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Perinatal Quality Collaboratives: Improving Care for Mothers and Infants

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Abstract

Perinatal morbidity and mortality are key indicators of a nation's health status. These measures of our nation's health are influenced by decisions made in health care facilities and by health care providers. As our health systems and health care for women and infants can be improved, there is an expectation that these measures of health will also improve. State-based perinatal quality collaboratives (PQCs) are networks of perinatal care providers including hospitals, clinicians, and public health professionals working to improve pregnancy outcomes for women and newborns through continuous quality improvement. Members of the collaborative are healthcare facilities, primarily hospitals, which identify processes of care that require improvement and then use the best available methods to effect change and improve outcomes as quickly as possible. The Division of Reproductive Health at the Centers for Disease Control and Prevention is collaborating with state-based PQCs to enhance their ability to improve perinatal care by expanding the range of neonatal and maternal health issues addressed and including higher proportions of participating hospitals in their state PQC. The work of PQCs is cross-cutting and demonstrates how partnerships can act to translate evidence-based science to clinical care.

Introduction

Perinatal morbidity and mortality are key indicators of a nation's health status and are associated with a variety of factors such as maternal health, quality and access to medical care, public health practices, and socioeconomic conditions. In 2009, the most recent year where international infant mortality rate comparisons were available, the United States ranked 30th in infant mortality rates; the infant mortality rate for that year was 6.4 deaths in the first year of life per 1,000 live births, and 22 other countries had corresponding rates of 5 deaths per 1,000 live births or lower.[1,2] Although recent data suggest a small decline in

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the infant mortality rate, changes since the beginning of the 21st century have been modest.[3] The main cause for the higher infant mortality rate in the United States compared with other industrialized nations is the relatively higher preterm birth rate in the United States.[4] The preterm birth rate rose by more than one-third from 1981 to 2006, but then fell for the sixth straight year in 2012, to 11.54 percent, down 10 percent from 2006.[5] However, there is still a marked racial disparity in preterm birth. In 2012, the preterm rate among black infants (16.53 percent) was still higher than that for all other race and Hispanic origin groups and is still more than 1.5 times the rate in non-Hispanic whites.[5] Although there has been an encouraging decrease in the preterm birth rate since 2006, preterm births are still major contributors to infant morbidity and mortality. Thus, in 2012, the United States ranked 131st in the world in terms of its preterm birth rate[6]. Even infants born beyond 37 weeks but prior to 39 weeks carry a greater risk of death during the first year of life, which has led to a refined classification of term and preterm birth.[7]

Another measure of our nation's health, maternal mortality, has been on the rise. U.S. maternal mortality data from the Centers for Disease Control and Prevention (CDC) National Center for Health Statistics for 2007 (the most recent year this rate was calculated) reveal a maternal mortality ratio of 12.7 deaths per 100,000 live births, up from approximately 7 to 8 maternal deaths per 100,000 live births in the 1980s and 1990s.[8,9] Although this increase may be partially attributable to better identification of maternal deaths over time, maternal mortality does not appear to be decreasing. Moreover, while maternal deaths are sentinel events, severe complications of pregnancy are about 100 times more common than maternal deaths.[10] Substantial components of these measures of our nation's health are influenced by decisions made in health care facilities and by health care providers. Collectively, these decisions comprise our health care delivery systems. To the extent that the quality of health systems can be improved, there is an expectation that our fundamental measures of health for women and infants will also improve. 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 through continuous quality improvement (CQI). The concept of CQI has contributed to important changes in health care delivery, and has led to significant improvements in perinatal measures, including reductions in elective deliveries without a medical indication prior to 39 weeks gestation, reductions in healthcare-associated bloodstream infections in newborns and increases in appropriate use and documentation of use of antenatal corticosteroids.[11–13]

Members of the collaboratives are healthcare facilities, primarily hospitals, which identify processes of care that require improvement and then use the best available methods to effect change and improve outcomes as quickly as possible. Data for quality improvement metrics collected at the patient and hospital level are analyzed, and then aggregate and site-specific data are fed back to members of the Collaborative in real time, within days to several months of a birth. Quality improvement science and methods are then used to implement interventions to improve data quality and outcomes.[14] An in-depth description of CQI science and methodology is beyond the scope of this article; however, baseline and ongoing collection of data is imperative in order to quickly provide feedback to PQC members. This is a complex process, requiring extensive collaboration and communication,

the application of a broad array of evolving technologies, and an ongoing evaluation and revision of efforts.[15] The work of PQCs is cross-cutting and represents an excellent example of how partnerships can translate evidence-based science to clinical care.

