

V09.4 Special Report - Linked Trend Analysis: Maternal Shoulder Dystocia and Inborn Birth Trauma (2005-2009)

July 2010

I. Literature Overview of Topic

Although the American College of Obstetricians and Gynecologists defines shoulder dystocia as “a delivery that requires additional obstetric maneuvers following failure of gentle downward traction on the fetal head to effect delivery of the shoulders”¹, there are multiple and varied definitions found in the literature². Along with variation of definitions, there is a subjective component to diagnosing this complication resulting in an incidence of shoulder dystocia ranging from approximately 0.6% to 1.4% among vaginal deliveries of infants in the vertex position³. Further variations exist when comparing the ACOG practice Bulletin on shoulder dystocia and guidelines from England, Canada, Australia and New Zealand⁴.

While most shoulder dystocia cannot be predicted, some risk factors associated with shoulder dystocia include macrosomia, maternal diabetes and obesity, operative vaginal delivery, precipitous delivery and prolonged second stage of labor, history of shoulder dystocia or macrosomic fetus, post term pregnancy and advanced maternal age.^{5,6,7,8,9,10} Further research is evaluating obesity as it relates to gestational diabetes and shoulder dystocia. Cheng, et al recommended utilizing the Carpenter and Coustan diagnostic thresholds for gestational diabetes rather than the National Diabetes Data Group (NDDG) thresholds; utilizing the NDDG criteria rather than the Carpenter and Coustan criteria resulted in more shoulder dystocia diagnoses.¹¹

Shoulder dystocia can pose a significant risk for mother and infant. For the infant, shoulder dystocia can result in brachial plexus injury, hypoxia and neonatal death.¹² For the neonate, shoulder dystocia is associated with the greatest risk for brachial plexus palsy.¹³ Maternal complications can include postpartum hemorrhage, vaginal and cervical lacerations, vaginal hematoma and bladder atony.¹⁴

Management of shoulder dystocia should include a team approach. Studies reference improved overall shoulder dystocia management and performance when team training and other strategies to enhance teamwork were instituted.^{15,16,17,18,19,20,21} It is helpful for the team to review the event and take the lessons learned back to the larger group of practitioners. As always, clear and organized documentation is important for this event. One study found that 54% of shoulder dystocia malpractice claims had poor documentation leading to the authors recommending a standardized procedure note for shoulder dystocia.²²

In Summary, shoulder dystocia remains unpredictable and is a rare emergency; team training with simulation drills is recommended to mitigate adverse outcomes for both mother and baby.

II. Description of Tables and Graphs

The V09.4 Special Linked Trend Analysis: Maternal Shoulder Dystocia and Inborn Birth Trauma provides you with the five year trend analysis of mothers **who had a vaginal delivery**, a shoulder dystocia code on their record and a birth trauma code on their **≥ 2500 gram** baby's record. The comparison group for this report is the NPIC Trend Data Base. The NPIC Trend Data Base is a subgroup of 43 hospitals that have participated in the NPIC database for the entire five year period.

If your hospital has not participated for the entire trend period or has not completed validation of your 2009 data, this trend analysis will only display data points for those years for which we have complete validated data. **The period of analysis is 2005-2009 and links women who delivered vaginally with their infants (≥ 2500 grams) using the mother's medical record number that appears on the baby's record as part of the hospital's NPIC/QAS data submission.** The analysis will only show the rate of birth trauma for those (inborns ≥ 2500 grams) where we were able to establish a link (i.e., when mother's medical record number is not missing or invalid on the baby's record). **We encourage all hospitals to provide the most complete linking data possible for future linked analyses.**

Sections A and B of the accompanying table display the Total Vaginal Deliveries and Total Inborns ≥ 2500 grams coded as delivered vaginally for your hospital and the trend database for the period 2005-2009.

Section C displays a count of vaginal deliveries with shoulder dystocia for your facility and the percent of total deliveries with the shoulder dystocia code for the period 2005-2009. Shoulder dystocia is identified as ICD-9-CM code 660.4, obstructed labor due to impacted shoulders. The trend database average is also displayed.

