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How Early Elective Deliveries Impact Infant Health in Mississippi

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ABSTRACT

A Background: Infants delivered early for non-medical reasons are at increased risk of poor birth outcomes. Trends and associated health outcomes were unexamined in Mississippi.

Objective: Determine elective delivery trends and impacts on infant mortality.

Methods: Identify cesarean deliveries and inductions without medical indications from birth certificate records linked with death certificate records. Assess differences in death rates between those born electively during 37 and 38 weeks compared to 39 weeks gestation.

Results: Early elective delivery rates increased significantly ($p < .01$) from 8.5% in 2001 to a peak of 17.8% in 2008. The rate began to decline in 2008 and was 16.5% in 2011. Neonates born electively before 39 weeks gestation had three-fold higher death rates [2.1 per 1,000] than neonates born at 39 weeks gestation [0.6 per 1,000], a statistically significant difference.

Conclusion: Early elective deliveries in Mississippi are associated with increased infant mortality. Reducing this common practice could improve birth outcomes in the state.

KEY WORDS: INFANT MORTALITY, PERINATAL SERVICE DELIVERY, HEALTH POLICY, PUBLIC HEALTH

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INTRODUCTION

Early elective deliveries are those performed through an induction of labor or a scheduled cesarean section from 37 weeks to less than 39 weeks of gestation, without a medical or obstetric indication. While classic teaching defined pregnancies after 37 weeks as ‘term’, this definition has changed based upon the recognition that neonatal morbidity varies during this time.¹ Research has shown that elective deliveries performed during the ‘early term’ period of 37 to 38 weeks, 6 days are associated with higher risks than those at ‘full term’ from 39 weeks through 41 weeks. These risks include a higher rate of neonatal intensive care unit admissions from transient tachypnea and respiratory distress syndrome, increased mechanical ventilation, feeding problems, sepsis, and prolonged hospitalization.²⁻⁶ Inductions during this ‘early term’ period are also at greater risk of resulting in cesarean delivery.² As there have been no proven health benefits for this practice and many documented harms, the American College of Obstetricians and Gynecologists recommend against performing elective deliveries before 39 weeks of gestation.^{7,8}

Examples of medical indications for an induction of labor or planned cesarean section before 39 weeks include conditions such as premature rupture of membranes, intrauterine infection, placental abruption, fetal compromise, preeclampsia, poorly controlled diabetes and other maternal medical conditions.⁷ Common reasons for delivery that are considered elective include convenience for the patient or physician, a history of fast labors, suspected fetal macrosomia, prodromal labor, and maternal discomfort or exhaustion with pregnancy. A mature fetal lung maturity test result before 39 weeks without an appropriate clinical situation is also not an indication for delivery.⁸

In the United States, the rate of elective inductions and cesarean deliveries increased significantly from 1990 through 2006.⁹ Induction rates rose from 9.5% in 1990 to 22.5% in 2006 as cesarean rates reached 32%.¹⁰ Much of this increase is attributed to non-medically indicated deliveries.⁹ Due to recent national efforts to reduce this practice, the rate of early elective

deliveries fell from 17% in 2010 to 11.2% in 2012. Great variation remains in the rate of early elective deliveries among the states, ranging from under 5% to over 25%.¹¹ According to the consensus reached through partnerships among experts and the March of Dimes, acceptable early elective delivery rates are considered to be less than 5%, rather than 0%, as there will continue to be acceptable reasons for delivery that do not fit into measured indications and errors in measurement can persist.²

There is limited published data about early elective deliveries in Mississippi. Of the five Mississippi hospitals reporting to Leapfrog in 2012, rates of elective deliveries ranged from a low of 2.2% to a high of 50%—well above the national target rate of 5% or less.¹¹ As early elective deliveries are a source of preventable morbidity and mortality, and Mississippi continues to have the highest infant mortality rate in the United States, understanding this practice is important for improving birth outcomes in the state.¹² In this study, we describe the state-wide trends in early elective deliveries in Mississippi and explore the impact of this health care practice on infant mortality.

METHODS

All singleton live births occurring in Mississippi were assessed by completed weeks of gestation using 2001 to 2011 birth certificate data. Non-medically indicated cesarean deliveries and inductions were identified using an algorithm that removed indicated deliveries such as preeclampsia and fetal distress, among others. The early elective delivery rate was calculated as the number of deliveries between 37 weeks and 38 weeks, 6 days with no documented labor or medical indication for early delivery. Trends in all deliveries were also assessed. Tests for statistical significance at an alpha level of .05 were calculated.

Death certificate records from 2007 to 2011 were linked with birth certificate records during the same time frame for infants up to 28 days old in order to discern mortality rates shortly after birth. Death rates for early, non-medically indicated deliveries were then compared to the death rates for infants delivered at 39 weeks of gestation. Confidence intervals were calculated at the 95% level to determine statistically significant differences.

RESULTS

Fig 1. Trends for Live Births by Week of Gestation in Mississippi, 2001-2011

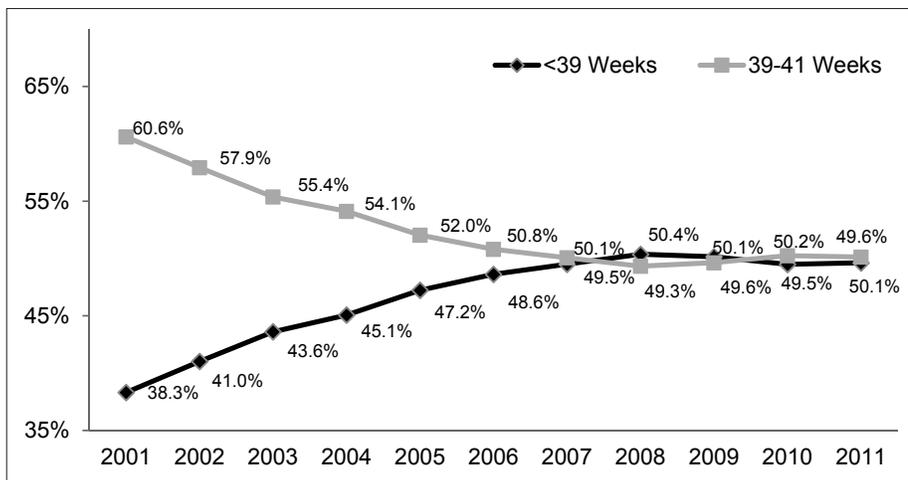
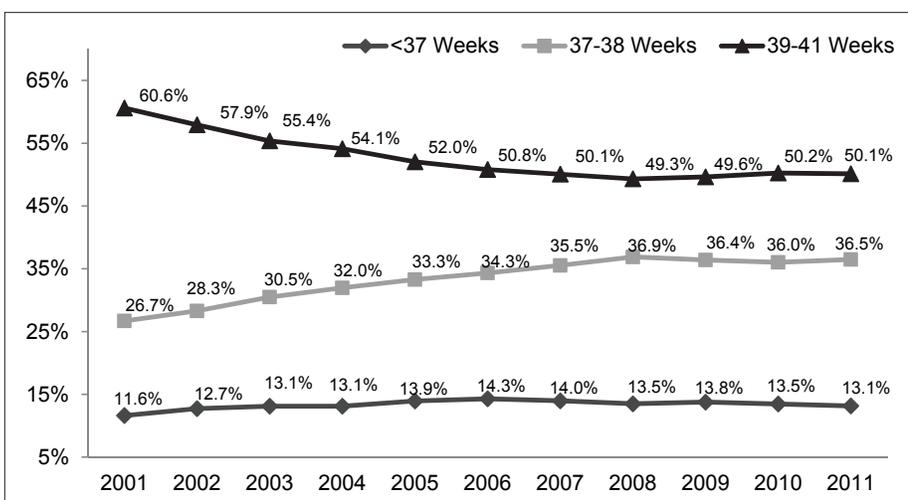


Fig 2. Trends for Live Births by Week of Gestation in Mississippi, 2001-2011



Delivery Rate Trends

In Mississippi, all deliveries between 39-41 weeks gestation declined significantly between 2001 to 2011 from 60.6% to 49.6% ($p < .01$) (Figure 1). During the same time frame, deliveries before 39 weeks of gestation rose significantly ($p < .01$). Half of all infants born during this time frame were delivered before 39 weeks of completed gestation.

The increase in deliveries before 39 weeks is primarily attributable to a rise in early term births during 37 and 38 weeks of gestation (Figure 2). While preterm deliveries at 36 weeks of gestation or less remained relatively stable, deliveries during the early term period of 37 and 38 weeks increased significantly ($p < .01$) from 26.7% to 36.5%.

Early elective delivery trends in Mississippi from 2001 to 2011 are shown in Figure 3. The rate rose significantly ($p < .01$) from 8.5% in 2001 to a peak of 17.8% in 2008. The rates began to decline from 2009 through 2011. Yet, 1 out of every 6 infants born in 2011 were delivered before 39 weeks of completed gestation without any medical indication.

Death Rate Analyses

Infant mortality is far less common for those delivered during the early term period than those delivered before 37

Fig 3. Trends of Early Elective Delivery Rates in Mississippi, 2001-2011

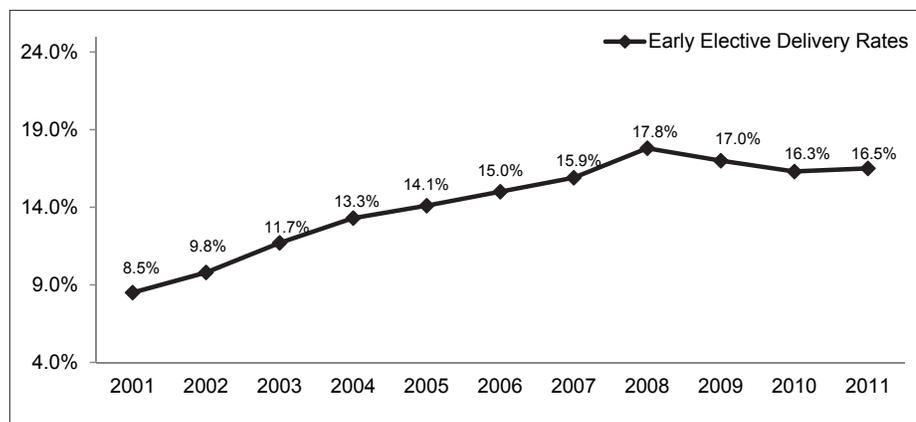
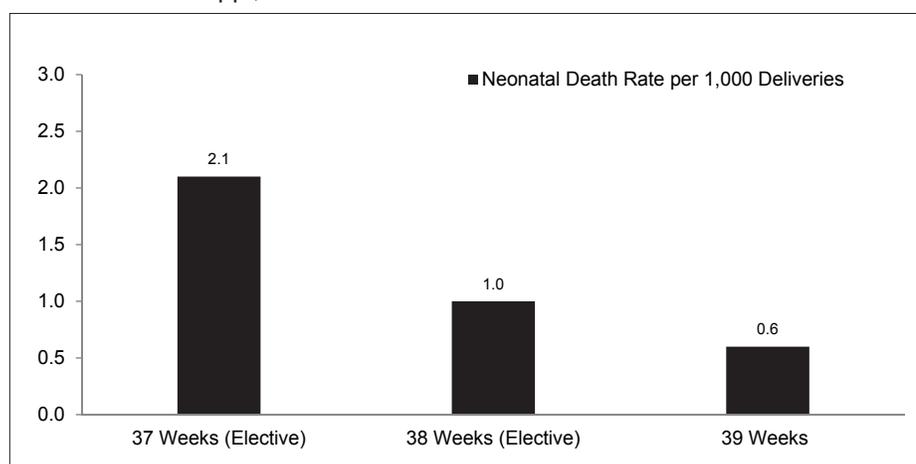