CDC Support of Perinatal Quality Collaboratives

In 2011, CDC's Division of Reproductive Health launched a cooperative agreement to support initiatives for perinatal care quality improvement through state-based PQCs. The specific purposes of this collaboration were to: (1) enhance the ability of established PQCs to collect timely data for providing feedback to improve perinatal care by sustaining current efforts, (2) increase the proportion of PQC-participating hospitals in funded states, and (3) expand the range of neonatal and maternal health issues addressed by these PQCs. The collaboratives supported under this agreement include the California Perinatal Quality Care Collaborative and California Maternal Quality Care Collaborative (CPQCC/CMQCC), the New York State Perinatal Quality Collaborative (NYSPQC), and the Ohio Perinatal Quality Collaborative (OPQC). The ultimate goal is to promote expansion of PQC projects throughout each entire state so that successful quality improvements made at the hospital level can be seen statewide.

Because state health departments are designated as registration areas for vital statistics, they are uniquely qualified to perform many of the programmatic activities for PQC projects. Moreover, they have the ability and authority to obtain population-based information from core data sets (such as birth and death files), which is crucial for the successful functioning of a statewide collaborative. Although most of the work of PQCs occurs in health care and academic institutions, partnering with the State Department of Health allows for institutionalizing the efforts of the PQC as a core public health function and allows for oversight and accountability. PQCs in California, New York, and Ohio have all exhibited exemplary partnerships between hospitals, clinicians, and state health department staff. As these states have demonstrated, the potential for sustainable statewide quality improvement activities is more likely to be realized when they begin as state-based initiatives rather than initiatives started by individuals or single institutions.

CPQCC/CMQCC: Enhancing and expanding data-driven maternal and neonatal quality improvement in California

CPQCC and CMQCC, two multi-stakeholder collaboratives that are based at Stanford University, have engaged nearly 1000 neonatologists, obstetric providers and nurses, and over 200 hospitals and numerous other stakeholders throughout California.[16,17] Beginning in January 2012, CMQCC implemented the California Maternal Data Center, a novel and state-of-the-art statewide database for California hospitals and other stakeholder organizations to track performance on key perinatal metrics. They have also developed an interactive, user-friendly, web-based tool for rapid collection and feedback of data to maternity hospitals throughout the state. This tool links data from birth certificates, patient hospital discharge data, and other pertinent clinical data elements to calculate clinical and data quality metrics (e.g., elective delivery at < 39 weeks gestation; low-risk, first-time cesarean sections; episiotomies; vaginal birth after cesarean; antenatal steroids; and newborn

bloodstream infections). The Maternal Data Center provides the infrastructure to drive quality improvement from multiple angles: providing benchmark statistics that compares individual hospital performance to the county, hospital system, regional and statewide statistics; drilling down to specific clinical and data quality issues at the patient and physician level; and providing data quality, utilization, and demographic statistics comparing the hospital population to regional and state averages. Hospitals using the Maternal Data Center quality improvement tools have demonstrated a 55% decrease in the percentage of non-medically indicated deliveries performed in the 37-and 38-week gestational period during 2012–2013. The California Maternal Data Center will link directly with the CPQCC data center, which follows more than 90% of < 1,500-gram infants and all critically ill larger infants in California, all neonatal transports (California Perinatal Transport System), and Neonatal Intensive Care Unit (NICU) graduates enrolled in high-risk infant follow-up programs through 3 years of age. The CMQCC also hosts statewide hospital-level learning and quality improvement collaboratives and is currently using the Maternal Data Center as a data repository and reporting application for their Preeclampsia Quality Improvement Collaborative. A demonstration of the Maternal Data Center web tool can be accessed at https://demo.datacenter.cmqcc.org/hospitals/1.