Section D shows for your hospital and the trend database the number of mothers who had vaginal deliveries with shoulder dystocia who also had a fourth degree perineal laceration (DX code 664.3) or a postpartum hemorrhage within the first 24 hours following delivery of placenta (DX code 666.1) or both a fourth degree perineal laceration **and** a postpartum hemorrhage. This section also displays the cases with these complications as a percentage of the total vaginal deliveries with shoulder dystocia.

The shaded sections of the table, **E through H**, display the linked inborn/mother information. **Section E** begins with the number and percent of total inborns ≥ 2500 grams that could be linked to a mother with a vaginal delivery for your hospital and the trend database.

Section F of the table shows the number of inborns ≥ 2500 grams that are linked to a mother with a vaginal delivery and shoulder dystocia code and the percent of inborns ≥ 2500 grams who were linked to a mother with the code. The trend database average is also displayed.

The remainder of the table focuses only on the inborns ≥ 2500 grams with birth trauma that are linked to a mother with a vaginal delivery and shoulder dystocia code. **Section G** displays the distribution of birth trauma codes and the total number of codes for the hospital and the trend data base average for each code. We only profile the three most frequently identified codes: 767.19: Other injuries to scalp; 767.2 Fracture of the clavicle; and 767.6 Injury to brachial plexus; palsy or paralysis. "All other birth trauma codes" is the count of birth trauma codes other than the one mentioned above. If you have cases with "other birth trauma codes" which you would like to review, we can provide you with a list displaying the specific codes.

The resulting rate of inborn cases ≥ 2500 grams with a birth trauma code linked to a mother delivered vaginally with a shoulder dystocia code, **Section H**, is also displayed for the hospital and the trend database. Additionally, this section shows the percentage of these inborns whose mothers had an operative vaginal delivery. These numbers should look credible for your hospital; as always, a list of medical record numbers for any of the case counts reflected in this analysis can be provided upon request.

Graph 1: Linked Maternal Shoulder Dystocia and Inborns Birth Trauma: Vaginal Deliveries; Inborns ≥ 2500 grams Percent of Vaginal Deliveries Coded with Shoulder Dystocia 2005-2009 with Trendlines, graphs the information provided in the unshaded section of the table, displaying the percent

of vaginal deliveries with shoulder dystocia for the five-year trend period. Below the graph is a table which includes all the data displayed for the trend analysis period: the trend database average rate, the hospital's rate with upper and lower confidence intervals and the hospital's count of numerator and denominator cases for each year. For each trendline, we indicate whether there is a significant upward or downward trend, or if it is stable over time.

Graph 2: Linked Maternal Shoulder Dystocia and Inborns with Birth Trauma: Vaginal Deliveries; Inborns \geq 2500 grams Percent of Inborns \geq 2500 grams with Birth Trauma linked to a Vaginally Delivered Mother coded with Shoulder Dystocia 2005-2009 with Trendlines, graphs the information in the shaded section of the table, displaying the percent of inborns \geq 2500 grams with Birth Trauma who are linked to a vaginally delivered mother with shoulder dystocia for the five-year trend period. Below the graph is a table which includes all the data displayed for the trend analysis period: the trend database average rate, the hospital's rate with upper and lower confidence intervals and the hospital's count of numerator and denominator cases for each year. For each trendline, we indicate whether there is a significant upward or downward trend, or if it is stable over time. **Please note that when reviewing this graph, the test of significance of the trend line only applies to the inborn cases \geq 2500 grams with birth trauma linked to a vaginally delivered mother coded with shoulder dystocia.**

Questions regarding this analysis should be directed to Sandra Boyle, Director of Membership Services (sboyle@npic.org) or Annemarie D'Abrosca, Senior Analyst/Hospital Liaison (adabrosca@npic.org) at 401-274-0650.

III. References

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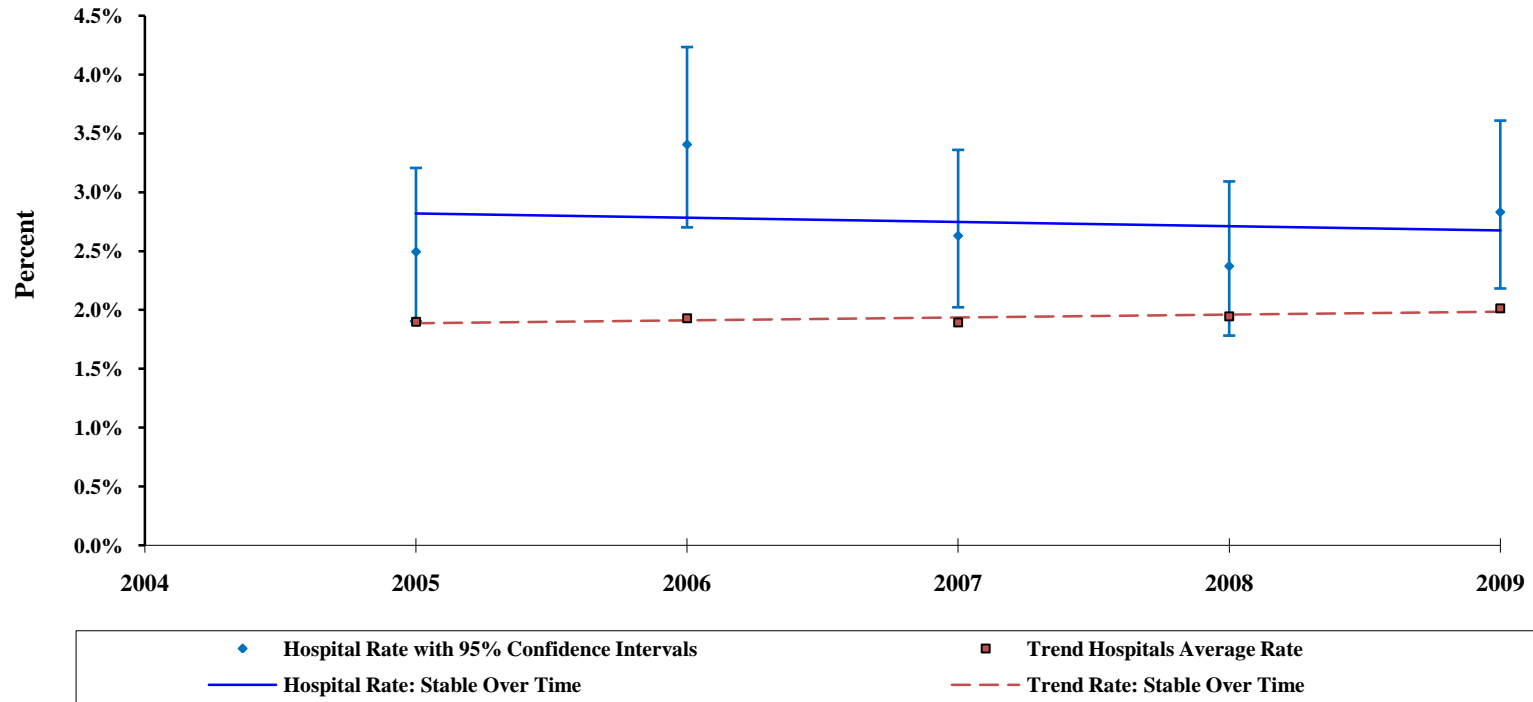
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V09.4 Special Linked Trend Analysis: Maternal Shoulder Dystocia and Inborn Birth Trauma (2005-2009)						
Vaginal Deliveries only; Inborns ≥ 2500 grams						
NPIC ID: SAMPLE	2005	2006	2007	2008	2009	Pct Change 05 - 09
A. Total Vaginal Deliveries						
Hospital	2,365	2,290	2,357	2,234	2,225	-5.9%
Trend Data Base Average	3,336	3,349	3,367	3,277	3,139	-5.9%
B. Total Inborns ≥ 2500 Grams coded as delivered vaginally						
Hospital	2,188	2,149	2,170	2,088	2,086	-4.7%
Trend Data Base Average	3,256	3,265	3,226	3,023	2,909	-10.7%
C. Vaginal Deliveries with Shoulder Dystocia ¹						
Hospital	59	78	62	53	63	6.8%
Vaginal Deliveries with Shoulder Dystocia as a percent of total vaginal deliveries	2.5%	3.4%	2.6%	2.4%	2.8%	13.5%
Trend Data Base Average	63	65	64	64	63	-0.2%
Vaginal Deliveries with Shoulder Dystocia as a percent of total vaginal deliveries	1.9%	1.9%	1.9%	1.9%	2.0%	6.1%
D. Vaginal Deliveries with Shoulder Dystocia who also had a Fourth Degree Laceration and/or Postpartum Hemorrhage ²						
Hospital						
664.3 Fourth degree perineal laceration only	1	3	1	1	1	0.0%
666.1 Postpartum Hemorrhage only	2	4	3	3	4	100.0%
Both 664.3 and 666.1	0	0	0	0	0	--
Vaginal Deliveries with Shoulder Dystocia who also have Fourth Degree Lacerations and/or Postpartum Hemorrhage as a percent of total vaginal deliveries with shoulder dystocia	5.1%	9.0%	6.5%	7.5%	7.9%	56.1%
Trend Data Base Average						
664.3 Fourth degree perineal laceration only	2	2	2	2	2	-24.4%
666.1 Postpartum Hemorrhage only	3	3	3	4	3	7.7%
Both 664.3 and 666.1	0	0	0	0	0	--
Vaginal Deliveries with Shoulder Dystocia who also have Fourth Degree Lacerations and/or Postpartum Hemorrhage as a percent of total vaginal deliveries with shoulder dystocia	8.6%	8.7%	8.3%	8.4%	8.2%	-4.4%
¹ ICD-9 Code 660.4 - Obstructed labor due to impacted fetal shoulders						
² ICD-9 Code 666.1 - Hemorrhage within the first 24 hours following delivery of placenta						

