



# Infant Mortality CoIN Case Study

## *Lessons on Early Elective Delivery from Oklahoma and Tennessee*

### Introduction

#### Executive Summary

This case study highlights two states' experiences assessing the economic impact of statewide perinatal health improvement initiatives. Teams in Oklahoma and Tennessee recently completed return on investment (ROI) analyses of the impacts of work to reduce early elective deliveries within their respective states. A major impetus for the analyses was the desire to express program impact in terms of improved health outcomes and to showcase financial savings. ROI methodologies enabled both states to generate this evidence.

In both cases, the project team involved individuals with expertise in ROI research methodology, subject matter experts, and members of the state health department that could help convene and shepherd the project. While the states used different approaches to identify economic experts, having these three competency areas represented on the team is critical to a successful ROI project.

Both projects used large amounts of data. While the specific data vary by project, many ROI projects — including both Tennessee's and Oklahoma's — make use of both primary and secondary sources. State data sources such as vital statistics or hospital discharge are often useful and state health department practitioners may be able to facilitate access for researchers.

Both projects generated ROI estimates that established an economic case for their state's work to reduce early elective deliveries. Teams were reportedly able to use their findings to successfully make the case that programs had both health and financial impacts. Both teams reported that their findings, 'every \$1 investment yields a specific dollar amount of benefits,' seemed to stick in the minds of key stakeholders as well as patients. As the use of economic impact evidence becomes more frequent, determining best practices for design and presentation of dissemination materials will be important.

Both Oklahoma and Tennessee demonstrated that ROI analyses can be a viable and valuable undertaking for officials working to improve the public's health. While maternal and child health professionals have become familiar with the need to demonstrate the health impact of their work, they are also increasingly being asked to demonstrate the financial impact these programs can have. Demonstrating financial impacts may be even more important as value-based payment approaches continue to proliferate. This case study sheds light on the process of performing an ROI analysis of a maternal and child health program.

# Background: Why Perform an Economic Analysis and Why Focus on Early Elective Delivery?

## Problem Statement

For several decades, dedicated maternal and child health (MCH) practitioners have worked to improve perinatal health outcomes. One broad area of work pertains to reducing the incidence of prematurity. State Title V programs have identified the programs, policies, and initiatives that best met their local needs and have undertaken a range of initiatives for reducing prematurity to improve birth outcomes. This often involves quality improvement collaboratives or statewide policy efforts to reduce incidences of prematurity.

For example, the Every Week Counts campaign, a multi-stakeholder effort including the March of Dimes and others, aims to improve awareness and understanding of the need for infants to reach full term prior to delivery, thereby reducing the incidence of early elective deliveries (EEDs). Defined as induced or scheduled Cesarean-sections prior to full-term (39 weeks) and without any underlying medical necessity, EEDs have been shown to increase the risk of low birthweight, admission to the NICU, and poor infant health outcomes. Numerous evaluations have concluded that initiatives like these have translated into sizable health gains and reductions in adverse birth outcomes. Yet in the wake of the Great Recession and other declines in availability of public funding, public programs are increasingly being asked to provide evidence not only regarding programmatic outputs and participant outcomes but also the economic impact of these outputs and outcomes.

## Overview of Economic Evaluation for Maternal and Child Health

Analyzing the economic impact of a program or policy can be an effective way to demonstrate the intrinsic value of a public program or to compare the relative value of several different public programs. MCH programs can be an especially appealing area for economic analyses.

Because of the profound, life-long impacts that MCH programs and policies can have, the financial impact of getting MCH 'right' is enormous. There are often multiple strategies for achieving a desired MCH goal. There are also multiple MCH goals that, implicitly or explicitly, can end up competing for a limited pool of MCH funding. And MCH funding is one of multiple broader expenditure categories for many communities. Thus, even in the best of cases, there is a strong case to be made that each dollar spent on MCH goals should be spent in ways that maximize its potential impact. The overall goal of economic analyses is to generate evidence to make those allocation decisions.