NYSPQC: Healthy mothers and healthy babies are a priority in New York

The mission of the New York State Perinatal Quality Collaborative (NYSPQC) is to provide the best and safest care for women and infants in New York State by preventing and minimizing harm through the use of evidence-based practice interventions. CDC's support has enabled the NYSPQC to enhance several of its key initiatives. Since 2010, the New York State Department of Health has been working with the state's regional perinatal centers (RPCs) as partners in the NYSPQC Obstetrical Improvement Project to reduce scheduled deliveries without a medical indication between 36 0/7 and 38 6/7 weeks gestation. In 2012, the project further aligned with the NYS Partnership for Patients, a joint initiative of the Greater New York Hospital Association and the Healthcare Association of New York State focused on improving obstetrical safety and resulting in the participation of 78 additional New York State birthing hospitals. Interventions have included improving patient and provider education, encouraging use of optimal gestational dating criteria, and improving communication. To measure outcomes, data are collected monthly using a standard web-based data collection tool that includes detailed reasons for deliveries, allowing participating hospitals to view their progress in near real time. Between September 2010 and July 2013, NYSPQC's efforts resulted in a decrease of more than 90% in scheduled deliveries without a medical indication between 36 0/7 and 38 6/7 weeks gestation among the 17 originally participating RPCs. Between June 2012 and July 2013, similar efforts have achieved a 75% reduction in scheduled deliveries without a medical indication between 36 0/7 and 38 6/7 weeks gestation among the 78 birthing hospitals that joined at the expansion of the project. In addition to reducing scheduled deliveries without a medical indication, the NYSPQC has also focused efforts on the identification and review of maternal deaths through its Maternal Mortality Review Initiative. They have subsequently developed guidelines and resources for the prompt identification and appropriate management of hypertensive disorders in pregnancy as a result of this work.

The NYSPQC Neonatal Improvement Project is currently focusing on early enteral nutrition for infants born at less than 31 weeks gestational age as well as reducing central and umbilical line associated blood stream infections (CLABSIs) in NICU patients. The Collaborative supports RPCs in standardizing their NICU policies and practices around enteral nutrition, measuring nutritional outcomes, and improving utilization of human milk. Their CLABSI project is an expansion of previous successful work by RPCs promoting the use of standardized central line care bundles and central line maintenance checklists to reduce infection.[13] More information on the NYSPQC can be found at http://www.nyspqc.org.

OPQC: Collaboration to improve birth data and prematurity outcomes

The Ohio Perinatal Quality Collaborative (OPQC) aims to "reduce preterm births and improve outcomes of preterm newborns in Ohio as quickly as possible."[18] Building upon their previous success in reducing scheduled deliveries between 36 and 39 weeks gestation without a medical indication, the OPQC expanded their 39-Weeks Project beyond the 20 largest maternity hospitals in the state that account for 49 percent of the annual state births, and included a component to improve the accuracy of birth certificate information. This expansion is projected to include all 107 of the state's maternity hospitals by the end of 2014. Since 2008, when the initial scheduled delivery intervention was introduced, 36,200 births expected for delivery at < 39 weeks gestation delivered at >39 weeks gestation. This shift translates to an estimated cost savings of $19,000,000 for the state of Ohio.

Improving the quality of data entered into the state's birth registry, the Integrated Perinatal Health Information System (IPHIS), has enabled OPQC to use existing vital statistics data for quality improvement. Two of the tools created by the Ohio collaborative for this project are an online training module for birth certificate abstractors and a document describing 13 essential variables in the state's birth data registry. The "13 Key IPHIS Variables" document offers definitions of each variable, their location in the system, and tips on entering that information correctly. In addition to the OPQC 39-Weeks and Birth Registry Accuracy Project, improvement of birth registry data has also been incorporated into another project aimed at improving antenatal corticosteroids (ANCS) administration to women with impending preterm births between 24 0/7 and 34 0/7 weeks gestation. OPQC has seen improvements in participating hospitals producing birth registry data that more accurately reflect ANCS administration. Based on their findings and the need to reach women early enough for ANCS to have the greatest effect, OPQC is developing new toolkits to include guidance for smaller hospitals that treat women prior to their transfer to larger maternity hospitals.

In their work with 24 NICUs, OPQC has sustained a 20% decrease in bloodstream infections among preterm infants. Through their "Milk is Medicine!" project, participating NICUs are working to achieve further reductions in blood stream infection rates by increasing the immediate postpartum use of human milk feeding in all preterm infants.

Perinatal Quality Collaborative Web Page and Webinar Series

One of the primary goals of CDC's work in this area is the dissemination of strategies utilized by high-functioning PQCs to states that are in various stages of establishing similar statewide organizations for perinatal health quality improvement. As such, CDC partnered with PQC awardees to sponsor a series of webinars from October 2012 through August 2013. These webinars, open to anyone interested and held every other month, were intended to help PQCs share knowledge and experiences, and teach other states how to start, maintain, and grow their own collaboratives. Topics included perinatal quality collaboratives 101, quality improvement principles and getting started, perinatal performance measures and data collection, and building and sustaining a collaborative. the remaining two webinars in the series highlighted examples of obstetric and neonatal quality improvement projects undertaken by PQCs. This series was very well received, averaging 137 participating phone lines per webinar, representing attendees in 49 states, 2 U.S. territories, and the District of Columbia. A second webinar series was launched in November 2013 to focus on topics addressing specific perinatal quality improvement initiatives, including neonatal abstinence syndrome, breastfeeding and human milk, and severe maternal morbidity quality metrics, among others. Each webinar is archived and made available on CDC's Perinatal Quality Collaboratives web site (www.cdc.gov/reproductivehealth/MaternalInfanthealth/PQC.htm). In addition to the webinar series, the CDC PQC website provides a map of states with functioning PQCs and includes corresponding contact information for each of them (www.cdc.gov/reproductivehealth/MaternalInfantHealth/PQC-States.html). This website is constantly evolving and aims to serve as a national resource for statewide PQCs.

Discussion

The hallmark of the perinatal quality improvement work has been the spirit of collaboration and cooperation, and one of the major accomplishments of PQCs is their ability to develop and maintain partnerships. Partnerships are critical to the success of a collaborative, and a culture of learning and transparency with sharing data is necessary, as is the involvement of key state agencies, professional organizations (e.g., American Congress of Obstetricians and Gynecologists, Association of Women's Health, Obstetric and Neonatal Nurses, American Academy of Pediatrics), the private sector (e.g., March of Dimes, Vermont Oxford Network), clinical leaders in obstetrics and pediatrics, and improvement science experts. The other key to the success of PQCs is the rapid cycle collection and feedback of high-quality data, which requires a population-based, rapid-response data system and the ability to engage participating institutions in the collaborative to act on the data. It often takes years for an evidence-based intervention to be taken up by the medical community and be accepted as standard practice.[19,20] Use of CQI science has been shown to be successful in making rapid health quality improvements statewide, and PQCs are a suitable vehicle for dissemination of innovation in perinatal care. Efforts to improve the quality and timeliness of administrative data will further advance the ability for rapid-cycle feedback of accurate data and the implementation of interventions to improve the quality of perinatal care.

Moving forward, CDC would like to get a broader perspective on the breadth of PQC activities taking place nationally. In the United States, many states have PQCs in various

stages of development. By gaining a better understanding of the different organizational models, strategies employed, and needs of state-based PQCs, CDC will be better positioned to facilitate potential areas of coordination and peer-to-peer information sharing to assist in the development and implementation of quality improvement initiatives and capacity building regionally and even nationally. In collaboration with established and new PQCs, CDC plans to develop a comprehensive guide about the design and operation of statewide and multi-state perinatal quality collaboratives to assist states in implementation of their statewide PQC. Furthermore, CDC is also planning to expand its support of state-based PQCs. As more state-based PQCs develop, there will be opportunities for states to work together as regions or across states, utilizing common resources and tools. These relationships will become primary models for future work achieved at regional and national levels. Finally, once established, the infrastructures within PQCs would be highly equipped to address emerging health needs, long-standing issues such as racial/ethnic disparities in perinatal care, and changes that take place in national public health surveillance systems (e.g., vital statistics), all aiming to improve pregnancy outcomes and care for women and newborns.

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