V09.4 Special Linked Trend Analysis: Maternal Shoulder Dystocia and Inborn Birth Trauma (2005-2009)						
Vaginal Deliveries only; Inborns ≥ 2500 grams						
NPIC ID: SAMPLE	2005	2006	2007	2008	2009	Pct Change 05 - 09
E. Linked Inborn/Mother records						
Hospital	2,167	2,119	2,140	2,065	2,046	-5.6%
Total inborns ≥ 2500 grams linked to a mother with a Vaginal Delivery as a percent of total Inborns ≥ 2500 Grams coded as delivered vaginally	99.0%	98.6%	98.6%	98.9%	98.1%	-1.0%
Trend Data Base Average	2,679	2,774	2,700	2,762	2,702	0.8%
Total inborns ≥ 2500 grams linked to a mother with a Vaginal Delivery as a percent of total Inborns ≥ 2500 Grams coded as delivered vaginally	82.3%	85.0%	83.7%	91.4%	92.9%	12.9%
F. Inborns ≥ 2500 grams Linked to a Mother with a Vaginal Delivery and Shoulder Dystocia code						
Hospital	58	78	61	52	62	6.9%
Total inborns ≥ 2500 grams linked to a mother with a Vaginal Delivery and Shoulder Dystocia code as a percent of total vaginal deliveries with shoulder dystocia	98.3%	100.0%	98.4%	98.1%	98.4%	0.1%
Trend Data Base Average	54	57	53	55	56	3.2%
Total inborns ≥ 2500 grams linked to a mother with a Vaginal Delivery and Shoulder Dystocia code as a percent of total vaginal deliveries with shoulder dystocia	86.0%	87.9%	82.6%	86.8%	89.0%	3.4%
Shaded areas represent linked data.						