Economic analyses can take many different forms. A few of the most common are:

**Return on Investment:** Net financial cost of an investment versus net financial gains/savings attributable to an investment.

**Cost Benefit Analysis:** Does monetary value of program benefits to society exceed total program cost?

**Cost Effectiveness Analysis:** When choosing between multiple strategies, how much does it cost to obtain a given health outcome and which strategy costs the least per health unit gained?

**Cost Analysis:** How much does a program or policy cost?

**Cost of Illness:** How much does a given disease or condition cost in total?

**Cost Minimization:** Which strategy costs the least?

The Association of Maternal & Child Health Programs (AMCHP) and the National Institute for Children's Health Quality (NICHQ), among others, have recognized the importance of economic analyses for MCH programs. AMCHP has undertaken capacity building work at the state level through a range of activities, including engaging states to share best practices, providing technical assistance opportunities, and encouraging communication of findings to policymakers.

Two recent success stories from this work come from state teams in Oklahoma and Tennessee. These teams worked in collaboration with key program stakeholders in their respective states, academic researchers with experience performing economic analyses, and external organizations such as AMCHP to conduct economic analyses of their states' efforts to reduce EEDs. Their findings have been outlined in greater detail elsewhere, but the process of how these states got from the starting line to the finish line can be instructive and informative for other states considering performing an economic analysis.

This report summarizes a series of discussions with key stakeholders from both states. Interviews were performed in August 2017. Each respondent answered questions pertaining to project initiation, project team, project methods and findings, and key takeaways from the project.

## **Using ROI in Tennessee to Evaluate a Statewide EED Reduction Initiative**

### **Project Overview**

A collaborative team of partners from the Tennessee Department of Health, the Tennessee Hospital Association, the Tennessee Initiative for Perinatal Quality Care, and the University of Tennessee Health Science Center recently performed a return on investment analysis of a statewide initiative to reduce EEDs in Tennessee that was rolled out gradually between 2009 and 2012.

### **Health Impact of Intervention**

The team concluded that within the first two years after implementing this intervention at each hospital, a total of 1,825 EEDs were prevented across Tennessee. The team generated this estimate by using vital statistics data to determine the number of cases of EEDs before and after the initiative began at three separate cohorts of hospitals across the state. The team used an interrupted time series model and controlled for the effects of many important maternal and child characteristics and demographic factors.

### **Cost Impact & ROI of Intervention**

The team concluded that the net savings of the averted EEDs in Tennessee due to this statewide initiative totaled nearly \$18.7 million compared to costs for the initiative of only \$1.2 million. The team calculated that this meant the ROI for the overall initiative was 15.9.

However, the impact of the intervention — and thus its ROI — varied across hospitals. The team calculated that the ROI for the initiative at the earliest group of hospitals to receive the intervention was 62. In comparison, the last group of hospitals to receive the intervention (the majority of hospitals in the state) had lower baseline EED rates and therefore the intervention's ROI was \$3.6 saved per \$1 invested. Additional methodological details are available in several reports prepared by the team and in a forthcoming manuscript in an academic journal.

## Behind the Scenes: How Tennessee Made Its ROI Analysis Work

### The Team

Tennessee's project was the result of a collaboration between several key stakeholders, each of which made vital contributions towards the result:

- **Tennessee Department of Health:** Helped to identify this priority area for study, facilitated access to study data, and leveraged strong connections with state and national partners to provide overall guidance and support for project.
- **Tennessee Hospital Association:** Provided key information regarding statewide initiative and facilitated cost data collection from hospitals across the state.
- **Tennessee Initiative for Perinatal Quality Care:** Served as expert resource regarding nuanced details of statewide intervention, including intervention components and timing.
- **University of Tennessee Health Science Center:** Performed economic analyses to generate estimates for the intervention's health impacts, cost impacts, and ROI. Also prepared several key dissemination products (including brief reports and a longer peer-reviewed manuscript forthcoming in an academic journal).
- **AMCHP & NICHQ:** Provided access to technical assistance and financial resources to facilitate project.

The contributions and collaborative work from these partners was key to the project's ability to yield timely, rigorous, and actionable findings. While the result of an ROI analysis may be a single numeric "answer" (in this case, 15.9), it would be nearly impossible to determine this without deep programmatic knowledge, access to relevant and high-quality data, economic methods expertise, and the ability to connect these pieces and bridge to additional external audiences (including policymakers and funders).

Tennessee has a relatively rich history of productive partnerships between academics and health sector practitioners that appears to have facilitated this project. For example, the state had recently hosted discussions about broader strategies for engaging economists to generate evidence regarding public health and health care priorities and to learn about the capacity for ongoing public health economic research within the state. These existing relationships enabled the state to quickly respond to an emergent opportunity to perform an economic evaluation of the state's EED reduction initiative.

### The Work

With the team in place, several major decisions had to be made: what is the *specific* question of interest, what data are available to answer this question, what additional data is realistic to obtain, what is the relevant audience(s), how can the findings be most effectively disseminated?

The goal of the project was to determine the ROI of Tennessee's EED reduction efforts. But translating that into an actionable research question required drilling down into the specifics of the intervention, the intended audience, and the data available. For example, the team decided that the analysis would involve *all* Tennessee hospitals, not just those who were among the first (or last) to implement the intervention. They determined that the analysis should include all births and not be limited only to certain insurance payers or patient groups. These details are critical to get agreement on as it is hard to overstate their cumulative impact on an ROI project.

With the project's scope defined, economists from the University of Tennessee Health Sciences Center began securing project approval and acquiring data. These are not necessarily steps that sound especially exciting or overly burdensome, but inexperienced teams can easily be stymied by either. In Tennessee's case, researchers devoted considerable time and attention to receiving ethical approval for the research from the university's Institutional Review Board (IRB) and then securing approval to use data on EEDs obtained from the statewide birth certificate data system. With these data in hand, researchers carefully analyzed the data to generate estimates of the health impact of the EED reduction initiative. This portion of the project is where researchers leverage their methodological expertise, apply rigorous statistical models, and generate an estimate of the causal impact of a given initiative on outcomes. In this case, researchers identified the distinct shifts in rates and trends of EEDs that occurred before and after each group of hospitals implemented the initiative. Since the literature is clear that a reduction in EEDs translates into gains in health outcomes, this was an important finding.

Researchers then translated this finding into an estimate of dollars saved. Researchers used Tennessee-specific data obtained from a robust national data source to obtain average cost data for several types of delivery scenarios (vaginal births versus cesarean section; adverse events versus no adverse events) and calculated the cost savings that resulted from the reduction in EEDS (a shift away from higher cost deliveries towards lower cost deliveries). This constituted the estimated 'savings' from the initiative. Data on the initiative's cost was not available in any existing data sources, so the team developed and implemented a survey of hospitals to estimate the administrative and in-kind costs related to implementing and maintaining the initiative. With these health impact, savings, and cost estimates, calculating the initiative's ROI is very straightforward.

With the ROI estimate in hand, the team could then focus on effectively disseminating to relevant stakeholders. Given the range of collaborating partners, the team prioritized a multi-faceted dissemination strategy to meet the information needs of multiple audiences. The team produced multiple Brief Reports focused on different pieces of the analysis, delivered presentations to external audiences detailing findings, and prepared a longer manuscript that was submitted to an academic journal. The Brief Reports could be used to summarize findings to hospital and provider audiences and to senior leaders of state agencies. Unofficially, practitioners had long assumed that the initiative had saved money, but without hard evidence it was not possible to make this argument to stakeholders such as the state legislature or other funders. These reports enabled that. In addition, since the project involved surveying hospitals to determine initiative costs, it was important to feed back findings to those involved in making the study possible. As findings continue to be disseminated to additional audiences, further refinements can be made. For example, even briefer reports with only a few key figures or paragraphs of text might be useful for policy audiences and patients.

