoring. The nurse educators would be responsible for the development of a training plan and incorporating the training into already existing hospital education days. NAS training would also become part of their orientation for new staff. While there would be costs associated with the purchase of the training materials,⁷ by incorporating the training into already scheduled education events, the increased costs to hospitals would be limited.
- Data Collection: The development of the portal and collection sheet will be completed by ISDH staff and will have a cost of \$50,000 to support an additional FTE to develop, support, monitor and analyze the NAS data collection process. Estimates on the additional time that it will take for hospital staff to gather the information and enter the data cannot be confirmed until the proposed pilot process is complete.

⁷ NeoAdvance from Vanderbilt University (\$120 for the DVD and Manual) and the module developed by Gateway Health in Pennsylvania (\$20 for the DVD and Manual)

APPENDIX A: NAS TASK FORCE MEMBERS

First Name	Last Name	Affiliation
Jonell	Allen, DNP, MSN, CNS-BC, RNC-OB	Community Health Network
Ivy	Antonian, RN	Franciscan St Elizabeth East
Deb	Beynon	St Vincent Women & Children's
Bob	Bowman	Indiana State Department of Health
James	Cameron, MD	Northern IN Neonatal Associates
Kathryn	Carboneau, MD	Retired Anesthesiologist
Amelia	Clark	Meridian Health Services
Teri	Conard	Marion Co Health Dept
Mary	Degeneffe, MD	Pediatrix Medical Group
Stan	DeKemper	Indiana Counselors Association on Alcohol and Drug Abuse (ICAADA)
Maria	Del Rio Hoover, MD**	St. Mary's Neonatal Clinic Indiana State Medical Association
Netta	Doughty	Social Worker
Joan	Duwve, MD	Indiana State Department of Health Indiana University School of Medicine
Lisa	Eagans, RNC, MSN	Schneck Medical Center
John	Ellis, MD**	MHS Indiana
Donetta	Gee-Weiler, RN, BSN	Community Health Network
Mark	Gentry, MD	Indiana Chapter, American College of Obstetrics and Gynecology
Don	Granger, MD, MPH	St. Mary's Neonatal Clinic
Laura	Haneline, MD	IU Dept of Pediatrics
Julia	Tipton Hogan	Indiana Perinatal Network
Larry	Humbert	Indiana Perinatal Network
Vicki	Johnson, MSN, RN, NE-BC	Schneck Medical Center
Julie	Kathman, MSN, RN, CNS-BC, CPN	Bloomington Hospital
Julie	Keck, MD	Anthem
Mary Beth	Koch, NNP-BC, C-NPT	IU Health Riley
Abigail	Kuzma	Attorney General's Office
Joseph	Landwehr, MD	IU Health Ball Memorial
Bethany	Littrell, LMHC, LCAC	St. Vincent Hospital
Art	Logsdon, JD	Indiana State Department of Health
Joanne	Martin, RN DrPH	Goodwill of Central Indiana
JoAnn	Matory, MD	Eskinazi Hospital - March of Dimes

First Name	Last Name	Affiliation
Christina	McCaul	Community Health Network
Deborah	McCullough, MD	North Shore Community Health Center
Debra	McDaniel, MD	Southern Indiana Physicians
Minjoo	Morlan, MSW	March of Dimes
Ann	Morrow, MSN, RN	Columbus Regional Hospital
Olufemi	Okanlami, MD	Memorial Hospital
Lu-Ann	Papile, MD	Indiana University IN Chapter American Academy of Pediatrics
Anna	Schwartz	IU Dept of Pediatrics
Kimberly	Shimer, MD	The Women's Hospital
Andy	Shull, MD	IN Academy of Family Physicians
Anne Lise	Sullivan, RN, BSN, MA	Marion Co Public Health
Dan	Sunkel, MD	Franciscan St. Elizabeth East
Bernie	Ulrich	Indiana Hospital Association
Holly	Walpole	IN Professional Licensing Agency
John	Wareham, MD	St Vincent Women & Children's
Eric	Yancy, MD	MHS Indiana

Appendix B: NAS Survey Tool

NAS Survey

The NAS Task Force is preparing a report on the incidence of Neonatal Abstinence Syndrome (NAS) for the Indiana General Assembly. The Task Force is charged with determining a process for identifying the extent of NAS in Indiana and to develop a consistent definition and protocols for the assessment of pregnant women and newborns. Please take a few minutes out of your very busy schedule to answer this short survey. All information will be aggregated and not attributable to any hospital. Thank you.

1. Hospital:

2. Contact Information:

Name:

Address:

Address 2:

City/Town:

ZIP:

Country:

Email Address:

Phone Number:

3. Self-Declared Level of Care

	Obstetrics	Neonatal
Level I	<input type="checkbox"/>	<input type="checkbox"/>
Level II	<input type="checkbox"/>	<input type="checkbox"/>
Level III	<input type="checkbox"/>	<input type="checkbox"/>
Level IV	<input type="checkbox"/>	<input type="checkbox"/>

4. Do you currently have a policy related to NAS in the following areas?

	Yes	No
Diagnosis	<input type="radio"/>	<input type="radio"/>
Management	<input type="radio"/>	<input type="radio"/>

5. How consistently is this policy implemented?

Always

Usually

Infrequently

We have no policy

NAS Survey

6. What education program do you use to train staff?

- Vanderbilt - NeoAdvance
- Pittsburgh - Gateway Health
- Other (please specify)

