



The Seventh Annual HealthGrades Maternity Care in American Hospitals Study

June 2010

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HEALTHGRADES®

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In this report, HealthGrades identifies patient outcomes for maternity care. The maternity care analysis uses three years of data (2006-2008) from 19 all-payer states and calculates maternal complication rates for vaginal, cesarean section (C-section), and patient-choice C-section deliveries. It also includes neonatal mortality rates for all hospitals evaluated. The analysis identifies best-performing (5-star rated) hospitals in maternity care to establish a best-practice benchmark against which other hospitals can be evaluated. See www.HealthGrades.com for a list of best-performing hospitals and for specific results for individual hospitals.

Introduction

The United States spends more on health care than in any other country.¹ A large proportion of this cost is due to childbirth-related hospitalizations. In fact, over 86 billion dollars a year is spent on childbirth in the U.S. These costs are the highest hospitalization costs relative to any other area of medicine.² About 4.3 million annual hospital stays are due to obstetric conditions.³

Yet, despite the money spent on childbirth, the U.S. ranks among the worst in maternal and neonatal mortality compared to other developed countries.⁴ Research suggests that certain maternity care practices in the U.S. are often overused without clinical indication, and that there are large gaps between best practice and actual care.⁵

Possibly, one such overused practice is the cesarean section (C-section). Nearly one-third of the childbirths in 2006 were delivered via C-section compared with approximately one-fifth in 1997 and less than 1 out of 10 in 1965.³ Part of the increase in the C-section delivery rate seems to arise from an increase in cesarean deliveries requested by mothers in the absence of any medical or obstetric indications.⁶ C-section deliveries continue to rise, despite evidence to indicate that C-sections do not improve outcomes. As such, the Joint Commission on Accreditation of Healthcare Organizations has recently encouraged hospitals to develop quality initiatives to decrease the rate of C-sections among low risk primary births.⁷

For many women, hospitalization due to childbirth is their first experience with inpatient care. To ensure that mothers-to-be and their families are able to make the best decision regarding their care, it is important to have comparative information about the quality differences that exist among hospital maternity care programs.

Unfortunately, there is limited objective quality information on hospital obstetric care available in the public domain, leaving women with no better source of information other than referrals or the reputation of their physician or hospital. However, referrals and reputation do not provide enough information and should not be the deciding factor when choosing a birthing facility. Women and their families need a better understanding of the differences in quality outcomes for birthing hospitals in

their community and a better understanding of hospitals that have demonstrated quality outcomes. *The Seventh Annual HealthGrades Maternity Care in American Hospitals Study* analyzes the quality of care at U.S. hospitals for women and their newborns.

Identifying Outcome Trends and 5-star Hospitals

Information regarding the variation in outcomes-based performance among hospitals is essential to improving the quality of care in America. The primary aims of this study are to:

- Identify the best-performing U.S. hospitals in maternity care from 2006 through 2008.
- Examine the maternal complication trends for vaginal, cesarean section (C-section), and patient-choice C-section deliveries from 2006 through 2008.
- Examine the difference in weight-stratified neonatal mortality between best-performing, average-performing, and poor-performing hospitals.
- Examine the maternal complication rates by delivery type between states.
- Examine practice patterns of vaginal deliveries and the use of different interventions among best-performing, average-performing, and poor-performing hospitals.

Assessing Maternity Care Outcomes

HealthGrades analyzed all-payer data of approximately 14 million hospital delivery and neonate records from 2006 through 2008 at more than 1,600 hospitals in the 19 states which make their data available. To identify maternity care program performance, HealthGrades studied overall maternal complication rates for vaginal deliveries, C-sections, and patient-choice C-sections (non-clinically indicated C-sections), as well as neonatal mortality.

The best-performing hospitals are those hospitals that have combined rates of maternal complications and weight-stratified neonatal mortality low enough to place them among the top 15% of hospitals evaluated. More information on the maternity care methodology can be found in the following *Maternity Care Methodology Brief* section, or in the *Hospital Report Cards™ Maternity Care 2010/2011 Methodology* white paper at www.HealthGrades.com.

Summary of Findings

HealthGrades analyzed approximately 14 million hospital delivery and neonate records from 2006 through 2008 in more than 1,600 hospitals in 19 all-payer states. Our study found that best-performing (5-star rated) hospitals had fewer maternal complications and fewer neonatal mortalities (*Table 1* and *Table 7*). Interestingly, we found that the best-performing hospitals also have higher C-section delivery rates (*Table 3*). Specifically:

- Best-performing hospitals had fewer complications compared with poor-performing hospitals:
 - The best-performing hospitals had a 51.30% lower maternal complication rate among women who had vaginal births compared to poor-performing hospitals, and a 74.34% lower complication rate among women who had C-sections. Patient-choice C-sections had the largest difference at 84.14% between best- and poor-performing hospitals (*Table 1*).
 - If all hospitals, among the 19 states studied, performed at the level of the best-performing hospitals from 2006 through 2008, 176,654 women may have avoided developing one or more in-hospital major obstetric complications (*Table 1*).
- C-section rates average approximately 32.59% among the 19 states studied with a range between 22.04% and 37.80% (*Table 5*).
- Best-performing hospitals had the highest episiotomy rates and vacuum-assisted delivery rates but the lowest forceps-assisted delivery rates when compared to all other facilities (*Table 6*).
- Best-performing hospitals had a 57.13% lower weight-stratified neonatal mortality rate when compared to poor-performing hospitals, and a 35.19% lower neonatal mortality rate than average-performing hospitals (*Table 7*).
- In the 19 states studied, 1,546 hospitals were eligible to be considered for the maternity care rating. Of these eligible hospitals, 232 best performers ranked in the top 15% and were recognized with a HealthGrades 5-star rating in maternity care. Of these best performers, 154 are recipients of the HealthGrades 2010/2011 Maternity Care Excellence Award™ representing the top 10% of hospitals in the 19 states studied (*Table 8*).
- Of hospitals in the 19 states studied, nearly 80% of Maternity Care Excellence Award hospitals are in five states: California (42), Texas (26), New York (24), Florida (18) and New Jersey (13) (*Table 8*).

If all hospitals, among the 19 states studied, performed at the level of best-performing hospitals, 176,654 women may have avoided developing one or more in-hospital major obstetric complications (2006 – 2008).

Best-performing hospitals had a 57.13% lower weight-stratified neonatal mortality rate compared to poor-performing hospitals.

Maternity Care Methodology Brief

To help consumers evaluate and compare hospital performance in maternity care, HealthGrades analyzed patient outcomes data for virtually every hospital in the 19 states that make their data available. The data represent three years of discharges (2006 through 2008). The 19 all-payer states evaluated were as follows:

- Arizona
- California
- Colorado
- Florida
- Iowa
- Maine
- Maryland
- Massachusetts
- New Jersey
- New York
- North Carolina
- Oregon
- Pennsylvania
- Rhode Island
- Texas
- Utah
- Virginia
- Washington
- Wisconsin

Maternity Care ratings are based on the analysis of four factors:

- Maternal complication rate among women undergoing single live-born vaginal or C-section deliveries
- Maternal complication rate among women undergoing “patient-choice” or non-clinically indicated C-sections
- Newborn volume adjusted for low birth weight
- Newborn mortality rate stratified into eight birth weight categories

For each factor, hospitals are ranked and a percentile score is calculated. Lower maternal complication rates correspond to lower percentile rankings. For newborn volume, hospitals are assigned a percentile rank based on their overall volume of single live-born neonates combined with the percentage of neonates falling into the 1,000 to 1,749 gram birth weight categories compared to the national average. Hospitals with higher volumes and higher percentages of these low birth weight infants receive lower percentile ranks. Finally, newborn mortality is ranked based on a combined z-score for the mortality rates of the eight birth weight categories.

Based upon each hospital's overall score, HealthGrades applied the following rating system.

- ★★★★★ **Best** – Top 15% of all hospitals within 19 all-payer states
- ★★★ **As Expected** – Middle 70% of all hospitals within 19 all-payer states
- ★ **Poor** – Bottom 15% of all hospitals within 19 all-payer states

For more detail on how the four factors were rated, see *HealthGrades Hospital Report Cards™ Maternity Care Methodology 2010/2011* available at www.HealthGrades.com.

Maternity Care Detailed Findings

HealthGrades seventh annual analysis of hospital maternity care programs found that the best-performing hospitals consistently outperformed all other hospitals for all maternal complication indicators as well as the weight-stratified neonatal mortality indicator.

In the 19 states studied, 1,546 hospitals (of the 1,616 hospitals in the 19 states) were eligible to be considered for the maternity care rating. Of these eligible hospitals, 232 best performers ranked in the top 15% and were recognized with a 5-star rating in maternity care. Of these best performers, 154 are recipients of the HealthGrades 2010/2011 Maternity Care Excellence Award™ representing the top 10% of hospitals in the 19 states studied. (See *Appendix A* for a complete list of award recipients; visit www.HealthGrades.com for hospital ratings.)

Best-performing Hospitals Outperformed all Others for Avoiding Maternal Complications

Best-performing (5-star) hospitals consistently outperformed all other hospitals for maternal complication indicators as well as the weight-stratified neonatal mortality indicator. This was not appreciably different from last year's study.

- For women having vaginal births, **the best-performing hospitals had a 51.30% lower complication rate compared to poor-performing hospitals**, and a 32.12% lower complication rate compared to average-performing hospitals (*Table 1*).
- The most frequent complications among women who had a vaginal delivery from 2006 through 2008 were third-degree perineal lacerations (2.74%), postpartum hemorrhage (2.29%), and injury to pelvic organs (2.04%) (*Table 2*).
- For women undergoing C-section deliveries, **the best-performing hospitals had a 74.34% lower complication rate compared to poor-performing hospitals** and a 45.04% lower complication rate compared to average-performing hospitals (*Table 1*).
- The most frequent complications among women who had a C-section delivery from 2006 through 2008 were postpartum hemorrhage (1.44%) and postpartum infections (0.87%) (*Table 2*).
- For women undergoing C-sections without a medical indication ("patient-choice" C-sections), best-performing hospitals had a 84.14% lower complication rate compared to poor-performing hospitals.
 - Among "patient-choice" C-sections, **best-performing hospitals had an average complication rate of 2.05% compared to 12.90% for poor-performing hospitals and 4.23% for average-performing hospitals** (*Table 1* and *Table 3*).
- If all hospitals performed at the level of the best-performing hospitals from 2006 through 2008 across the 19 states studied, **176,654 women may have avoided developing one or more in-hospital major maternal obstetric complications** associated with vaginal or C-section delivery (*Table 1*).
- **Higher rated facilities, on average, have higher average delivery volumes**, with 5-star rated hospitals delivering more than four times as many babies as 1-star rated hospitals. On average the best-performing hospitals delivered more than five times the number of babies via C-section compared to the worst-performing hospitals. Furthermore, the best-performing hospitals, on average, had nearly four times the number of vaginal deliveries compared to worst-performing hospitals (*Table 1*).
- Our study has shown that 5-star hospitals have fewer complications and higher C-section delivery rates (*Table 1* and *Table 3*).

For women undergoing C-section deliveries, the best-performing hospitals had a 74.34% lower complication rate compared to poor-performing hospitals.

Higher rated facilities have higher average delivery volumes, with 5-star rated hospitals delivering more than four times as many babies as 1-star rated hospitals.

Table 1. Complication Rates by Delivery Type

Delivery Type	Hospital Maternity Care Outcomes Performance	Total Number of Deliveries Studied	Average Delivery Volume	Observed Inhospital Complication Rate	Number of Women Who Could Have Potentially Avoided Developing One or More Major Obstetric Complications if Performed at Level of Best Hospitals	Reduction in Complication Rate if Performed at Level of Best Hospitals
Vaginal Delivery	1-star	280,544	1,209	15.26%	21,963	51.30%
Vaginal Delivery	3-star	3,201,462	2,959	10.95%	112,562	32.12%
Vaginal Delivery	5-star	1,053,168	4,540	7.43%	0	0.00%
C-section Delivery	1-star	114,392	493	10.52%	8,942	74.34%
C-section Delivery	3-star	1,500,974	1,387	4.91%	33,187	45.04%
C-section Delivery	5-star	577,670	2,490	2.70%	0	0.00%
Patient-Choice C-section Deliveries	1-star	2,194	9	12.90%	238	84.14%
Patient-Choice C-section Deliveries	3-star	33,747	31	4.23%	735	51.59%
Patient-Choice C-section Deliveries	5-star	16,377	71	2.05%	0	0.00%
Total					176,654	

Note: Patient-choice C-section complications saved are not included in total because they were already counted in C-section Deliveries.

Table 2. Five Most Common Maternal Complications by Delivery Type

Delivery Type	ICD-9 Code	Description	Volume	Complication Rate
Vaginal Delivery	664.21	Third-degree perineal laceration	124,059	2.74%
	666.12	Other immediate postpartum hemorrhage	104,023	2.29%
	665.51	Other injury to pelvic organs	92,375	2.04%
	665.41	High vaginal laceration	74,379	1.64%
	664.31	Fourth-degree perineal laceration	32,035	0.71%
C-section Delivery	666.12	Other immediate postpartum hemorrhage	31,525	1.44%
	670.02	Major puerperal infection (postpartum infection)	19,171	0.87%
	674.32	Other obstetrical surgical wound complication	17,658	0.81%
	668.82	Other complications of anesthesia in labor and delivery	7,181	0.33%
	669.42	Other complications of obstetrical surgery and procedures	6,047	0.28%

Table 3. Birthing Volume and C-section Complication Rates

Hospital Maternity Care Outcomes Performance	Average Delivery Volume	Average Number of C-section Deliveries (All)	C-section Rate	C-section Complication Rate	Patient-choice C-section Rate	Patient-choice C-section Complication Rate
1-star	1,702	493	28.96%	10.52%	0.56%	12.90%
3-star	4,346	1,387	31.92%	4.91%	0.72%	4.23%
5-star	7,030	2,490	35.42%	2.70%	1.00%	2.05%

Complication Rates have Improved Over Time

While 5-star hospitals had lower complication rates overall, 1-star hospitals saw greater improvement in complication rates from 2006 to 2008 compared to 5-star hospitals.

- Complication rates have decreased between 2006 and 2008 for vaginal deliveries and C-section deliveries, including patient-choice C-section deliveries (*Table 4*).
- One-star hospitals saw a greater improvement in their maternity care complication rates compared to 5-star hospitals. Ratios of 1-star improvement over 5-star improvement ranged from 1.12 in vaginal delivery to 1.48 in patient-choice C-section.

Table 4. Maternity Care Complication Rates of Improvement

Hospital Maternity Care Outcomes Performance	Year	Delivery Complication Rate		
		Vaginal	C-section	Patient-Choice C-section
1-star Rated Hospitals	2006	17.07%	11.13%	14.29%
	2007	15.67%	10.52%	13.54%
	2008	12.97%	9.91%	10.90%
	% Difference*	23.99%	10.94%	23.71%
3-star Rated Hospitals	2006	12.35%	5.26%	4.43%
	2007	11.35%	4.83%	4.41%
	2008	9.09%	4.65%	3.84%
	% Difference*	26.37%	11.67%	13.22%
5-star Rated Hospitals	2006	8.28%	2.88%	2.39%
	2007	7.48%	2.57%	1.75%
	2008	6.51%	2.64%	2.01%
	% Difference*	21.40%	8.35%	16.01%
Ratio of 1-star Improvement Over 5-star Improvement		1.12	1.31	1.48

* % Difference is the reduction in the complication rate from 2006 to 2008.

One-star hospitals saw a greater improvement in their maternity care complication rates compared to 5-star hospitals.

Maternal Complication Rates Vary by State and Delivery Type

Among the top five states with the lowest complication rates in each of the delivery types:

- Florida and New Jersey were among the top five states for all three delivery types: vaginal, C-section, and patient-choice C-section.
- California, Rhode Island and Texas were among the top five states for two of the three delivery types.

Table 5. Maternity Care Complication Rates by State

State	Vaginal Delivery			C-section Delivery			Patient-choice C-section			Total Deliveries
	Volume	% Deliveries in State	Complication Rate	Volume	% Deliveries in State	Complication Rate	Volume	% Deliveries in State	Complication Rate	
Arizona	179,955	71.10%	11.72%	73,131	28.90%	4.86%	1,406	0.56%	5.12%	253,086
California	971,508	67.78%	9.42%	461,865	32.22%	4.10%	11,683	0.82%	3.30%	1,433,373
Colorado	133,155	73.11%	14.72%	48,964	26.89%	7.41%	913	0.50%	6.24%	182,119
Florida	384,043	62.20%	8.51%	233,426	37.80%	3.74%	6,849	1.11%	2.76%	617,469
Iowa	78,259	71.87%	12.36%	30,630	28.13%	4.60%	813	0.75%	3.20%	108,889
Maine	26,123	70.18%	13.77%	11,101	29.82%	4.91%	356	0.96%	5.34%	37,224
Maryland	125,323	66.49%	12.19%	63,148	33.51%	4.93%	1,011	0.54%	5.64%	188,471
Massachusetts	144,764	67.40%	10.46%	70,016	32.60%	6.01%	1,683	0.78%	4.81%	214,780
New Jersey	187,166	62.70%	9.31%	111,360	37.30%	3.33%	2,886	0.97%	2.81%	298,526
New York	451,696	66.95%	8.93%	222,944	33.05%	5.37%	5,924	0.88%	4.22%	674,640
North Carolina	228,855	68.98%	11.41%	102,914	31.02%	4.98%	1,950	0.59%	5.59%	331,769
Oregon	91,574	70.63%	13.44%	38,079	29.37%	6.16%	836	0.64%	4.67%	129,653
Pennsylvania	266,543	69.13%	12.94%	119,022	30.87%	5.07%	2,976	0.77%	4.13%	385,565
Rhode Island	24,626	69.60%	9.88%	10,756	30.40%	5.71%	317	0.90%	3.79%	35,382
Texas	652,318	64.74%	9.74%	355,261	35.26%	4.27%	7,669	0.76%	3.96%	1,007,579
Utah	118,510	77.96%	9.95%	33,507	22.04%	5.97%	694	0.46%	6.20%	152,017
Virginia	172,120	64.89%	10.74%	93,113	35.11%	4.47%	2,120	0.80%	4.62%	265,233
Washington	156,054	70.05%	12.73%	66,737	29.95%	5.39%	1,326	0.60%	4.22%	222,791
Wisconsin	142,582	75.18%	11.38%	47,062	24.82%	5.16%	906	0.48%	4.64%	189,644
Total / Average	4,535,174	67.41%	11.24%	2,193,036	32.59%	5.08%	52,318	0.77%	4.49%	6,728,210

C-sections Account for Almost One-third of All Deliveries in the 19 All-payer States

C-sections account for almost one-third of all deliveries in the 19 states studied.

- C-section rates average approximately 32.59% among the 19 all-payer states with a range between 22.04% and 37.80% (*Table 5*).
- States with high C-section rates tended to show a higher rate of patient-choice C-sections (*Table 5*).
- Florida and New Jersey had the highest rates of both C-section and patient-choice C-section deliveries. These states also have the lowest complication rates for C-section deliveries (*Table 5*).

Differences in Vaginal-assisted Delivery Practices

- Episiotomy rates among vaginal deliveries were highest among 5-star rated hospitals at a rate of 18.55%, followed by 3-star rated hospitals with a rate of 12.43%. Hospitals performing worse than expected (1-star rated) had an episiotomy rate of 7.38% (*Table 6*).
- Rates of forceps-assisted vaginal deliveries were lowest among 5-star rated hospitals (0.89%) and highest among 1-star rated hospitals (1.59%). Birthing centers performing as expected (3-star rated hospitals) had a forceps-assisted rate of 1.19% (*Table 6*).
- Vacuum-assisted vaginal delivery rates were highest among 5-star rated hospitals with a rate of 7.70% and lowest among the 1-star rated facilities with a rate of 6.03%. Three-star rated hospitals had a vacuum-assisted vaginal delivery rate of 6.74% (*Table 6*).

Table 6. Vaginal-assisted Deliveries

Hospital Maternity Care Performance	Number of Hospitals	Total Volume	Episiotomy with Vaginal Delivery		Forceps-assisted Vaginal Delivery		Vacuum-assisted Vaginal Delivery	
			Volume	% Total	Volume	% Total	Volume	% Total
1-star	232	280,544	20,715	7.38%	4,463	1.59%	16,922	6.03%
3-star	1,082	3,201,462	397,946	12.43%	38,135	1.19%	215,768	6.74%
5-star	232	1,053,168	195,314	18.55%	9,420	0.89%	81,063	7.70%
All Hospitals	1,546	4,535,174	613,975	13.54%	52,018	1.15%	313,753	6.92%

Neonatal Mortality was Lower in Best-performing Hospitals

- Best-performing hospitals had a 57.13% lower weight-stratified neonatal mortality rate compared to poor-performing hospitals, and a 35.19% lower mortality rate than average-performing hospitals (*Table 7*).

Table 7. Neonatal Mortality Rates

Hospital Maternity Care Performance	Number of Births	Observed Inhospital Mortality Rate	Expected Inhospital Mortality Rate Based on Weight Classes	Observed-to-Expected Ratio	Relative Risk Reduction Associated with Best Compared to Poor Performers	Relative Risk Reduction Associated with Best Compared to Average Performers
1-star	421,303	0.28%	0.18%	1.57	57.13%	35.19%
3-star	4,977,439	0.16%	0.15%	1.04		
5-star	1,726,505	0.09%	0.13%	0.67		

Of these best performers, 154 are recipients of the HealthGrades 2010/2011 Maternity Care Excellence Award™ representing the top 10% of hospitals in the 19 states studied. Nearly 80% of Maternity Care Excellence Award hospitals are in five states: California (42), Texas (26), New York (24), Florida (18) and New Jersey (13). (See *Appendix A* for a list of award recipients.)

Table 8. Maternity Care 5-star Hospitals Distribution by State

State / Abbreviation		Eligible Hospitals	Maternity Care 5-star Hospitals	% of Eligible Hospitals that are Maternity Care 5-star Hospitals	% of All Maternity Care 5-star Hospitals	Maternity Care Excellence Award Hospitals
Arizona	AZ	43	3	6.98%	1.29%	2
California	CA	255	55	21.57%	23.71%	42
Colorado	CO	50	1	2.00%	0.43%	1
Florida	FL	106	30	28.30%	12.93%	18
Iowa	IA	80	1	1.25%	0.43%	1
Maine	ME	30	0	0.00%	0.00%	0
Maryland	MD	33	3	9.09%	1.29%	2
Massachusetts	MA	47	7	14.89%	3.02%	4
New Jersey	NJ	57	17	29.82%	7.33%	13
New York	NY	139	37	26.62%	15.95%	24
North Carolina	NC	84	12	14.29%	5.17%	5
Oregon	OR	52	1	1.92%	0.43%	0
Pennsylvania	PA	111	8	7.21%	3.45%	4
Rhode Island	RI	7	1	14.29%	0.43%	1
Texas	TX	201	40	19.90%	17.24%	26
Utah	UT	36	3	8.33%	1.29%	3
Virginia	VA	58	5	8.62%	2.16%	3
Washington	WA	61	4	6.56%	1.72%	4
Wisconsin	WI	96	4	4.17%	1.72%	1
Totals		1,546	232			154

Interpretation of Results

This study highlights large variations in maternal complications and weight-stratified neonatal mortality between best-performing and all other hospitals.

The difference in quality of care between maternity care programs is substantial for both vaginal and C-section deliveries (including patient-choice C-sections). Although complications have decreased between 2006 and 2008 among all performance categories, the difference in complication rates between the best-performing and poor-performing hospitals is 51.30% for vaginal deliveries, 74.34% for C-sections, and 84.14% for patient-choice C-section deliveries (*Table 1*).

Given that the largest variability in complication rates occurs among women undergoing C-section procedures—most notably patient-choice C-sections—the increasing prevalence of C-sections necessitates further investigation to define patients who will have the best outcomes from this surgery. For the years 2006 through 2008, nearly one mother in three gave birth by C-section in the United States, making it the most common operating room procedure (compared to a rate of 4.5% in 1965⁸).

It has been suggested that this increase is largely due to maternal requests for C-sections. Our study found that there was a direct relationship between overall volume of C-sections and rates of patient choice C-sections (*Table 3*). It is worth noting that, on average, the hospitals with the lowest rates of in-hospital maternal complications had the highest volume of C-sections (*Tables 1 and 3*). This will be an interesting trend to watch with the renewed emphasis on reducing C-sections for uncomplicated first-time pregnancies.

Studies have suggested that the best outcomes for mothers and babies seem to occur with C-section rates under 15% for first time pregnancy.⁹ The U.S. Department of Health and Human Services, Health People 2010, recommend a C-section rate of less than 15% for first time pregnancy and 63% for women who have had previous C-sections.¹⁰ Considering that in our study we saw an average range of 28.96% to 35.42% (*Table 3*), U.S. hospitals have a long way to go to achieve these reductions. Then again, we find that 5-star rated hospitals show a much lower complication rate for C-section deliveries relative to vaginal deliveries. Further research is needed to define the best rate of C-section deliveries to support the fewest complications and best outcomes for mom and baby, as well as be cost-effective for our health care system.

Our study found differences among vaginal delivery practices between best-performing and all other hospitals. A review of episiotomy in obstetric care from the Agency for Healthcare Research and Quality found there was no health benefit from episiotomy.¹¹ However, when we evaluated rates by performance category the hospitals with the lowest maternal complication rates, on average, had the highest rates of episiotomies (*Table 1 and Table 6*). These hospitals also had the highest rates of vacuum-assisted delivery, but the lowest rates of forceps-assisted delivery (*Table 6*).

In conclusion, this study clearly demonstrates the need for more quality information surrounding hospital maternity care programs. Large variations in both quality and delivery practices make it imperative that women educate themselves about potential complications and different delivery practices. Prior to choosing a provider, it is vital that mothers-to-be not only research the level of care and quality outcomes of their area hospitals, but also be prepared with specific questions about delivery practices. With these tools in hand, women can choose a hospital whose maternity care program meets their individual needs.

Limitations of the Maternity Care Performance Assessment

It must be understood that while these models may be valuable in identifying hospital groups that perform better than others, one should recognize that these models are limited by the following factors:

- Cases may have been coded incorrectly or incompletely by the hospital.
- The models can only account for risk factors that are coded into the billing data. If a particular risk factor was not coded into the billing data, such as a patient's socioeconomic status and health behavior, then it was not accounted for with these models.
- Although HealthGrades has taken steps to carefully compile these data, some information may be missing, outdated, or incorrect.

Although the 19 states we studied for maternity care represented a large percentage of all U.S. hospital discharges from 2006 through 2008, our findings may not be generalized to the entire United States or to states that we did not study.

Acknowledgements

Health Grades, Inc., 500 Golden Ridge Road, Suite 100, Golden, Colorado 80401. Health Grades Inc. is the leading independent health care ratings organization, providing quality ratings, profiles and cost information on the nation's hospitals, physicians, nursing homes and prescription drugs.

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Appendix A: HealthGrades 2010/2011 Maternity Care Excellence Award™ Recipients

The following hospitals are recipients of HealthGrades 2010/2011 Maternity Care Excellence Award™. Some of the Maternity Care Excellence Award recipients have multiple locations. In these cases, results for all locations were used in the analysis and each of the facilities is designated as a recipient of the award.

HealthGrades 2010/2011 Maternity Care Excellence Award™ Recipients*	City
Alabama	
<i>Data are not publically available for this state.</i>	
Alaska	
<i>Data are not publically available for this state.</i>	
Arizona	
Arrowhead Hospital	Glendale
Banner Gateway Medical Center	Gilbert
Arkansas	
<i>Data are not publically available for this state.</i>	
California	
AHMC - Anaheim Regional Medical Center	Anaheim
Antelope Valley Hospital	Lancaster
Bellflower Medical Center	Bellflower
Cedars - Sinai Medical Center	Los Angeles
Centinela Freeman Regional Medical Center - Centinela	Inglewood
<i>including: Centinela Freeman Regional Medical Center - Memorial</i>	Inglewood
Citrus Valley Medical Center – Inter-Community Campus	Covina
<i>including: Citrus Valley Medical Center - Queen of the Valley</i>	West Covina
Coastal Communities Hospital	Santa Ana
Community Hospital of San Bernardino	San Bernardino
El Camino Hospital	Mountain View
Garden Grove Hospital and Medical Center	Garden Grove
Garfield Medical Center	Monterey Park
Good Samaritan Hospital	Los Angeles
Hoag Memorial Hospital Presbyterian	Newport Beach
Huntington Memorial Hospital	Pasadena
Kaweah Delta District Hospital	Visalia
Los Angeles Metropolitan Medical Center	Los Angeles
Los Robles Regional Medical Center	Thousand Oaks
Madera Community Hospital	Madera
Methodist Hospital of Southern California	Arcadia
Miller Children's Hospital	Long Beach
Monterey Park Hospital	Monterey Park

* Distinction cannot be used without a Licensing Agreement from Health Grades, Inc. Continued....

HealthGrades 2010/2011 Maternity Care Excellence Award™ Recipients*	City
Northridge Hospital Medical Center	Northridge
O'Connor Hospital	San Jose
Orange Coast Memorial Medical Center	Fountain Valley
Pacific Alliance Medical Center	Los Angeles
Palomar Medical Center	Escondido
Pioneers Memorial Health Care District	Brawley
Pomona Valley Hospital Medical Center	Pomona
Providence Holy Cross Medical Center	Mission Hills
Providence Saint Joseph Medical Center	Burbank
Providence Tarzana Medical Center	Tarzana
Saint Agnes Medical Center	Fresno
Saint Bernardine Medical Center	San Bernardino
Saint Francis Medical Center	Lynwood
Saint Mary Medical Center	Long Beach
San Gabriel Valley Medical Center	San Gabriel
San Joaquin Community Hospital	Bakersfield
Santa Barbara Cottage Hospital	Santa Barbara
Valley Presbyterian Hospital	Van Nuys
West Hills Medical Center	West Hills
Western Medical Center - Anaheim	Anaheim
Whittier Hospital	Whittier
Colorado	
Exempla Saint Joseph Hospital	Denver
Connecticut	
<i>Data are not publically available for this state.</i>	
Delaware	
<i>Data are not publically available for this state.</i>	
District of Columbia	
<i>Data are not publically available for this state.</i>	
Florida	
Baptist Hospital of Miami	Miami
Bethesda Memorial Hospital	Boynton Beach
Brooksville Regional Hospital	Brooksville
<i>including:</i> Spring Hill Regional Hospital	Spring Hill
Halifax Medical Center	Daytona Beach
<i>including:</i> Atlantic Medical Center	Daytona Beach
Heart of Florida Regional Medical Center	Davenport
Kendall Regional Medical Center	Miami
Manatee Memorial Hospital	Bradenton

* Distinction cannot be used without a Licensing Agreement from Health Grades, Inc. Continued....

HealthGrades Maternity Care in American Hospitals Study 2010 - 17
 Appendix A: HealthGrades 2010/2011 Maternity Care Excellence Award Recipients

HealthGrades 2010/2011 Maternity Care Excellence Award™ Recipients*	City
Memorial Hospital Miramar	Miramar
Mercy Hospital	Miami
Mount Sinai Medical Center	Miami Beach
<i>including: Mount Sinai Medical Center and Miami Heart Institute</i>	Miami Beach
Munroe Regional Medical Center	Ocala
Osceola Regional Medical Center	Kissimmee
Saint Petersburg General Hospital	Saint Petersburg
Sarasota Memorial Hospital	Sarasota
South Miami Hospital	South Miami
Wellington Regional Medical Center	Wellington
West Boca Medical Center	Boca Raton
Winter Haven Hospital	Winter Haven
Georgia	
<i>Data are not publically available for this state.</i>	
Hawaii	
<i>Data are not publically available for this state.</i>	
Idaho	
<i>Data are not publically available for this state.</i>	
Illinois	
<i>Data are not publically available for this state.</i>	
Indiana	
<i>Data are not publically available for this state.</i>	
Iowa	
Mercy Medical Center - Des Moines	Des Moines
Kansas	
<i>Data are not publically available for this state.</i>	
Kentucky	
<i>Data are not publically available for this state.</i>	
Louisiana	
<i>Data are not publically available for this state.</i>	
Maine	
<i>There are no recipients of this award in this state.</i>	
Maryland	
Holy Cross Hospital	Silver Spring
Washington Adventist Hospital	Takoma Park

* Distinction cannot be used without a Licensing Agreement from Health Grades, Inc. Continued....

HealthGrades 2010/2011 Maternity Care Excellence Award™ Recipients*	City
Massachusetts	
Baystate Medical Center	Springfield
Caritas Good Samaritan Medical Center	Brockton
Hallmark Health - Lawrence Memorial Hospital	Medford
<i>including:</i> Hallmark Health - Melrose-Wakefield Hospital	Melrose
Southcoast Hospitals Group - Charlton Memorial	Fall River
<i>including:</i> Southcoast Hospitals Group - Saint Luke's Hospital	New Bedford
Southcoast Hospitals Group - Tobey Hospital	Wareham
Michigan	
<i>Data are not publically available for this state.</i>	
Minnesota	
<i>Data are not publically available for this state.</i>	
Mississippi	
<i>Data are not publically available for this state.</i>	
Missouri	
<i>Data are not publically available for this state.</i>	
Montana	
<i>Data are not publically available for this state.</i>	
Nebraska	
<i>Data are not publically available for this state.</i>	
Nevada	
<i>Data are not publically available for this state at the time of this study.</i>	
New Hampshire	
<i>Data are not publically available for this state.</i>	
New Jersey	
AtlantiCare Regional Medical Center - Atlantic City	Atlantic City
<i>including:</i> AtlantiCare Regional Medical Center - Mainland	Pomona
Christ Hospital	Jersey City
Englewood Hospital & Medical Center	Englewood
Hackensack University Medical Center	Hackensack
Holy Name Hospital	Teaneck
Kimball Medical Center	Lakewood
Monmouth Medical Center	Long Branch
Morristown Memorial Hospital	Morristown
Palisades Medical Center	North Bergen
Saint Barnabas Medical Center	Livingston
Saint Peters Medical Center	New Brunswick
Valley Hospital	Ridgewood
University Medical Center at Princeton	Princeton

* Distinction cannot be used without a Licensing Agreement from Health Grades, Inc. Continued...

HealthGrades 2010/2011 Maternity Care Excellence Award™ Recipients*	City
New Mexico	
<i>Data are not publically available for this state.</i>	
New York	
Bronx - Lebanon Hospital Center	Bronx
Coney Island Hospital	Brooklyn
Faxton - Saint Luke's Healthcare	Utica
Forest Hills Hospital	Forest Hills
Good Samaritan Hospital of Suffern	Suffern
Huntington Hospital	Huntington
Lawrence Hospital Center	Bronxville
Lenox Hill Hospital	New York
New York Downtown Hospital	New York
New York Hospital Medical Center of Queens	Flushing
North Central Bronx Hospital	Bronx
North Shore University Hospital <i>including: North Shore University Hospital Syosset</i>	Manhasset Syosset
Nyack Hospital	Nyack
NYU Langone Medical Center	New York
Plainview Hospital	Plainview
Richmond University Medical Center	Staten Island
Saint Charles Hospital	Port Jefferson
Saint John's Episcopal Hospital at South Shore	Far Rockaway
Saint John's Riverside Hospital - Andrus Pavilion <i>including: Saint John's Riverside Hospital - ParkCare Pavilion</i>	Yonkers Yonkers
Sound Shore Medical Center of Westchester	New Rochelle
Southside Hospital	Bay Shore
Vassar Brothers Medical Center	Poughkeepsie
White Plains Hospital Center	White Plains
Winthrop - University Hospital	Mineola
North Carolina	
Alamance Regional Medical Center	Burlington
Durham Regional Hospital <i>including: Select Specialty Hospital - Durham</i>	Durham Durham
Grace Hospital	Morganton
Onslow Memorial Hospital	Jacksonville
Wilson Medical Center	Wilson
North Dakota	
<i>Data are not publically available for this state.</i>	

* Distinction cannot be used without a Licensing Agreement from Health Grades, Inc. Continued....

HealthGrades Maternity Care in American Hospitals Study 2010 - 20
 Appendix A: HealthGrades 2010/2011 Maternity Care Excellence Award Recipients

HealthGrades 2010/2011 Maternity Care Excellence Award™ Recipients*	City
Ohio	
<i>Data are not publically available for this state.</i>	
Oklahoma	
<i>Data are not publically available for this state.</i>	
Oregon	
<i>There are no recipients of this award in this state.</i>	
Pennsylvania	
Main Line Hospitals - Bryn Mawr	Bryn Mawr
Memorial Medical Center	Johnstown
Moses Taylor Hospital	Scranton
Westmoreland Hospital	Greensburg
<i>including: Westmoreland Hospital at Jeannette</i>	Jeannette
Rhode Island	
Kent Hospital	Warwick
South Carolina	
<i>Data are not publically available for this state.</i>	
South Dakota	
<i>Data are not publically available for this state.</i>	
Tennessee	
<i>Data are not publically available for this state.</i>	
Texas	
Clear Lake Regional Medical Center	Webster
Cypress Fairbanks Medical Center	Houston
Dallas Regional Medical Center	Mesquite
Del Sol Medical Center	El Paso
Doctors Hospital Tidwell	Houston
East Houston Regional Medical Center	Houston
Houston Northwest Medical Center	Houston
Kingwood Medical Center	Kingwood
Knapp Medical Center	Weslaco
Laredo Medical Center	Laredo
Medical Center Hospital	Odessa
Memorial Hermann Healthcare System - Southwest	Houston
<i>including: Memorial Hermann Northwest</i>	Houston
<i>Memorial Hermann Southeast</i>	Houston
<i>Memorial Hermann The Woodlands Hospital</i>	The Woodlands
Memorial Hermann Memorial City Hospital	Houston
Memorial Hermann Northeast Hospital	Humble
Methodist Charlton Medical Center	Dallas
Methodist Willowbrook Hospital	Houston

* Distinction cannot be used without a Licensing Agreement from Health Grades, Inc. Continued...

HealthGrades 2010/2011 Maternity Care Excellence Award™ Recipients*	City
Presbyterian Hospital of Allen	Allen
Providence Memorial Hospital	El Paso
Saint David's Medical Center	Austin
Saint David's North Austin Medical Center	Austin
San Angelo Community Medical Center	San Angelo
Seton Medical Center	Austin
St. Luke's The Woodlands Hospital	The Woodlands
The Corpus Christi Medical Center	Corpus Christi
<i>including: Corpus Christi Medical Center - Northwest</i>	Corpus Christi
The Medical Center of Southeast Texas	Port Arthur
Val Verde Regional Medical Center	Del Rio
Utah	
McKay - Dee Hospital Center	Ogden
Ogden Regional Medical Center	Ogden
Utah Valley Regional Medical Center	Provo
Vermont	
<i>Data are not publically available for this state at the time of this study.</i>	
Virginia	
Lynchburg General Hospital	Lynchburg
Sentara Leigh Hospital	Norfolk
Sentara Virginia Beach General Hospital	Virginia Beach
Washington	
Evergreen Hospital Medical Center	Kirkland
Good Samaritan Hospital and Rehabilitation Center	Puyallup
Overlake Hospital Medical Center	Bellevue
Saint Joseph Medical Center	Tacoma
West Virginia	
<i>Data are not publically available for this state.</i>	
Wisconsin	
Aspirus Wausau Hospital	Wausau
Wyoming	
<i>Data are not publically available for this state.</i>	

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Appendix B: Patient Cohorts and Related ICD-9-CM Codes

Patient Definitions	ICD-9 Procedure/Diagnosis Codes and Criteria
Maternity Care	
Cesarean section with Single Birth	<p>Procedure Codes: 74.0 74.1, 74.2, 74.4, 74.99</p> <p>Principal Diagnoses: 640.0 through 676.9 (where fifth digit is 1 or 2), excluding patients with diagnosis codes 651.00 through 651.93, 652.61, 660.50, 660.51, 660.53, V23.7, or V27.1 through V27.9; excluding patients with procedure codes: 37.51, 37.52, 37.53, 37.54, 37.62, 37.63</p>
Vaginal Delivery with Single Birth	<p>Principal Diagnoses: 640.0 through 676.9 (where fifth digit is 1 or 2), excluding patients with diagnosis codes 651.00 through 651.93, 652.61, 660.50, 660.51, 660.53, V23.7, or V27.1 through V27.9; excluding patients with procedure codes: 37.51, 37.52, 37.53, 37.54, 37.62, 37.63, or 74.0 through 74.99</p>
Patient-Choice C-section	<p>Patients who had a cesarean section (cesarean procedure codes: 74.0 through 74.99); and did not labor (labor diagnosis codes like any of the following: 652.1*, 653*, 656.3*, 659.0*, 659.1*, 660*, 661*, 662*, or 663.0*); and did not have labor induction (procedure codes 73.01, 73.09, 73.1, 73.4); and did not have a previous cesarean section (previous cesarean section diagnosis code like: 654.2*); and did not have any of the following diagnosis codes for these 16 clinical conditions:</p> <ul style="list-style-type: none"> • Malpresentation: 652 through 652.03, 652.2 through 652.43, 652.6 through 652.93 • Antepartum bleeding or placental abruption: like 641*, like 656.0* • Herpes: like 054*, like 647.6* • Severe hypertension: eclampsia and severe pre-eclampsia: like 642.5*, like 642.6* • Uterine scar unrelated to cesarean delivery: like 654.9* • Multiple gestation: like 651*, like 660.5**, V27.2 through V27.9 • Macrosomia: like 656.6* • Unengaged (high) fetal head: like 652.5* • Maternal soft tissue disorder (uterine abnormalities): like any of the following: 654.0*, 654.1*, 654.4*, 654.5*, 654.6*, 654.7* • Other types of hypertension: like 642* (where the fourth digit is not equal to 5 or 6) • Preterm gestation: 644.0 like 644.2* • Congenital fetal CNS anomaly or chromosomal abnormality: like 655.0*, like 655.1* • Cardiovascular disease in fetus 648.61 • Other known or suspected fetal abnormalities NEC 655.81 • Poor fetal growth 656.51 • Abnormal fetal heart rhythm 659.71 <p>Exclusion criteria: Patients that have a stillborn diagnosis (stillborn diagnosis codes: V27.1, V27.3, V27.4, V27.6, V27.7, or between 651.30 and 651.63) or that had inadequate pre-natal care (diagnosis v237).</p>

Patient Definitions	ICD-9 Procedure/Diagnosis Codes and Criteria
Newborn Mortality	
500 to 749 grams	Diagnoses: 764.02 through 765.12 (where the fifth digit is 2), excluding patients with diagnosis codes 764.00, 764.10, 764.20, 764.90, 765.00, 765.10, v31*, v32*, v33*, v34*, v35*, v36*, v37*, 996.8* or any code listed in Appendix C; excluding patients with procedure codes like 37.5*, 37.62, 37.63
750 to 999 grams	Diagnoses: 764.03 through 765.13 (where the fifth digit is 3), excluding patients with diagnosis codes 764.00, 764.10, 764.20, 764.90, 765.00, 765.10, v31*, v32*, v33*, v34*, v35*, v36*, v37*, 996.8* or any code listed in Appendix C; excluding patients with procedure codes like 37.5*, 37.62, 37.63
1000 to 1249 grams	Diagnoses: 764.04 through 765.14 (where the fifth digit is 4), excluding patients with diagnosis codes 764.00, 764.10, 764.20, 764.90, 765.00, 765.10, v31*, v32*, v33*, v34*, v35*, v36*, v37*, 996.8* or any code listed in Appendix C; excluding patients with procedure codes like 37.5*, 37.62, 37.63
1250 to 1499 grams	Diagnoses: 764.05 through 765.15 (where the fifth digit is 5), excluding patients with diagnosis codes 764.00, 764.10, 764.20, 764.90, 765.00, 765.10, v31*, v32*, v33*, v34*, v35*, v36*, v37*, 996.8* or any code listed in Appendix C; excluding patients with procedure codes like 37.5*, 37.62, 37.63
1500 to 1749 grams	Diagnoses: 764.06 through 765.16 (where the fifth digit is 6), excluding patients with diagnosis codes 764.00, 764.10, 764.20, 764.90, 765.00, 765.10, v31*, v32*, v33*, v34*, v35*, v36*, v37*, 996.8* or any code listed in Appendix C; excluding patients with procedure codes like 37.5*, 37.62, 37.63
1750 to 1999 grams	Diagnoses: 764.07 through 765.17 (where the fifth digit is 7), excluding patients with diagnosis codes 764.00, 764.10, 764.20, 764.90, 765.00, 765.10, v31*, v32*, v33*, v34*, v35*, v36*, v37*, 996.8* or any code listed in Appendix C; excluding patients with procedure codes like 37.5*, 37.62, 37.63
2000 to 2499 grams	Diagnoses: 764.08 through 765.18 (where the fifth digit is 8), excluding patients with diagnosis codes 764.00, 764.10, 764.20, 764.90, 765.00, 765.10, v31*, v32*, v33*, v34*, v35*, v36*, v37*, 996.8* or any code listed in Appendix C; excluding patients with procedure codes like 37.5*, 37.62, 37.63
2500 plus grams or normal newborns	Diagnoses: 764.09 through 765.19 (where the fifth digit is 9), V30.00, V30.01, excluding patients with diagnosis codes 764.00, 764.10, 764.20, 764.90, 765.00, 765.10, v237, v31*, v32*, v33*, v34*, v35*, v36*, v37*, 996.8* or any code listed in Appendix C; excluding patients with procedure codes like 37.5*, 37.62, 37.63; and excluding patients in any of the above weight categories as well as the under 500 grams category

* Includes all sub-codes related to the ICD-9 grouping.