### **Reflecting on the Project**

Tennessee's experiences getting to a final ROI answer can be instructive for others interested in successfully completing an economic analysis project. While it is not possible to conclusively identify a single factor responsible for the project's ultimate success, it is highly likely that the pre-existing and wide-reaching group of collaborative partners was highly important. Because of work done in advance to establish partnerships between academics and practitioners, between public health and hospitals, and with maternal and child health stakeholders across the state, the team was well-positioned to respond when opportunity arose.

# Using ROI in Oklahoma to Evaluate the Every Week Counts Campaign

## Project Overview

A team including the Oklahoma State Department of Health, Oklahoma's Perinatal Quality Improvement Collaborative, and researchers from the University of South Florida collaborated on a Return on Investment analysis of Oklahoma's work to reduce its EED rates through its Every Week Counts program.

## Health & Cost Impact of Intervention

The team concluded that the Every Week Counts program in Oklahoma yielded significant gains in two perinatal outcomes: non-medically necessary cesarean section deliveries and early-term births. The team concluded this by using vital statistics data to determine incidence of these events before and after the initiative.

## Cost Impact & ROI of Intervention

The team concluded that, from the Every Week Counts program, Oklahoma realized savings of \$4.0–4.6 million due to reductions in the number of non-medically necessary cesarean section deliveries. In addition, the state saved between \$38.4 million and \$65.8 million due to reductions in the rate of early-term births.

In total, the team calculated that the interventions cost the state \$736,868. This meant that for every \$1 spent on Every Week Counts, the state of Oklahoma saved between \$4.49 and \$5.28 due to prevention of non-medically necessary cesarean sections and between \$51.09 and \$88.31 due to decreased health care costs related to early-term births. Additional methodological details are available in dissemination reports prepared by the team.

## Behind the Scenes: How Oklahoma Made Its ROI Analysis Work

### The Team

Oklahoma's project team included key stakeholders that each brought critical expertise to the project:

- **Oklahoma State Department of Health (OSDH):** Helped to identify this priority area for study, facilitated access to study data, and leveraged strong connections with state and national partners to provide overall guidance and support for project.
- **University of Oklahoma Health Sciences Center Office of Perinatal Quality Improvement (OUHSC OPQI) and Oklahoma Perinatal Quality Improvement Collaborative (OPQIC):** Provided key information regarding statewide initiative and facilitated cost data collection from hospitals across the state. Served as expert resource regarding nuanced details of statewide intervention, including intervention components and timing. OPQIC includes representatives from the OSDH, OUHSC OPQI, March of Dimes, Oklahoma Hospital Association, Medicaid agency, birthing hospitals, mental health agency, private physicians/providers, and other critical partners.
- **University of South Florida:** After a competitive bid process, researchers from the University of South Florida were selected to perform economic analysis on the ROI of the Every Week Counts campaign, among other economic analyses and services.
- **AMCHP & NICHQ:** Provided access to technical assistance and financial resources to facilitate project.

Oklahoma's experiences convening a team to complete an ROI analysis offers valuable guidance to practitioners in settings without a long history of collaboration between state health stakeholders and academic health economists. In contrast to the case of Tennessee outlined above, Oklahoma identified

economics expertise using a competitive bid process. After reviewing bids, economics experts from the University of South Florida were selected to collaborate on this analysis. The competitive bidding approach is no doubt familiar to many in public agencies, but Oklahoma's experiences here reiterate that this approach can work even for seemingly complex or technical work such as ROI.

A key step prior to issuing the request for proposals is to carefully scope out the required and desired services — including deliverables. Another key element is ensuring that the request for proposals reaches the right audiences. The department worked with AMCHP and the Robert Wood Johnson Foundation to generate a distribution list to maximize the chance that the funding opportunity reached its target audiences and would lead to a successful pairing pursuant to public procurement policies.