7. What scoring tool are you currently using?

- Finnegan
- Modified Finnigan
- Other (please specify)

8. What hospital staff are currently being trained? Check all that apply.

	NAS Protocols	Scoring
NICU Nurses	<input type="checkbox"/>	<input type="checkbox"/>
Newborn Nursery Nurses	<input type="checkbox"/>	<input type="checkbox"/>
Labor and Delivery Nurses	<input type="checkbox"/>	<input type="checkbox"/>
Postpartum/mother baby Nurses	<input type="checkbox"/>	<input type="checkbox"/>
Pediatric Nurses	<input type="checkbox"/>	<input type="checkbox"/>
Emergency Room Nurses	<input type="checkbox"/>	<input type="checkbox"/>
Neonatologists	<input type="checkbox"/>	<input type="checkbox"/>
Pediatricians	<input type="checkbox"/>	<input type="checkbox"/>
Obstetricians	<input type="checkbox"/>	<input type="checkbox"/>
Emergency Medicine Physicians	<input type="checkbox"/>	<input type="checkbox"/>

Appendix C: Proposed NAS Training Overview⁸

Clinician Type	Training Topics				Trainee Locations ⁹			Potential Training Modes	
	NAS General	NAS Screening	Finnegan Scoring	Data Gathering and Submission	Hospital	Office	Other	Initial (Periodic)	Ongoing (as needed)
Providers:								<ul style="list-style-type: none"> Self-study Hospital 	<ul style="list-style-type: none"> Self-study Hospital
OB	X	X			X	X	Birthing Centers	Training Resources, Sponsors, Communicators: <ul style="list-style-type: none"> ISDH IPN INAAP INACOG March of Dimes 	<ul style="list-style-type: none"> IHA ISMA INAAFP INACEP AWHONN
PED	X	X	X		X	X	Urgent Care Centers		
FP	X	X	X		X	X			
ED	X	X			X				
Adv Practice Nurses	X	X	X						
Nurses						X	X	<ul style="list-style-type: none"> Train the Trainer Day Statewide Competency Training Day Unit Orientation Self-Study 	<ul style="list-style-type: none"> Competency Training Day Unit Orientation Self-Study
Hospital Departments									
• L&D					X				
• Post-Partum	X	X	X		X				
• Mother-Baby	X	X	X	X	X				
• NICU	X	X	X						
• Nursery				X	X				
• Pediatrics	X	X	X	X					
• ED	X	X	X						
Birthing Centers	X								
Urgent Care Centers					X				
Home Health		X	X						
Public Health	X	X	X						
	X	X	X						
	X	X	X						
	X	X	X						
Medical Support Personnel	X	X		X	X	X	X	With the nurses	With the nurses
SW	X	X		X	X		X	With the nurses	With the nurses
OT/PT/SLP	X				X			With the nurses	With the nurses

⁸ This reflects the best thinking of the Task Force prior to pilots.

⁹ At the discretion of the Center

Appendix D: NAS Data Collection Elements

<p>Hospital Name:</p>	<p>Department where infant screening occurred:</p> <ul style="list-style-type: none"> <input type="checkbox"/> NICU <input type="checkbox"/> Newborn Nursery <input type="checkbox"/> Pediatrics
<p>Maternal Age:</p> <ul style="list-style-type: none"> <input type="checkbox"/> < 20 <input type="checkbox"/> 20-24 <input type="checkbox"/> 25-29 <input type="checkbox"/> 30-34 <input type="checkbox"/> 35-39 <input type="checkbox"/> 40+ 	<p>Maternal Residence:</p> <ul style="list-style-type: none"> <input type="checkbox"/> In-state <input type="checkbox"/> Out-of-State <p>Third Party Coverage:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Medicaid <input type="checkbox"/> Private Insurance <input type="checkbox"/> None <input type="checkbox"/> Other: _____
<p>Infant Gestational Age at Birth:</p> <ul style="list-style-type: none"> <input type="checkbox"/> 25 weeks or less <input type="checkbox"/> 26 weeks through 32 weeks <input type="checkbox"/> 33 weeks through 34 weeks <input type="checkbox"/> 35 weeks through 38 weeks <input type="checkbox"/> 39 weeks through 40 weeks <input type="checkbox"/> 41 weeks <input type="checkbox"/> 42 weeks and beyond 	<p>Infant Chronologic Age at Diagnosis:</p> <ul style="list-style-type: none"> <input type="checkbox"/> < 1 week <input type="checkbox"/> 1-2 weeks <input type="checkbox"/> 3-4 weeks <input type="checkbox"/> 5-6 weeks <input type="checkbox"/> > 6 weeks
<p>Method of Maternal Diagnosis:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Verbal Screen <input type="checkbox"/> Toxicology Screen 	<p>Maternal Drugs Identified:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Maternal Self Report: Listing of Drugs and other <input type="checkbox"/> Toxicology Results: Listing of Drugs from Toxicology Report
<p>Method of Infant Diagnosis:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Urine Screen <input type="checkbox"/> Cord Screen <input type="checkbox"/> Meconium Screen 	<p>Infant: Listing of Drugs from Toxicology Report</p> <ul style="list-style-type: none"> <input type="checkbox"/> Urine: <input type="checkbox"/> Cord: <input type="checkbox"/> Meconium: