Report on Early Elective Deliveries

As Required By
The 2016-17 General Appropriations Act, House Bill 1,
84th Legislature, Regular Session, 2015
(Article II, Special Provisions relating to All Health and Human Services Agencies, Sec. 45)

Health and Human Services Commission
Department of State Health Services
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1. Executive Summary

This report was required by the 2016-17 General Appropriations Act, House Bill (H.B.) 1, 84th Legislature, Regular Session, 2015 (Article II, Special Provisions Relating to All Health and Human Services Agencies, Sec. 45). The Texas Health and Human Services Commission (HHSC) and Texas Department of State Health Services (DSHS) coordinated to:

- Revise the method to estimate the rate of early elective deliveries (EEDs) in Texas (DSHS role);
- Evaluate claims for similar services submitted to Texas Medicaid fee-for-service and managed care programs (HHSC role); and
- Evaluate the effectiveness of strategies to reduce EEDs using this revised estimate and audit results (coordinated role).

For the purpose of this report, EEDs are those which occur before 39 weeks of gestation by cesarean section or induced delivery where the available administrative (claims-based) data did not provide an identifiable clinical indication for the early delivery. The clinical indications used in this study were adapted from various sources, and will be discussed below.

In response to Special Provision 45, DSHS adapted and combined methods to estimate EEDs from The Joint Commission's (TJC) National Quality Measure, as well as the Collaborative Innovation and Improvement Network to Reduce Infant Mortality (CoIIN). DSHS used this revised estimate to assess the impact of the following strategies focused on reducing rates of EEDs:

- **DSHS sent quarterly reports on percentages of EED to the CoIIN.** These quarterly reports are submitted by Texas and other states as part of a public-private partnership to reduce infant mortality. The CoIIN creates learning communities for stakeholders to establish benchmarks, learn about each other's activities, and track each other's progress. DSHS compared the CoIIN method of estimating EEDs to the revised method produced for this report. All methods of calculation produced similar trends. Overall, the new method of estimation produced lower percentages of EEDs than the CoIIN method, but it requires validation before implementing as a standard.
- **DSHS sent reports of birth outcome data to hospitals in May 2014.** These reports provided hospitals information on their EED percentages estimated from birth certificates and allowed them to compare their percentage to those of other similar hospitals. DSHS assessed whether the revised estimate showed a reduction in the EED percentage before and after May 2014, but found no statistically significant differences.

DSHS' analysis identified certain sociodemographic subgroups with higher percentages of EEDs. Mothers of non-Hispanic white race/ethnicity, mothers with private insurance, and mothers who had at least one previous cesarean section, had higher percentages of EEDs. Mothers from Public Health Region 5 (Southeast Texas) and Public Health Region 11 (South Texas) also had higher percentages.

In response to Special Provision 45, HHSC used administrative data from Medicaid claims to evaluate the effectiveness of HHSC's policy to reduce EEDs, implemented in October 2011.[A] Physicians were required to indicate on the Medicaid physician claim whether a delivery was before or after 39 weeks of gestation and for those occurring before 39 weeks, whether it was medically necessary. From 2010 to 2014, less than 0.2 percent of claims were deliveries before 39 weeks of gestation without medical necessity. To enhance and verify this Medicaid policy HHSC's Office of Inspector General instituted a series of physician claim retrospective reviews. These reviews indicated a ≥99 percent concordance between the information about the delivery in the medical record and the related information on the medical claim.

It is important to note within this report, the DSHS statistics presented represent estimates of EEDs, which are calculated based on an algorithm using data elements from both birth certificate data and inpatient hospital discharge data from all payer types. The Medicaid (HHSC) rates of EED presented are calculated using specific obstetrical procedure codes submitted on healthcare claims, which also includes additional codes to indicate whether the delivery was before or after 39 weeks, and if the delivery was medically necessary. Because the methods, populations, and data sets utilized by DSHS and HHSC are different, the results are different.

HHSC and DSHS are committed to working closely to monitor EED percentages in Texas. Important components of this united effort consist of evaluating methods to estimate EEDs, soliciting stakeholder feedback regarding EED percentages, using linked data sources to increase quality of data and statistics, and conducting targeted reviews for Medicaid claims of medically necessary cesarean sections and inductions before 39 weeks of gestation.

2. Introduction

2016-17 General Appropriations Act, H.B. 1, 84th Legislature, Regular Session, 2015 (Article II, Special Provisions Relating to All Health and Human Services Agencies, Sec. 45), requires HHSC and DSHS to take steps to improve data and oversight to reduce the rate of EEDs in Texas.

Special Provision 45 is listed below:

Sec. 45. Early Elective Deliveries. Out of funds appropriated elsewhere in this Act, the Health and Human Services Commission, and the Department of State Health Services shall take steps to improve data and oversight to reduce the rate of early elective deliveries in Texas, including:

a. The Department of State Health Services shall modify the methodology they use to estimate the rate of early elective deliveries in Texas to include the use of administrative claims data for all payer types contained in the Texas Health Care Information Collection data combined with birth certificate data.

b. The Texas Health and Human Services Commission shall regularly audit claims submitted in the Texas Medicaid fee-for-service and managed care programs for obstetric delivery procedures

[A] A banner message regarding the policy can be accessed at: http://www.tmhp.com/News_Items/2011/08-Aug/08-09-11%20Update%20to%20OB%20Claims.pdf[1]

that include a modifier indicating that the delivery was medically necessary and prior to 39 weeks of gestation.

c. The Texas Health and Human Services Commission and the Department of State Health Services shall evaluate the effectiveness of strategies to reduce early elective deliveries using improved data and audit results and submit a report to the Legislative Budget Board and the Governor by December 1, 2016.

3. Background

Early Elective Deliveries

Since 1979, the American College of Obstetrics and Gynecology (ACOG) has discouraged delivering a baby before 39 weeks of gestation when not medically necessary. Non-medical reasons for EEDs may include delivery for purposes of family or provider convenience or to relieve the mother of the continuing discomfort of pregnancy. EEDs are known to entail a statistically higher health risk to the infant and the mother than waiting until full term has been achieved at 39 weeks.[3,4,5,6] *In this report, deliveries before 39 weeks of gestation where the available data does not document a valid clinical reason for the early delivery are defined as EEDs (see Appendix B).*[B]

Activities to Reduce Early Elective Deliveries

There is currently a national movement to reduce the number of EEDs to improve birth outcomes.[2,7] Since early 2010, both HHSC and DSHS have been involved in several activities focused on reducing EEDs:

- **DSHS Participates in Collaborative Innovation and Improvement Network to Reduce Infant Mortality (CoIIN) Reporting.** In January 2012, the Health Resources and Services Administration (HRSA) established a public-private partnership between state and federal health organizations and other stakeholders interested in reducing infant mortality rates, and one of its priorities is to reduce non-medically indicated cesarean sections and induced deliveries from between 37 through 38 weeks of gestation (a term approximately equivalent to EEDs) (see Appendix B). The CoIIN creates learning communities for stakeholders to establish benchmarks, learn about each other's activities, and track each other's progress.[2] DSHS is a participant and reports statistics to the CoIIN for non-medically indicated cesarean sections and induced deliveries from 37 through 38 weeks of gestation.
- **DSHS Reported Birth Outcome Data to Hospitals.** In May 2014, DSHS provided statistics on non-medically indicated cesarean sections and induced deliveries from 37 through 38 weeks of gestation (along with other birth outcomes) directly to hospital administrators. These reports used information from the Texas birth certificate (CoIIN method of calculating EEDs) (see Appendix C) and allowed administrators to examine statistics on their facility

[B] Many definitions of EEDs instead focus on the 37 to 38 weeks of gestation timeframe, including some activities by DSHS. DSHS also conducted analyses using data within the 37 to 38 weeks of gestation timeframe, but outcomes were the same.

and to compare with other hospitals. With this information, hospitals could identify opportunities for improvement.

- **HHSC Policy to Potentially Recoup Medicaid Payments for EEDs.** As required by H.B. 1983, 82nd Legislature, Regular Session, 2011, HHSC implemented a policy where payments to physicians for elective deliveries prior to 39 weeks in the Medicaid program, are subject to recoupment. In October 2011, Texas HHSC implemented a Medicaid medical policy for delivering physicians. This policy required delivering physicians, when filing healthcare claims in Medicaid, to indicate whether the delivery was medically necessary and whether it was prior to or after 39 weeks' gestational age. Claims that do not indicate the delivery was medically necessary prior to 39 weeks' gestational age are subject to payment recoupment based on retrospective reviews of medical records by the Office of the Inspector General.[1] The goal of this policy is to use financial disincentives to promote what is considered to be best clinical practice. It should be noted some hospitals and managed care organizations adopted this best practice prior to the official implementation date.

Over the past few years, DSHS and HHSC have:

- Solicited participation from Texas birthing hospitals in a CoIIN-sponsored online survey on EEDs;
- Implemented several training and educational opportunities (among both providers and patients) to increase awareness of the negative consequences of EEDs;
- Participated in a multistate collaborative focused on identifying opportunities and leveraging initiatives to impact birth outcomes;
- Participated in workgroups focused on maternal and child health, in which reduction of EEDs was a topic; and
- Surveyed the Medicaid health plans regarding their policy to reduce EEDs.

The available data provides no direct means to assess whether or to what degree the steps mentioned above directly influenced the EED rates over the time span included in this report.

4. Differences between DSHS and HHSC Medicaid Data Sources and Methods

HHSC and DSHS coordinated activities to reduce EEDs, but populations, data sources, and methods used in this report differ by agency.

Data Sources Differ by Agency

Data used by DSHS to respond to Special Provision 45 subsection (a) and the DSHS part of subsection (c) are based on information from all payer types included in the birth certificate, as well as data collected from birthing hospitals. In contrast, data used by HHSC to respond to Special Provision 45 subsection (b) and HHSC's portion of subsection (c) are based on Medicaid utilization data, in which a physician reports whether a delivery paid for by Medicaid is before 39 weeks and is not medically necessary.

The Method of Calculating EEDs Differs by Agency

In order to best appreciate both the strengths and limitations of the DSHS EED estimates provided in this report, it is crucial to understand the nature of the data sources available to DSHS. For this report, DSHS assessed claims-based administrative data submitted by birthing hospitals to the Texas Health Care Information Collection (THCIC) as well as birth certificate data from across the state. In both instances, the data available in these sources is based upon diagnosis codes or other clinical data submitted by the healthcare provider. Neither source provides a direct, detailed healthcare record of the care provided nor the medical decision made leading up to the delivery. Therefore, DSHS's EED estimation to respond to Special Provision 45 subsection (a) and the DSHS portion of subsection (c) examines the available data and ascertains whether or not it documents the presence of health conditions or other clinical circumstances that are recognized as valid reasons for elective delivery (Cesarean section or medically induced vaginal delivery). For the purposes of the DSHS analysis, the delivery is counted as an EED whenever the available data lacks such documentation.

The method of calculating EEDs using this data was also revised in response to Special Provision 45 subsection (a) and the DSHS portion of subsection (c). This report includes background information and methods regarding this revised statistic.

In contrast, HHSC's EED estimations in response to Special Provision 45 subsection (b) and HHSC's portion of subsection (c) use Medicaid claims data in which a physician directly reports whether a delivery is before 39 weeks and is not medically necessary. Audits in response to Special Provision 45 subsection (b) and HHSC's portion of subsection (c) were done by reviewing medical records to determine whether there was a medical indication for early delivery.

In addition, EED percentages are calculated differently. In HHSC's EED percentage, the denominator is all Medicaid deliveries. In DSHS' EED percentage, the denominator is limited to early deliveries (i.e. before 39 weeks of gestation) with no documented medical reason for the early delivery (see Appendix C).

As a result of these limitations, DSHS' EED estimates are not equivalent to HHSC's EED estimates. The following DSHS and HHSC sections describe the EED estimation methods and results in more detail.

5. DSHS Estimation Method and Results

The following sections provide background information, methods, and results of the revised estimation of EEDs, performed by DSHS in response to Special Provision 45 subsection (a) and the DSHS portion of subsection (c).

DSHS Revised Early Elective Deliveries Estimation Method

All live births in Texas are registered and information regarding the birth is collected on the birth certificate. Data collected includes information about the delivery, as well as maternal and infant

risk factors. DSHS also used data from the THCIC for the estimates presented in this report. THCIC collects data on hospital discharges from state licensed hospitals in accordance with Texas Health and Safety Code, Section 108.012(b). The majority of birthing hospitals in Texas provide data to the THCIC.

In accordance with Special Provision 45, DSHS linked these birth certificates with THCIC data and used this linked data to estimate the percentage of EEDs. As described above and following, the nature of the data available to DSHS require the agency to adapt criteria used in two other well-described, standardized methods (see Appendix C).

- The TJC National Quality Measure, Elective Delivery, v2015a[8], was adapted. The original version of the measure used multiple data sources (*e.g.* patient care records). DSHS adapted this measure to use only the birth certificate and THCIC inpatient hospital discharge data sources, and to use all deliveries before 39 weeks of gestation instead of only deliveries from 37 through 38 weeks of gestation (TJC method).
- The CoIIN estimation method was also adapted. The original version of the measure estimated EEDs using deliveries occurring at 37 through 38 weeks of gestation. The measure was adapted to instead use all deliveries before 39 weeks of gestation (CoIIN method).[7]

The TJC and CoIIN estimation methods were then combined to use information from both methods and to provide upper and lower estimates of the EED percentage (see Appendix A).

- The upper end of the EED percentage estimate. In this percentage, **only one** of either the birth certificate or the THCIC hospital discharge data set indicated the delivery was by cesarean section or by induction. This method produced percentages probably higher than the true percentage.
- The lower end of the EED percentage estimate. In this percentage, **both** the birth certificate and the THCIC hospital discharge data set indicated the delivery was by cesarean section or by induction. This method produced percentages that are probably lower than the true percentage.

To recap, the DSHS EED estimate was derived by using the available data to calculate a percentage. The denominator was all live births reported in the state that occurred prior to 39 weeks of gestation and where the data submitted did not document a diagnosis or medical condition recognized in this report as a valid clinical indication for EED. The numerator was those where the data submitted documented delivery by cesarean section or medically induced vaginal delivery.

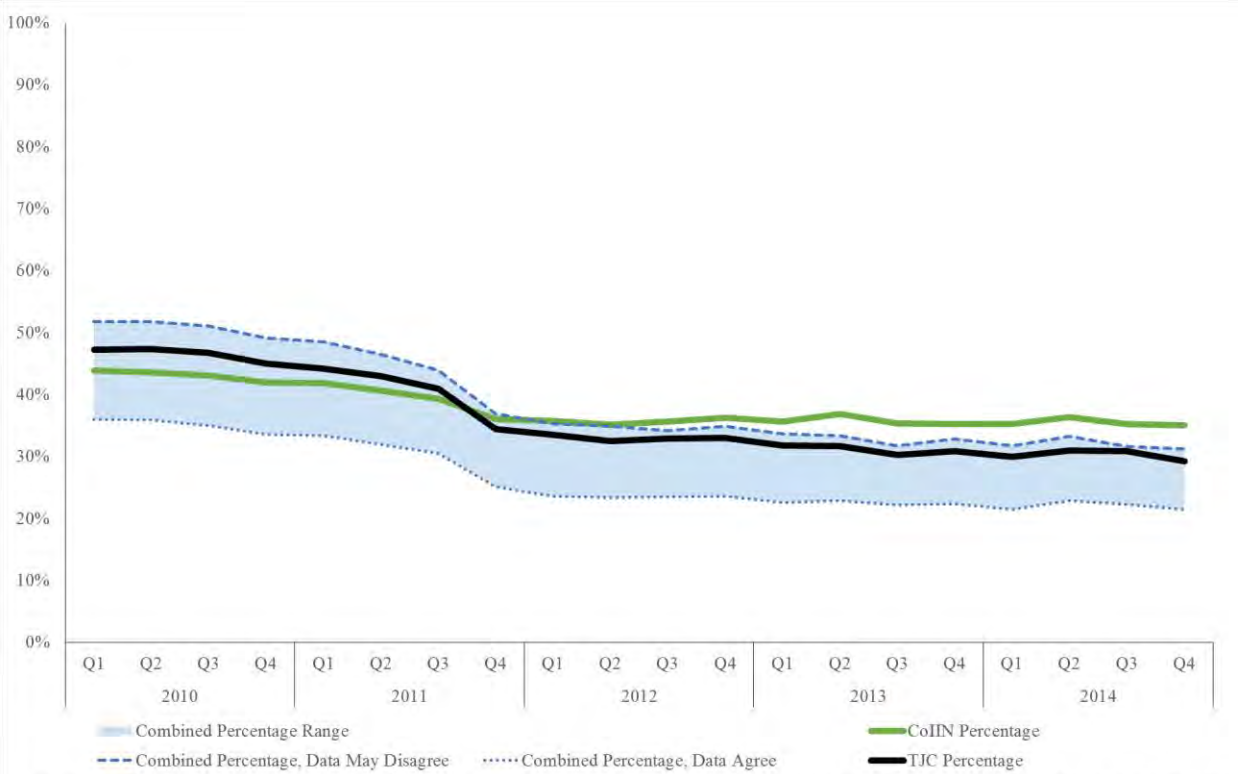
Results from DSHS Revised Early Elective Deliveries Estimation