### ***The Work***

The team's motivation to pursue an ROI project arose in part because in the past it was no longer enough to do good work and show positive *health* impacts through program evaluations. As funding continues to grow scarcer, expectations for evidence of the *economic* impacts also began to emerge. The team used this project as an opportunity to demonstrate the health and economic impact of the Every Week Counts initiative. These strategic decisions painted the way for the team to scope out the project and put the work out for bid.

Once successfully bid, the project's research component could begin. While the contract with the research team from South Florida included more than just this specific ROI analysis, the Every Week Counts ROI evaluation project involved substantial data gathering and analysis by researchers, the state health department, OUHSC OPQI, and the OPQIC partners. The Oklahoma State Department of Health gathered data on the full costs of the state's Every Week Counts initiative, including training costs at hospitals, stipends paid to participants, costs for updates to data tracking systems, educational materials for the public and for practitioners, costs for media such as public service announcements, and all other related costs. In addition to primary data, the team also gathered cost information from other sources using literature reviews. In short, it was a lot of data, much of which was drastically easier to gather on the front end rather than retrospectively.

Researchers used vital statistics data to calculate the impacts of Every Week Counts on perinatal outcomes in Oklahoma. Data access was facilitated by the state health department, though long timelines still apply to receive all relevant approvals for accessing this sensitive data source.

The team also worked to attach costs to health outcomes. While many health economists are familiar with attaching costs to emotional topics such as a life lost or an adverse birth outcome, the process can be tricky to navigate for many stakeholders. Careful consideration of messaging is critical to ensure that the findings convey the seriousness (and good intentions) of the analyses. Also, some outcomes of interest were easier to attach cost estimates to than others. For example, the economic cost of an admission to the hospital is relatively easy to attach a cost to whereas the economic cost of risk factors such as unsafe sleep patterns may be more challenging.

After obtaining estimates for the Every Week Count's health impact, attributable savings, and total costs, calculating the initiative's ROI is fairly straightforward. The ROI estimates were provided to the OPQIC, state policymakers, and the practice community at large. Given the range of collaborating partners, the team prioritized a multi-faceted dissemination strategy to meet the information needs of multiple audiences.

Unofficially, many involved in the initiative had suspected that it had resulted in cost savings. But this ROI analysis provided the actual evidence to enable stakeholders to make that case to external audiences. The ROI takeaway (that for every \$1 invested, at least \$4.48 was saved) was memorable, but some audiences requested even more details regarding how that estimate was generated. As findings are shared with additional audiences, these additional refinements can be made to future dissemination products.

## **Reflecting on the Project**

Oklahoma's work to complete an ROI of its Every Week Counts initiative contains important lessons for others facing similar challenges. The team did not set out with a contact list full of health economists to call on to undertake this project. Yet their competitive bidding process — with targeted dissemination efforts — successfully matched the team's subject matter experts with the economic expertise necessary for this ROI analysis. Even though collaborating remotely (e.g., Oklahoma to Florida) on nuanced, numbers-heavy topics such as ROI analyses can sometimes be challenging, this project team found a way to make it work. This should provide other states with reassurance that it can be done.

In short, Oklahoma, like many other states, is beginning to see the need for and benefit of generating evidence regarding the *double impact* to the state (i.e., both health and economic) of funding for perinatal health initiatives. This was a fundamental goal of the project and informed the project's overall goals and dissemination avenues.

## **Looking Forward: Use of ROI in a Value-Driven Care System**

Work by teams in Oklahoma and Tennessee demonstrated the positive ROI of campaigns to reduce prematurity in their states. ROI analyses may play an even greater role as the U.S. health care delivery system continues its transition to paying health care providers based on the value of the services they provide — the quality of care rather than the quantity of care delivered.

Under the most advanced, value-driven models, both patients and providers will benefit from provision of high-ROI services. Yet determining which services or delivery approaches have a high ROI will require rigorous inquiries such as those summarized here by Oklahoma and Tennessee.

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## **More Information**

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