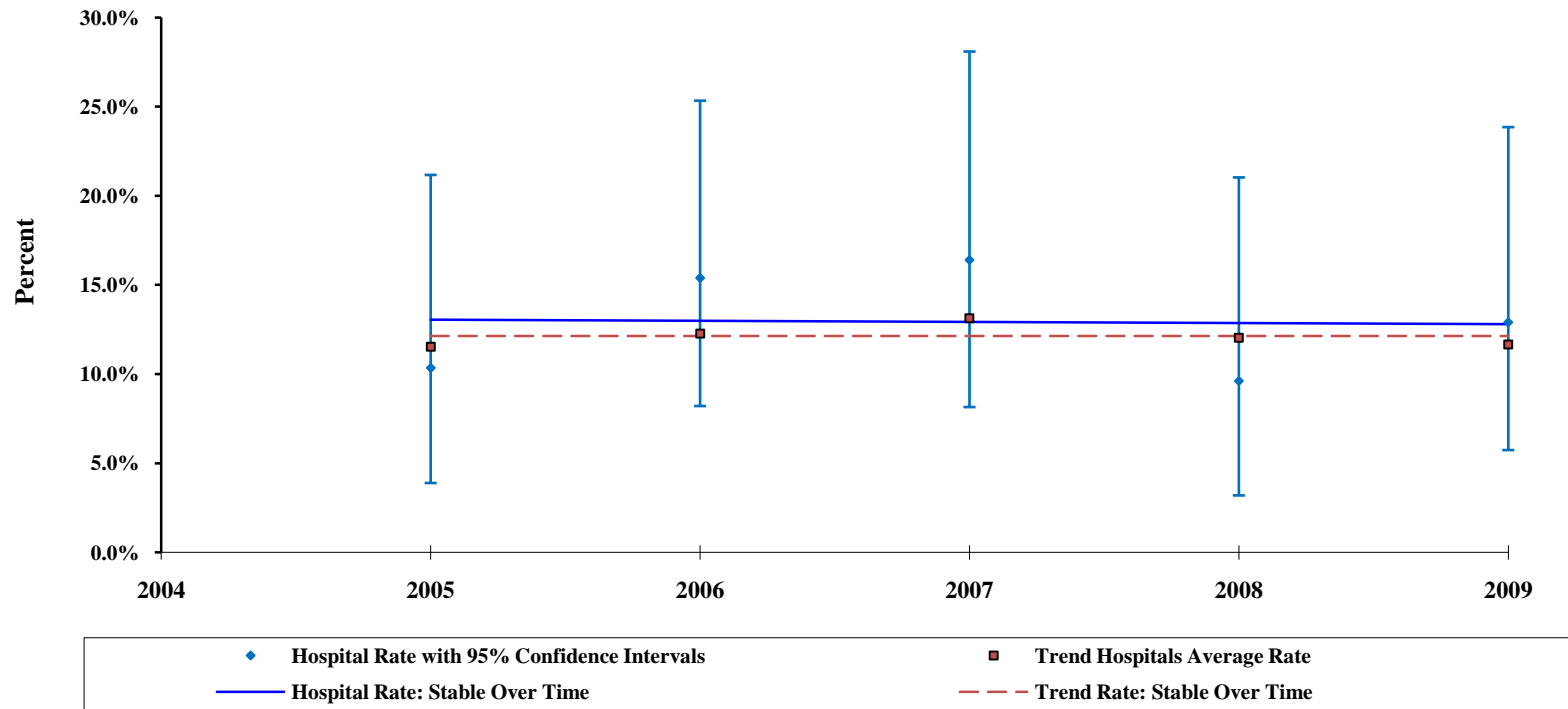
V09.4 Special Linked Trend Analysis: Maternal Shoulder Dystocia and Inborn Birth Trauma (2005-2009)						
Vaginal Deliveries only; Inborns ≥ 2500 grams						
NPIC ID: SAMPLE	2005	2006	2007	2008	2009	Pct Change 05 - 09
G. Distribution of Birth Trauma Codes on Inborns ≥ 2500 grams linked to Mothers with a Vaginal Delivery and Shoulder Dystocia						
Hospital						
767.19 Other injuries to scalp	1	4	4	1	1	0.0%
767.2 Fracture of clavicle	3	0	3	1	4	33.3%
767.6 Injury to brachial plexus; palsy or paralysis	0	8	3	2	2	--
All other birth trauma codes	3	5	4	2	2	-33.3%
Total Birth Trauma Codes - Hospital:	7	17	14	6	9	28.6%
Trend Data Base Average						
767.19 Other injuries to scalp	2	2	2	2	2	0.0%
767.2 Fracture of clavicle	2	2	2	2	2	0.0%
767.6 Injury to brachial plexus; palsy or paralysis	2	3	3	2	3	50.0%
All other birth trauma codes	1	1	1	1	1	0.0%
Total Birth Trauma Codes - Trend:	7	8	8	7	8	14.3%
H. Inborn Cases ≥ 2500 grams** with Birth Trauma that are linked to a mother with a Vaginal Delivery and Shoulder Dystocia code						
Hospital	6	12	10	5	8	33.3%
Total inborns ≥ 2500 grams with birth trauma linked to a mother with a vaginal delivery and shoulder dystocia as a percent of total Inborns ≥ 2500 grams Linked to a Mother with a Vaginal Delivery and Shoulder Dystocia code	10.3%	15.4%	16.4%	9.6%	12.9%	24.7%
Percent of cases whose mother had an operative vaginal delivery***	0.0%	0.0%	0.0%	0.0%	0.0%	--
Trend Data Base Average	6	7	7	7	7	16.7%
Total inborns ≥ 2500 grams with birth trauma linked to a mother with a vaginal delivery and shoulder dystocia as a percent of total Inborns ≥ 2500 grams Linked to a Mother with a Vaginal Delivery and Shoulder Dystocia code	11.5%	12.3%	13.1%	12.0%	11.7%	1.0%
Percent of cases whose mother had an operative vaginal delivery***	0.0%	0.0%	0.0%	0.0%	0.0%	--
<p>** This number may be smaller than the total number of birth trauma codes because there may be more than one code on the inborn record.</p> <p>*** Includes codes 72.xx: Forceps, Vacuum and breech delivery.</p> <p style="text-align: right;">Shaded areas represent linked data.</p>						