Fig 4. Neonatal Death Rates for Early Elective and 39 Week Deliveries in Mississippi, 2007-2011



weeks.¹² Over the 5 year period examined (Figure 4), neonates delivered electively at 37 weeks of gestation had three-fold higher death rates [2.1 per 1,000; 95%CI: 1.20,3.41] compared to those delivered at 39 weeks of gestation [0.6 per 1,000; 95%CI: 0.43,0.82]. Thus, electively delivered, early term infants in Mississippi had significantly higher death rates within their first 28 days of life than those delivered at 39 weeks of gestation.

DISCUSSION

Nationally, there has been a growing concern about early elective deliveries and numerous quality improvement efforts extended to decrease this practice.¹³⁻¹⁵ No studies have demonstrated an increased rate of stillbirth or poor outcomes by eliminating non-medically indicated deliveries before 39 weeks.¹⁴ Given the extent of data showing the potential harm of early elective deliveries and proven capacity for hospitals to modify this practice, the Joint Commission now includes early elective deliveries before 39 weeks as a quality indicator for obstetric hospitals.¹⁶

The March of Dimes began focusing on reducing early elective deliveries through a campaign called 'Healthy Babies are Worth the Wait' in 2007.¹⁴ Since then, states across the country have partnered on initiatives to reduce early elective

deliveries with notable successes. In 2011, 5 states collaborated in a rapid-cycle improvement program and reduced the rates of early elective delivery from 27.8% in the first month to 4.8% by the 12th month.¹³ South Carolina announced a 45% reduction in early elective deliveries through its Birth Outcomes Initiative and estimated a cost savings of \$6 million dollars for the state within the first quarter of 2013.¹⁷ Successful strategies to reduce non-medically indicated deliveries have included implementing delivery scheduling policies that require a medical indication for planned deliveries before 39 weeks gestation and payment reforms to discourage the practice.^{17,18}

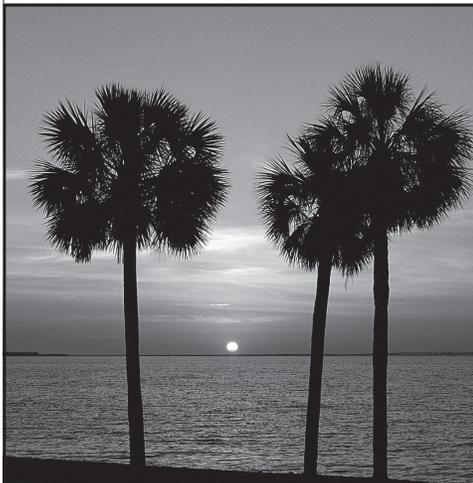
In light of the developing evidence, the Mississippi State Department of Health recently partnered with the Mississippi Hospital Association and the state chapters of the March of Dimes and the American College of Obstetricians and Gynecologists to request hospitals performing obstetric services implement firm policies to reduce early elective deliveries. Facilities officially pledging to do so in 2014 will be recognized publicly for their efforts to curtail this practice.

It is encouraging to note that Mississippi is showing declines in early elective delivery rates that, with ongoing support, will translate to improved birth outcomes. Vital statistics show the majority of infant deaths in Mississippi are among those born with anomalies or prematurely.¹² Consistent with other study findings, this research demonstrates a significantly higher rate of death among neonates delivered electively during the 'early term' of gestation in Mississippi. While not all poor birth outcomes can be prevented, and elective deliveries during the early term period may at times be justified, reducing this practice can lead to improved birth outcomes in Mississippi, where infant death remains a significant challenge.

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