Trends and Assessment of Differences by Estimation Method

For all methods, EEDs declined from 2010 through 2011. That decline slowed in 2012 and by 2013, trends were stable or decreasing slightly. Figure 1shows the percentage of EEDs by quarter of delivery and estimation method (TJC, CoIIN, and the Combined Percentage Range).

In response to Special Provision 45 subsection (c), DSHS compared estimates produced by the CoIIN method to estimates produced by the revised method. Up to 2011, the CoIIN method produced EED percentage estimates within the revised estimate range but after 2011, the CoIIN method produced higher estimates (see Figure 1).

Figure 1: DSHS Estimates: Percentages of Early Elective Deliveries, Texas, 2010-2014, by Calendar Year, Quarter, and Method of Calculation



Data Source: Texas DSHS, 2010-2014 Texas Linked Birth Certificate and Inpatient Hospital Discharge Data, Limited to Singleton Live Births among Texas Resident Mothers, Occurring in Texas Hospitals that Report Inpatient Hospital Discharge Data to the THCIC
Denominator: All live births reported in the state that occurred prior to 39 weeks of gestation and where the data submitted did not document a diagnosis or medical condition recognized in this report as a valid clinical indication for early elective delivery.
Numerator: Those in the denominator where the data submitted documented delivery by cesarean section or medically induced vaginal delivery.

Assessments for Potential Impact of the Birth Outcomes Facility Reports

In response to Special Provision 45 subsection (c), DSHS conducted statistical analyses to assess whether there was any potential impact of sending the May 2014 report on birth outcomes to hospitals (see Appendix C). There were no statistically significant differences in EED percentages observed before versus after May 2014.

Comparisons by Sociodemographic Factors, Previous Cesarean Sections, and Region[C]

Table 1 shows EED percentage estimates by calendar year as well as sociodemographic factors, previous cesarean sections, and geographic region. Percentages shown are the lower range of the combined EED percentage (the more conservative estimate of EEDs). EED percentages were higher among mothers age 35 and older, among non-Hispanic white mothers, deliveries paid by private insurance, deliveries among mothers who had at least one previous cesarean section, as well as deliveries in border and rural counties. Percentages were lower among mothers of non-Hispanic other race/ethnicity as well as deliveries that were self-paid. Percentages of EEDs were higher in Public Health Regions 5 (Southeast Texas) and 11 (South Texas), and lower in Region 7 (Central Texas) (see Figure 2).

The percentage of EEDs was much higher among mothers who had at least one previous cesarean section than among mothers who had no previous cesarean section. In 2010, the EED percentage for mothers who had at least one previous cesarean section was 82.7 percent, compared to just 15.8 percent for mothers who had no previous cesarean section. By 2014, EED percentages had decreased for both groups, but a large difference in percentages remained (69.0 percent versus 7.8 percent, respectively) (see Table 1).

Results of Adding Additional Clinical Criteria from the Literature

DSHS conducted a literature review as part of the work on the report for Special Provision 45, and identified research studies including additional clinical criteria as medical conditions for early delivery (see Appendix C). Mothers with a previous cesarean delivery, for example, were included among these additional criteria but were not used in the TJC or CoIIN methods. To determine the potential impact on EED estimates, these additional clinical criteria were applied to the lower end of the combined EED percentage. This estimate was the most permissive and was expected to produce the lowest percentage of EEDs. With these additional criteria, EED percentages were:

Calendar Year	**2010**	**2011**	**2012**	**2013**	**2014**
Percentage	10.3	7.7	4.5	3.5	2.9

Estimates produced by this method should be interpreted with caution. While this method includes additional criteria physicians might consider as a medical reason for early delivery, these additional criteria are not used in the TJC and CoIIN standardized methods.

[C] **Maternal Sociodemographics:** Mother's age (less than 20, 20 through 34, and 35 and above), race/ethnicity (non-Hispanic white, non-Hispanic black, Hispanic, and non-Hispanic other), and initial intended payment source (Medicaid, private insurance, self-pay, other) were obtained from the birth certificate. Initial intended payment source does not indicate the final method of payment. Reflecting practices of the Texas State Demographer, beginning in 2012, selections of multiple non-Hispanic races were coded in the other race/ethnicity category.
Previous Cesarean Status: Mothers having at least one previous cesarean section were identified from both data sources.
Geographic Region: Texas counties were designated as 32 border versus 222 non-border counties. Texas counties were also classified as 82 urban versus 172 rural counties. Accessed at http://dshs.texas.gov/chs/hprc/counties.shtm?terms=rural%20urban

Table 1. Percentages[*] Early Elective Deliveries, Texas, Calendar Years 2010-2014, By Sociodemographic, Medical, and Regional Characteristics[†]

Calendar Year	2010	2011	2012	2013	2014
Total	35.1	30.4	23.5	22.4	22.0
Age Group					
Less than 20	19.6	16.1	11.6	11.3	9.8
20-34	36.6	31.6	23.8	22.8	22.1
35 and older	41.7	37.5	32.0	29.4	30.4
Race/ Ethnicity					
Non Hispanic White	37.5	32.8	26.8	25.0	24.3
Non-Hispanic Black	33.3	28.9	23.1	23.2	22.4
Hispanic	34.7	30.0	22.2	21.2	21.1
Non-Hispanic Other	27.9	23.1	19.0	19.3	18.1
Initial Intended Payment Source[‡]					
Medicaid	34.5	29.5	21.9	21.3	20.9
Private	37.6	33.0	26.2	24.8	23.7
Self-Pay	26.2	24.6	20.7	19.2	18.8
Other	34.9	29.6	22.9	21.4	22.9
Rural vs. Urban Counties					
Rural	38.5	34.7	27.1	25.3	25.6
Urban	34.5	29.8	23.0	22.1	21.5
Border vs. Non-Border Counties					
Border	44.7	40.1	29.1	27.9	27.8
Non-Border	33.0	28.5	22.5	21.5	20.9
Previous Cesarean Sections					
None	15.8	12.6	9.4	8.7	7.8
At least one	82.7	79.0	69.4	69.3	69.0

[*] Percentages are calculated within each group (by cell). Percentages shown here are the estimate where both the birth certificate and the THCIC hospital discharge data set indicated the delivery was by cesarean section or by induction.

[†] Data Source: Texas DSHS, Center for Health Statistics, 2010-2014 Texas Linked Birth Certificate and Inpatient Hospital Discharge Data, Limited to Singleton Live Births among Texas Resident Mothers, Occurring in Texas Hospitals that Report Inpatient Discharge Data to the THCIC
Denominator: All live births reported in the state that occurred prior to 39 weeks of gestation and where the data submitted did not document a diagnosis or medical condition recognized in this report as a valid clinical indication for early elective delivery.
Numerator: Those in the denominator where the data submitted documented delivery by cesarean section or medically induced vaginal delivery.

[‡] Initial intended payment source does not indicate the final method of payment.

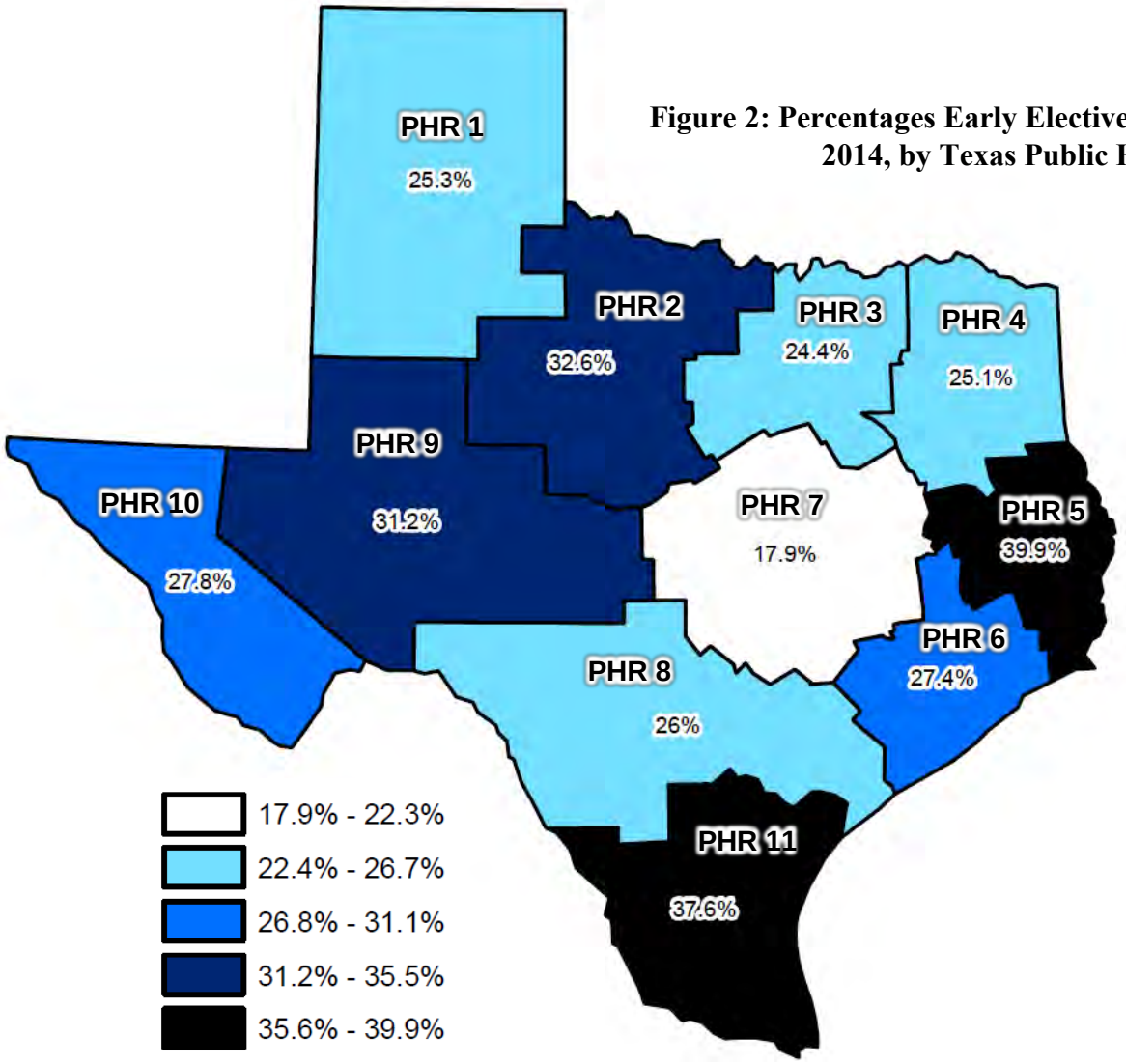


Figure 2: Percentages Early Elective Deliveries, Calendar Years 2010-2014, by Texas Public Health Region (PHR)

Percentage Early Elective Deliveries by PHR and Calendar Year

PHR	2010	2011	2012	2013	2014
1	31.9	29.1	26.2	16.2	17.3
2	43.8	36.4	25.4	25.1	25.3
3	30.0	25.8	22.0	21.6	20.3
4	29.5	28.9	22.4	21.6	20.7
5	48.1	39.8	36.2	36.5	34.1
6	35.3	30.5	23.3	22.4	22.2
7	21.9	18.7	16.5	16.0	15.4
8	33.5	31.0	21.7	20.2	20.3
9	39.6	33.7	27.1	27.4	26.2
10	38.2	30.0	20.2	20.0	25.0
11	48.6	43.6	31.5	29.9	27.3

*†‡

[*] Note: Rates shown on map utilize all records that met selection criteria from years 2010 through 2014. Rates shown within table are by year.
[†] Note: PHRs show a statistically significant downward trend.
[‡] Data Source: Texas DSHS, Center for Health Statistics, 2010-2014 Texas Linked Birth Certificate and Inpatient Hospital Discharge Data, Limited to Singleton Live Births among Texas Resident Mothers, occurring in Texas Hospitals that Report Inpatient Discharge Data to the THCIC.
Denominator: All live births reported in the state that occurred prior to 39 weeks of gestation and where the data submitted did not document a diagnosis or medical condition recognized in this report as a valid clinical indication for early elective delivery.
Numerator: Those in the denominator where the data submitted documented delivery by cesarean section or medically induced vaginal delivery.

Discussion on DSHS Revised Early Elective Deliveries Estimation

Summary and Relationship to Previous Activities

To recap and summarize the DSHS portion of this report: DSHS linked birth certificate and THCIC hospital discharge data, and adapted the standardized TJC and CoIIN methods to create a revised estimate of EEDs. DSHS has been involved in many activities to reduce EED percentages. However, the data sources in the revised method are incapable of attributing any given outcome to any particular set of causative influences. As a result, the revised method was only appropriate to:

- Re-analyze the previously reported CoIIN statistics. The revised EED estimate produced similar trends but after 2011, the CoIIN method produced higher estimates.
- Determine if there was any potential impact of the May 2014 birth outcomes facility report. Statistical analyses demonstrated that the facility report did not appear to reduce the percentage of EEDs.

Strengths and Limitations of the Combined Estimation Method

The methods used in this DSHS study have the following strengths:

- DSHS used both birth certificate and inpatient hospital discharge data sources to increase the amount of information about the delivery.
- DSHS used a detailed (probabilistic) matching technique that resulted in high match percentages (98.0 percent to 98.4 percent), which greatly reduced sampling bias.
- The use of both datasets and combined estimation methods allowed for more complete assessment of EEDs, particularly of medical indications for early delivery.

The DSHS study and revised estimation methods also have certain limitations:

- DSHS does not have access to patients' clinical care records, as do those reporting EEDs to TJC.[8] As a result, the estimates provided in those retrospective reports are not equivalent to the methods or results available to DSHS.
- DSHS could not calculate a definitive EED percentage using the revised estimation method, as the data sources often disagreed on whether a delivery was made by cesarean section or induction, and these data sources had not yet been validated in Texas (see Appendix D). Instead, DSHS calculated an EED percentage probably higher than the true percentage and another EED percentage probably lower than the true percentage. The true EED percentage is probably somewhere between.
- DSHS could not match the TJC method of calculating EEDs completely using only information from the birth certificate and THCIC inpatient hospital discharges. Matching the TJC measure completely would require information from several additional data sources, including medical charts.
- DSHS used ICD-9-CM coding represented in THCIC data. However, coding represented in THCIC data changed to ICD-10-CM in October 2015. The method used in this report would need to be updated again to reflect the change to ICD-10-CM (which is being used by TJC for the PC-01 measure as of revision v2015b).[9]

Additional Considerations from Literature on Early Elective Deliveries

EED studies published in the professional literature are able to access data sources that differ significantly from those available to DSHS, as presented in this report. Therefore, the EED rates reported here may vary from those in other published sources. There are several notable findings from the DSHS literature review, outlined below:

- Few researchers have combined birth certificate and hospital discharge data sources to estimate EEDs.
- Birth certificate and hospital discharge data accuracy varies by state,[10] and DSHS' literature review identified no articles that used data from Texas.
- In other states, inaccurate reporting (including underreporting of medical information) is common in both birth certificates and hospital discharge data.[11-15] Similarly, DSHS' analyses showed these data sources in Texas often disagreed on whether the delivery was by cesarean section or induction.
- Debate exists within the professional literature on whether the CoIIN and TJC standardized methods correctly identify EEDs. Specifically:
  - Some researchers identified additional clinical criteria for early delivery are not used in these standardized methods.[10,13,14,16-21] When DSHS considered these additional clinical criteria, percentages were lower.
  - When producing rates of EEDs, some researchers calculated cesarean sections and induced deliveries separately, and found outcomes of cesarean section and induced delivery are not the same.[20,22]
  - Researchers caution the EED numerators and denominators may not fit medical decisions to deliver early versus continue the pregnancy. In order to better target the timeframe and results of this medical decision, some researchers instead compared deliveries before 39 weeks to deliveries after. Others measured deliveries at 38 weeks of gestation separately from deliveries earlier than 38 weeks. Results differed based on method of estimation.[16-18,22]

Readers should consider limitations of the data sources and revised estimate, as well as results from the DSHS literature review. It is not known whether the revised EED estimate is closer to the true percentage of EEDs than other well-documented, standardized methods (the TJC and CoIIN methods). Similarly, researchers have suggested alternatives to these EED estimation methods.

This literature review and its results are described in more detail within Appendix D.

6. HHSC Review Results and Monitoring Strategy

The following information includes background regarding the HHSC data collected, as well as a description of the retrospective reviews completed and results responsive to Special Provision 45 subsection (b) and HHSC's portion of Special Provision 45 subsection (c).

As required by H.B. 1983, 82nd Legislature, Regular Session, 2011, HHSC implemented a policy prohibiting payment for elective deliveries prior to 39 weeks in the Medicaid program. This policy began on October 1, 2011, and has been tracked through reviews of coding of

physician health care claims data (see Table 2), coupled with intermittent reviews of claims data compared with the corresponding physician medical records (see Table 3).

All physician deliveries covered by Medicaid are required to include an attestation on healthcare claims submitted for payment. There are three types of attestations delivering physicians must include when submitting a claim for payment:

- U1: delivery was prior to 39 weeks of gestation and medically necessary;
- U2: delivery was on or after 39 weeks of gestation; or
- U3: delivery was prior to 39 weeks of gestation and not medically necessary.

Table 2. Physician Modifier Code Usage for Early Elective Deliveries, by Percent of Total, Total, and State Fiscal Year (SFY), Texas Medicaid and CHIP, SFYs 2012 - 2015*

Modifier Code	Gestational Weeks	Medically Necessary	SFY 2012	SFY 2013	SFY 2014	SFY 2015
U1	0 - 38	Yes	31%	35%	35%	35%
			65,962	*72,366*	*70,401*	*70,675*
U2	39 +	*n / a*	60%	65%	65%	64%
			125,672	*135,280*	*131,114*	*128,480*
U3	0 - 38	No	0.2%	0.0%	0.0%	0.0%
			389	*65*	*75*	*99*
Missing	*Data field not populated*		9%	1%	1%	1%
			18,682	*2,011*	*1,643*	*1,823*
		Total	**100%**	**100%**	**100%**	**100%**
			210,705	*209,722*	*203,233*	*201,077*

* Notes: Due to rounding, component percentages may not exactly total one hundred percent for a given fiscal year. CHIP data represent CHIP encounters for the CHIP-Perinate Program, since hospital delivery claims for CHIP-Perinate clients are covered by Medicaid. Modifier code totals listed here are slightly less than the total Medicaid-paid birth counts for the same time period. For example, in SFY15 the modifier code totals represent about 96% of Medicaid-paid births for that year. The difference may be due to normal variances related to the claim submission process, claim adjudication process, and / or reporting methodology.

Multiple reviews of physician claims by the HHSC Office of Inspector General (OIG) compared with the corresponding physician medical records largely indicate concordance between the attestation on the claims data and corresponding medical records documentation (see Table 3).

Since inception of this Medicaid policy on non-payment for elective deliveries prior to 39 weeks and pursuant to monitoring claims activity, OIG has conducted multiple reviews. Table 3 shows the results of these reviews.

Table 3: HHSC OIG Reviews of Medicaid Physician Claims For Deliveries and Corresponding Medical Records

Review Date	Number of Delivery Claims Sampled	Number of Deliveries Reviewed	Medicaid Claims Paid Amounts Reviewed	Medicaid Funds Recouped	Recoupment Rate
1/23/2012	3,485	930	$2,441,146	$23,536	1.0%
5/25/2012	660	151	$480,535	$2,051	0.4%
7/24/2012	1,360	359	$935,293	$0	0.0%
9/2/2015	23,715	771	$2,346,933	$16,465	0.7%

Despite the absence of comparative data prior to the policy implementation, these results appear to indicate this policy is achieving its intended purpose, which is to utilize payment policies to shape provider behavior (in this case, the reduction of EEDs). The policy also allows HHSC to collect and evaluate Medicaid delivery data based on gestational ages before or after 39 weeks of gestation.

Efforts Going Forward

Enhanced Reviews by the Office of Inspector General

Future reviews by OIG will utilize a new record review method with a more focused approach. The new method employs a Centers for Medicare & Medicaid Services approved software called SURProfiler Plus, used to obtain profiles for Surveillance Utilizations Reviews. It allows for identifying outlier providers with a high proportion and high overall use of modifiers indicating the delivery was prior to 39 weeks and medically necessary. Once this outlier report is run, further data mining will take place and instead of the current process of a random sample, which requires large resource allocation for medical record requests and review, the new tool will allow for more targeted and cost effective examinations. Starting fall of fiscal year 2017, OIG will conduct reviews on a bi-annual schedule, in September and March of each year.

HHSC will continue to survey providers of health plans for their input and effectiveness of this policy.

A Medicaid comprehensive Obstetric (OB) policy review is currently underway by HHSC where genetic screening, postpartum depression, scope of practice, 17P (hormone treatment to reduce potential for premature births) and American College of Obstetricians and Gynecologists (ACOG) recommendations for various topics are being considered. Results from this review could result in other ways to monitor the 39 week policy.

HHSC will continue to work together with DSHS to explore ways to match data from reviews or from claims/encounters with birth records data.

7. Conclusions

In response to Special Provision 45 subsections (a) and the DSHS portion of subsection (c), DSHS used state-level administrative data (birth certificate data and hospital discharge claims data) to assess elective deliveries before 39 weeks of gestation. DSHS adapted and combined the CoIIN and TJC methods of measurement. Using this estimation, DSHS had the following findings:

- Combining these data sources (birth certificate and claims data) to calculate EEDs has rarely been done. Overall, the new method of estimation produced lower percentages of EEDs, but neither these data sources nor the revised EED statistic have been validated.
- All methods of estimation produced similar trends. Percentages of EED declined in 2011, but have been mostly stable since 2012.
- In May 2014, DSHS provided birthing facilities with information on their percentages of EEDs, as calculated from birth certificate data. DSHS assessed whether changes in EED percentages were observed before versus after May 2014, but found no statistically significant differences.
- Subgroups were identified with higher percentages of EEDs. Mothers of non-Hispanic white race/ethnicity, mothers with private insurance, and mothers who had at least one previous cesarean section had higher percentages of EEDs. Further, mothers from Public Health Regions 5 (Southeast Texas) and 11 (South Texas) had higher percentages.

In response to Special Provision 45 subsections (b) and the HHSC portion of subsection (c), HHSC calculated the proportion of EEDs using Medicaid claims data, collected from delivering physicians, with codes indicating whether a delivery was medically necessary and if it was prior to or after 39 weeks of gestation. HHSC used these data to calculate the proportion of EEDs. From this review of claims data, HHSC had the following findings:

- Based on Medicaid claims data, the proportion of EEDs among all Medicaid deliveries was 0.2 percent in state fiscal year 2012 and less than 0.1 percent in state fiscal years 2013 through 2015.
- To examine compliance with Medicaid policy regarding recoupment of payments made for non-medically necessary deliveries before 39 weeks of gestation, the claims of medically necessary deliveries before 39 weeks of gestation were reviewed by OIG on four separate occasions. These retrospective reviews revealed high compliance with only 1.0 percent or less of claims/encounters paid recouped due to claims of medical necessity not being documented on the medical record. In the future, OIG reviews will be more targeted.
- A small proportion of physician claims were missing codes that could be used to determine whether deliveries were EEDs. HHSC will continue to work with the health plans to ensure all birth claims have a modifier.
- A comprehensive OB policy review is currently underway where genetic screening, postpartum depression, scope of practice, 17P and ACOG recommendations for various topics are being considered. Findings from this review could result in other ways to monitor the policy regarding recoupment of payments made for non-medically necessary deliveries before 39 weeks of gestation.

It is important to note the all payer hospital level *estimates* of EED provided by DSHS and the Medicaid physician level rates of EED (measured by direct attestation by physicians using a claims modifier), while different, are not in conflict. They are based on different populations and data sets, and use different methods.

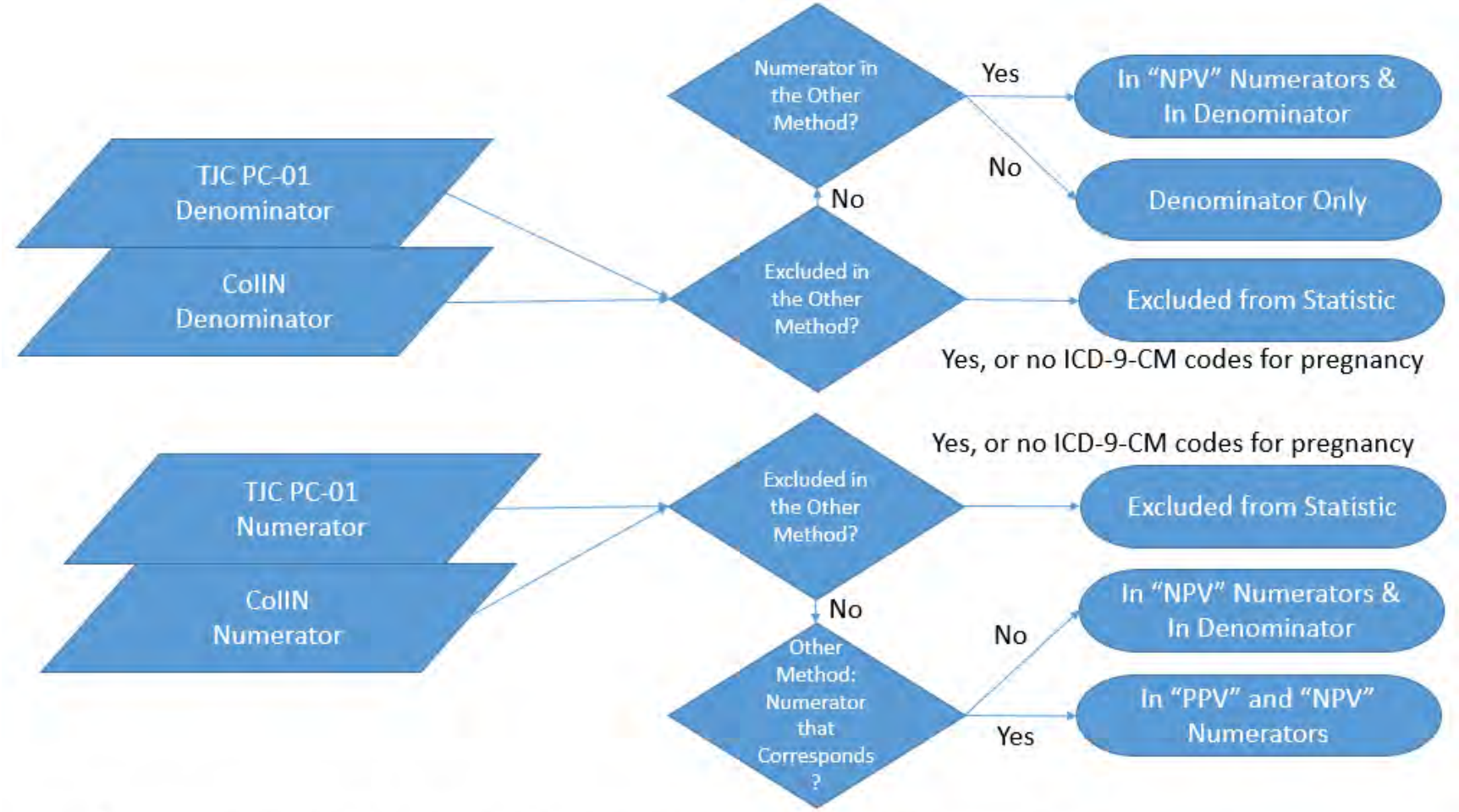
HHSC will continue to work in collaboration with DSHS to explore ways to match data from reviews of claims/encounters and medical records with birth certificate data.

List of Acronyms

Acronym	Full Name
17P	A progesterone (17 alpha hydroxyprogesterone caproate) used to prevent preterm births
ACOG	The American College of Obstetrics and Gynecology
CoIIN	Collaborative Improvement and Innovation Network to Reduce Infant Mortality
DSHS	Department of State Health Services
EED	Early Elective Delivery
HHSC	Health and Human Services Commission
HRSA	Health Resources and Services Administration
ICD-9-CM	International Classification of Diseases, Ninth Revision, Clinical Modification
ICD-10-CM	International Classification of Diseases, Tenth Revision, Clinical Modification
OIG	Office of Inspector General
NPV	Negative Predictive Value
OB	Obstetrics
PPV	Positive Predictive Value
Special Provision 45	2015-2016 General Appropriations Act, H.B. 1, 84th Texas Legislature Regular Session, 2015 (Article II, Health and Human Services, Special Provisions Relating to All Health and Human Services Agencies, Sec. 45)
THCIC	Texas Health Care Information Collection
TJC	The Joint Commission

Appendix A: Additional Figures

Figure A-1. Method to Combine Both TJC and CoIIN Estimations



Notes: The same process to combine is used for both rates produced before and after adding additional codes from the literature.
PPV = Positive Predictive Value; NPV = Negative Predictive Value. These numerators are not directly tests of validity, but "PPV" numerators indicate that both data sources consistently documented the same outcome of NMI Early Term Cesarean or Induction, whereas "NPV" numerators indicate that the data sources disagreed on outcomes. "PPV" Numerators are therefore a conservative estimate of NMI early term cesarean or induction, whereas "NPV" numerators likely overestimate. The true proportion is likely somewhere between.