Graph 1: Linked Maternal Shoulder Dystocia and Inborn Birth Trauma
Vaginal Deliveries only; Inborns ≥ 2500 grams
Percent of Vaginal Deliveries Coded with Shoulder Dystocia 2005-2009 with Trendlines
NPIC ID: SAMPLE



	2005	2006	2007	2008	2009	Pct Change 05 - 09
Trend Rate	1.9%	1.9%	1.9%	1.9%	2.0%	6.1%
Hospital Rate	2.5%	3.4%	2.6%	2.4%	2.8%	13.5%
Hospital Numerator	59	78	62	53	63	
Hospital Denominator	2365	2290	2357	2234	2225	
Lower CI	1.9%	2.7%	2.0%	1.8%	2.2%	
Upper CI	3.2%	4.2%	3.4%	3.1%	3.6%	

**Graph 2: Linked Maternal Shoulder Dystocia and Inborn Birth Trauma - Vaginal Deliveries only; Inborns \geq 2500 grams
Percent of Inborns \geq 2500 grams with Birth Trauma linked to a Vaginally Delivered Mother Coded with Shoulder Dystocia
2005 - 2009 with Trendlines
NPIC ID: SAMPLE**



	2005	2006	2007	2008	2009	Pct Change 05 - 09
Trend Rate	11.5%	12.3%	13.1%	12.0%	11.7%	1.0%
Hospital Rate	10.3%	15.4%	16.4%	9.6%	12.9%	24.7%
Hospital Numerator	6	12	10	5	8	
Hospital Denominator	58	78	61	52	62	
Lower CI	3.9%	8.2%	8.2%	3.2%	5.7%	
Upper CI	21.2%	25.3%	28.1%	21.0%	23.9%	