Appendix B: Detailed Background and Rationale for the DSHS Revised Estimation Method

Background and History Leading to this Report

Timing of Birth and Advocacy to Avoid Early Term Delivery

The typical length of pregnancy is 40 weeks of gestation, and the best time period to deliver a baby has traditionally been between 37 and 41 weeks of gestation (a "term" delivery). However, researchers have shown deliveries at 37 or 38 weeks of gestation may still be more risky than deliveries at 39 or 40 weeks of gestation.[3,4] In 2012, researchers and public health experts recommended to re-define "term" deliveries into three groups: "early term" (37 through 38 weeks of gestation), "full term" (39 through 40 weeks), and "late term" (41 weeks).[4,5,23] This revised definition reinforces longstanding recommendations by the American College of Obstetrics and Gynecology that doctors should generally wait to deliver a baby until 39 weeks of gestation.[24]

Combating the Rising Rates of Early Delivery in Texas

The number of live births among Texas residents have risen from 316,257 in 1990 to 399,482 in 2014. From the 1990s until the early 2000s, the prevalence of deliveries before 39 weeks of gestation had also been rising in Texas. This increase mirrored national trends, and one of the reasons may have been increasing use of cesarean sections and induction of delivery.[25] Since 2006, that trend has instead been decreasing, and this shift may reflect the impact of initiatives aimed at reducing otherwise uncomplicated deliveries before 39 weeks of gestation.[26] In Texas, the prevalence of deliveries before 39 weeks of gestation in 2014 was 40.3 percent. That percentage was lower than in 2006 (46.0 percent), but still higher than in 1991 (33.6 percent) (see Figure B-1). Notably, in 2014, an estimated 48.0 percent of live births before 39 weeks of gestation were paid for by Medicaid.

Definition of Early Elective Deliveries in this Report

EEDs are defined in this report as those which occur before 39 weeks of gestation and where there appears to be no medical reason necessitating the early delivery. Non-medical reasons may include performing a cesarean delivery or inducing labor just because the mother lives far from a hospital, or just to relieve the mother of the continuing discomfort of pregnancy.[27]

In this report, the term EED was used to match the language in Special Provision 45. However, other terms are often used to refer to this statistic. Such terms include "non-medically indicated early term cesarean sections and induced deliveries" or "non-medically indicated early term delivery". These terms are often used instead of EED when the data sources do not identify a medical reason for the delivery, but also do not specifically identify the early delivery was "elective".

Method Used at DSHS to Calculate Early Elective Deliveries

In 2012, the HRSA CoIIN developed a method to calculate the percentage of EEDs using only data from birth certificates.[2,7] DSHS has been using this estimation method since 2012. There are a few strengths and limitations of this method.

- Strengths include:
  - Simple estimation
  - Uniform data collection for the entire state
  - Ability to compare with other states

- Limitations include:
  - Does not match methods used by doctors and hospital facilities to compute EEDs (TJC's National Quality Measure, TJC, 2015A Perinatal Care measure set, measure ID PC-01: Elective Delivery)[8]
  - Does not collect all medical indications for early cesarean sections and induced deliveries
  - Medical information on the birth certificate may be underreported[11,12]

Legislative Budget Board Report and Request to Include Hospital Discharge Data

In 2015, the Legislative Budget Board submitted a report[24] to the 84th Texas Legislature with selected issues and recommendations on Texas state government effectiveness and efficiency.[27] The report made the following comments and recommendations:

- The birth certificate may overestimate the percentage of EEDs. This is in part because not all medical indications for early delivery are collected.
- The estimation of EEDs might be improved by combining birth certificate data with THCIC hospital discharge data.
  - The authors of this report recommend using this combined data to adapt TJC's guidelines to calculate elective deliveries (TJC PC-01 National Quality Measure, Elective Delivery).[8]

Literature Review to Determine Revised Estimation Method

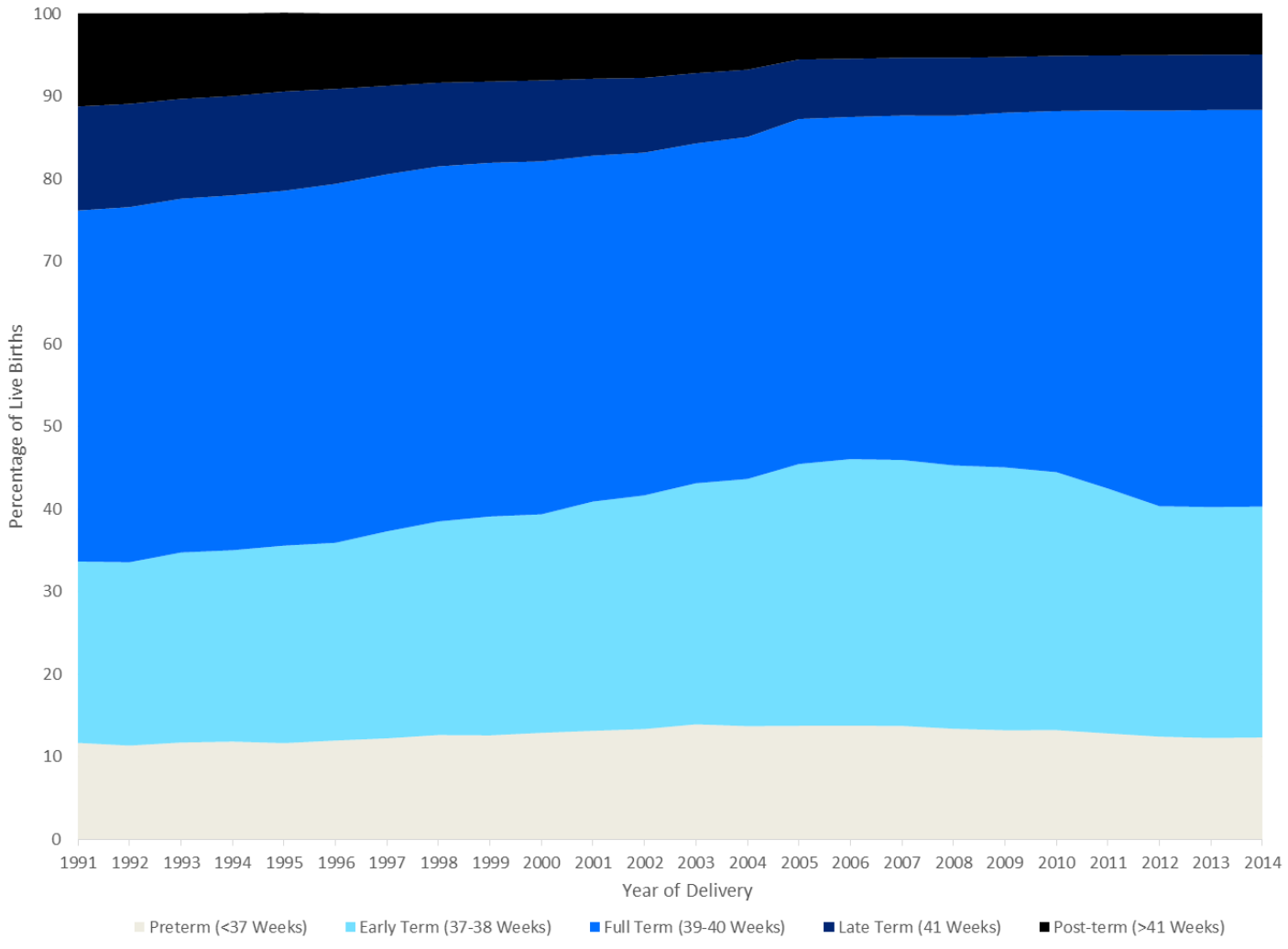
A rigorous literature review was conducted to determine how often birth certificate and hospital discharge data sources were combined to measure EED, and the estimation methods used. Only 13 articles were found which used both data sources to measure EEDs. Of these, the most common method used was the TJC method.[8] The CoIIN method was used as well, but was not as common. Estimation methods often differed from the TJC and CoIIN, and some articles included additional medical reasons for early delivery (including previous cesarean sections).[10,11,13,14,16,17-20,22,29-31]

DSHS also reviewed these articles to determine if using both data sources improved the estimation. Only three articles included information about data validation, but they generally showed using both data sources was better than using only one because the results better matched the information in medical charts.[11,13,14] However, even though the combined data sources improved quality of the EED percentage, one article found the TJC estimation still did

not relate to expected outcomes[30], and this indicates standardized estimation of EED may not actually identify EEDs. DSHS also noted data quality can vary by state, but none of the articles used data from Texas.

Therefore, few researchers have used both TJC and CoIIN methods to calculate EEDs. Those that did use both methods generally found it improved the estimation, but still has limitations. Based on this review, DSHS chose to combine and compare the TJC and CoIIN methods of estimation, and to assess further differences using the additional medical reasons for early delivery provided by the literature.

Figure B-1. Percentage of Live Births among Texas Residents by Term Status, Calendar Years 1991-2014



Calculated Weeks of Gestation Based on Last Normal Menses Date
Percentages are of All Live Births to Texas Residents in which the Last Normal Menses Date was Known
Data Source: Texas Department of State Health Services, Center for Health Statistics, Birth Statistical Files, among Texas Residents

Appendix C: Detailed Methods of the DSHS Early Elective Delivery Estimation

Data Sources and Data Linkage

Data was obtained from the Texas birth certificate and from THCIC inpatient hospital discharges for single live births occurring in Texas between 2010 and 2014. Direct identifiers (such as name and social security number) as well as indirect identifiers (such as birth facility) were used to link the data sources. A detailed, probabilistic matching procedure was used, which helped to determine if records were properly linked. Linkage percentages varied by calendar year from 94.6 percent to 94.8 percent. After linkage, selection criteria from both the TJC and CoIIN methods were applied.[7,8] The resulting dataset had linkage rates by calendar year from 98.0 percent to 98.4 percent, which indicated a large portion of the data was linked. Linked records had a higher proportion of deliveries by cesarean section, but otherwise were not consistently different from the full set of records.

Early Elective Delivery Estimation Methods

TJC Method Estimation and Interpretation

This report adapted the TJC method (v2015a, the most recent at the time of analysis).[8] The method was adapted so it used only the birth certificate and THCIC inpatient hospital discharge data sources. (Data for the TJC method are normally collected from various sources including ICD-9-CM diagnosis and procedure codes, information from medical history documents, prenatal care records, and others.) It was also adapted so all deliveries before 39 weeks of gestation were used rather than only early term deliveries. The measure is interpreted as the percent of live births before 39 weeks of gestation, by cesarean section or induction, where there is no medical reason (present prior to or during delivery) for the early cesarean section or induction.

CoIIN Method Estimation and Interpretation

This report adapted the CoIIN estimation method.[7] The method was adapted so it used all deliveries before 39 weeks of gestation rather than only early term deliveries. The measure is interpreted slightly differently than the TJC method. It is interpreted as the percent of live births before 39 weeks of gestation, by cesarean section or induction, where there is no medical reason (present prior to delivery) for the early cesarean section or induction and furthermore no medical reason occurring during delivery.

Combined TJC and CoIIN Methods

The TJC and CoIIN methods were combined so all information was used from both methods of estimation (see Figure 1). For cases which did not have a medical indication for early delivery, information from the birth certificate and THCIC hospital discharge data sources were compared to determine if both showed the delivery was by cesarean section or by induction. Two EED statistics were produced representing the upper end and lower end of the combined EED

percentage: The "combined PPV"[D] statistic shows the percentage where both data sources had identified the delivery was by cesarean section or by induced delivery. The "combined NPV"[E] statistic shows the percentage where at least one data source had identified the delivery was by cesarean section or induced delivery. The "combined PPV" statistic probably underestimates the percentage (is too low), whereas the "combined NPV" statistic probably overestimates the percentage (is too high). These two statistics provide a range where the true percentage of EED in Texas is probably somewhere between. The measures are interpreted as the percent of live births before 39 weeks of gestation, by cesarean section or induction, where there is no medical reason (present prior to or during delivery) for the early cesarean section or induction.

Adding Additional Clinical Criteria from the Literature

Researchers identified additional clinical criteria not used in either the TJC or the CoIIN standard methods. These included additional medical indications for early delivery as well as additional criteria to identify cesarean sections or induced deliveries.[10,13,14,16,17,19-21] These additional criteria were added to the "combined PPV" estimation to produce EED percentages that account for all information provided from the CoIIN, TJC, and literature.

Statistical Analyses

First, EED percentages were compared between the CoIIN and the combined EED estimation methods to determine if the combined EED methods of estimation produced lower percentages than the CoIIN method. Second, "combined PPV" percentages before May 2014 were compared to percentages after May 2014 in order to determine if the birth outcomes facility report had potentially resulted in a reduction of EEDs. These statistical analyses required DSHS to use percentages by month (in order to have enough data points to determine if changes occurred across time). However, percentages by month often include only a small number of EEDs in the numerator, and this makes the percentage less appropriate for comparison purposes. Therefore, percentages within this report are instead provided by calendar year and quarter.

[D] "Positive predictive value" (PPV) in this report means that the statistic has a low likelihood of false positives. Although data are not validated against medical chart abstraction, the data sources agreed on the result. Therefore, cases in this numerator have a higher likelihood of being an EED. Because these data sources must agree to be included, this measure likely underestimates the percentage of EEDs (see Appendix C).

[E] "Negative predictive value" (NPV) in this report means that the statistic has a low likelihood of false negatives. These data are not validated against medical chart abstraction and the data sources disagreed on the result. Because this percentage uses information from either data source, records in the denominator only have a low likelihood of being an EED. These data sources do not need to agree, so this measure likely overestimates the percentage of EEDs (see Appendix C).

Appendix D: Relationship to Previous Activities and Findings from Literature

This portion of the report used linked birth certificate and inpatient hospital discharge data, and EED estimation methods were revised to use these linked data. Overall, the revised EED estimation methods produced lower percentages than the original CoIIN estimation method used by the state. However, in many cases, only one of the two data sources used (either the birth certificate alone or hospital discharge data alone) indicated the delivery was by cesarean section or induction. This shows inaccurate or under-reporting is common in one or both of these data sources, and these inaccuracies affect the EED percentage. Previous studies have shown medical indications for early delivery are commonly under-reported.[11,12] Studies also have shown using both the birth certificate and inpatient hospital discharge data sources together improves accuracy of the EED percentage, but accuracy still varies by state[10], and our literature review identified no articles used data from Texas. In the future, it will be important to conduct validation of Texas birth certificate and inpatient hospital discharge data in order to identify whether the revised EED estimation method actually produces percentages that are close to the true EED percentage.

DSHS adapted methods of calculating EED which are standardized, commonly used, and reported across states (the CoIIN and TJC methods). However, researchers have sometimes questioned the accuracy of both of these methods to actually identify EEDs. In particular, they think these standardized methods might not identify all medical indications for early delivery. Darney and his colleagues[16] also considered previous cesarean sections as a medical indication for early delivery. Since the TJC and CoIIN methods are standardized and used across several states, groups should carefully assess any new methods of calculating EEDs to ensure the new method is better than those methods.

The CoIIN, TJC, and the DSHS combined method all used a percentage estimation where the denominator is considered a "population at risk". The "population at risk" included all deliveries before 39 weeks of gestation without a documented medical reason for the early delivery. The numerator included only those in the denominator whose delivery occurred by cesarean section or induction. However, some researchers have shown different results are produced with different denominators (such as only looking at 38 weeks of gestation) or by comparing against individuals who deliver at or beyond 39 weeks of gestation. These researchers argue such comparisons may be more appropriate if the focus is to compare the impact of a medical decision to deliver in the early term period versus to continue the pregnancy.[16-18,22] Similarly, researchers have also looked at cesarean sections and induced deliveries separately and found results differ between them.[20,22] In the future, researchers may consider adjusting their denominators, using comparison groups, or calculating EEDs by cesarean section separately from EEDs by induction.

DSHS has been involved in many activities to reduce EED percentages. However, the data sources in the revised method do not include any information on these activities or their impact, or information on many other potential reasons why EED percentages may have gone up or down. As a result, the revised method of calculating EED percentages was only appropriate to re-analyze the previously reported CoIIN statistics and to determine if there was any potential

impact of the May 2014 birth outcomes facility report. When comparing the DSHS revised EED estimation to the previously reported CoIIN statistics, these tests showed the revised method produced lower percentages of EED, but otherwise trends were very similar. The revised method of estimation still showed percentages of EED have been stable since 2012 (See Figure 1). Regarding any potential impact of the May 2014 birth outcomes facility report, the statistical analyses results showed the facility report did not appear to reduce the percentage of EEDs.

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