Appendix C: Maternity Care Major Complications

Major Complications – Maternity Care Vaginal Delivery

Major Complications – Maternity Care – Vaginal Delivery			
287.4	2ND THROMBOCYTOPENIA	674.32	OB SURG COMP NEC-DEL PP
512.0	SPONT TENS PNEUMOTHORAX	785.51	CARDIOGENIC SHOCK
512.1	IATROGENIC PNEUMOTHORAX	785.59	SHOCK W/O TRAUMA NEC
512.8	SPONT PNEUMOTHORAX NEC	996.31	MECH COMP URETHRAL CATH
518.4	ACUTE LUNG EDEMA NOS	996.60	INFECT DUE TO DEVICE NOS
518.81	AC RESPIRATORY FAILURE	996.62	INFECT D/T VASC DEVICE
584.5	ACUTE RENAL FAILURE	997.00	NERV SYST SURG COMP NOS
584.8	AC REN FAIL-PATH LES NEC	997.01	CNS SURG COMP
584.9	ACUTE RENAL FAILURE NOS	997.02	IATROGEN CV INFARCT/HEM
664.21	DEL W 3 DEGREE LAC-DEL	997.09	NERV SYST SURG COMP NEC
664.31	DEL W 4 DEGREE LAC-DEL	997.1	SURG COMP-HEART
665.10	RUPTURE UTERUS NOS-NOS	997.3	SURG COMP-RESP NEC
665.11	RUPTURE UTERUS NOS-DEL	997.4	SURG COMP-DIGESTIVE
665.22	INVERS UTER-DEL, PP COMP	997.5	SURG COMP-URINARY NEC
665.31	LACERATION OF CERVIX-DEL	997.91	SURG COMP-HYPERTENSION
665.41	HIGH VAGINAL LAC-DEL	998.0	POSTOPERATIVE SHOCK
665.51	OB INJ PELV ORG NEC-DEL	998.11	HEMORRHAGE COMP PX
666.02	3RD STAGE PP HEMOR-DEL	998.2	ACCIDENTAL OP LACERATION
666.04	3RD STAGE PP HEMOR-PP	998.3	POSTOP WOUND DISRUPTION
666.10	IMMED PP HEMOR NEC-NOS	999.31	INFECT D/T CVC
666.12	IMMED PP HEMOR NEC-DEL	999.39	INFECT COMP MED CARE
666.14	IMMED PP HEMOR NEC-PP	998.4	FB LEFT DURING PROCEDURE
666.20	DELAYED PP HEMOR-NOS	998.59	POSTOP INFECTION NEC
666.22	DELAYED PP HEMOR-DEL PP	998.7	POSTOP FOREIGN SUBST RXN
666.24	DELAYED PP HEMOR-PP	998.81	EMPHYSEMA DUE TO PX
666.30	PP COAG DEFECT-NOS	998.83	NON-HEALING SURG WND
666.32	PP COAG DEFECT-DEL PP	998.9	SURGICAL COMP NOS
666.34	PP COAG DEFECT-PP	999.1	AIR EMBOL COMP MED CARE
667.02	RET PLAC S HEMOR-DEL PP	999.2	VASC COMP MED CARE NEC
668.02	ANES PULM COMP DEL-DELPP	999.3	INFECT COMP MED CARE NEC
668.12	ANES CARD COMP DEL-DELPP	999.4	ANAPHYLACTIC SHOCK-SERUM
668.14	ANES CARD COMP DEL-PP	999.5	SERUM REACTION NEC
668.22	ANES CNS COMP DEL-DEL PP	999.6	ABO INCOMPATIBILITY RXN
668.82	ANES COMP DEL NEC-DEL PP	999.7	RH INCOMPATIBILITY RXN
669.12	OB SHOCK-DEL, PP COMP	999.8	TRANSFUSION REACTION NEC
669.14	OBSTETRIC SHOCK-PP	999.9	COMP MED CARE NEC & NOS
670.02	MAJOR PP INFECT-DEL PP		

Major Complications – Maternity Care C-section Delivery

Major Complications – Maternity Care - C-section Delivery			
287.4	2ND THROMBOCYTOPENIA	785.59	SHOCK W/O TRAUMA NEC
512.0	SPONT TENS PNEUMOTHORAX	996.31	MECH COMP URETHRAL CATH
512.1	IATROGENIC PNEUMOTHORAX	996.60	INFECT DUE TO DEVICE NOS
512.8	SPONT PNEUMOTHORAX NEC	996.62	INFECT D/T VASC DEVICE
518.4	ACUTE LUNG EDEMA NOS	997.00	NERV SYST SURG COMP NOS
518.81	AC RESPIRATORY FAILURE	997.01	CNS SURG COMP
584.5	ACUTE RENAL FAILURE	997.02	IATROGEN CV INFARCT/HEM
584.8	AC REN FAIL-PATH LES NEC	997.09	NERV SYST SURG COMP NEC
584.9	ACUTE RENAL FAILURE NOS	997.1	SURG COMP-HEART
666.00	3RD STAGE PP HEMOR-NOS	997.3	SURG COMP-RESP NEC
666.02	3RD STAGE PP HEMOR-DEL	997.4	SURG COMP-DIGESTIVE
666.04	3RD STAGE PP HEMOR-PP	997.5	SURG COMP-URINARY NEC
666.10	IMMED PP HEMOR NEC-NOS	997.91	SURG COMP-HYPERTENSION
666.12	IMMED PP HEMOR NEC-DEL	998.0	POSTOPERATIVE SHOCK
666.14	IMMED PP HEMOR NEC-PP	998.11	HEMORRHAGE COMP PX
666.20	DELAYED PP HEMOR-NOS	998.2	ACCIDENTAL OP LACERATION
666.22	DELAYED PP HEMOR-DEL PP	998.3	POSTOP WOUND DISRUPTION
666.24	DELAYED PP HEMOR-PP	999.31	INFECT D/T CVC
666.30	PP COAG DEFECT-NOS	999.39	INFECT COMP MED CARE NEC
666.32	PP COAG DEFECT-DEL PP	998.4	FB LEFT DURING PROCEDURE
666.34	PP COAG DEFECT-PP	998.51	INFECTED POSTOP SEROMA
667.02	RET PLAC S HEMOR-DEL PP	998.59	POSTOP INFECTION NEC
668.02	ANES PULM COMP DEL-DELPP	998.7	POSTOP FOREIGN SUBST RXN
668.04	ANES PULM COMP DEL-PP	998.81	EMPHYSEMA DUE TO PX
668.12	ANES CARD COMP DEL-DELPP	998.83	NON-HEALING SURG WND
668.14	ANES CARD COMP DEL-PP	998.9	SURGICAL COMP NOS
668.22	ANES CNS COMP DEL-DEL PP	999.1	AIR EMBOL COMP MED CARE
668.24	ANES CNS COMP DEL-PP	999.2	VASC COMP MED CARE NEC
668.82	ANES COMP DEL NEC-DEL PP	999.3	INFECT COMP MED CARE NEC
669.42	OTH OB SURG COMP-DEL PP	999.4	ANAPHYLACTIC SHOCK-SERUM
669.44	OTH OB SURG COMP, PPCOND	999.5	SERUM REACTION NEC
670.02	MAJOR PP INFECT-DEL PP	999.6	ABO INCOMPATIBILITY RXN
674.12	DISRUPT CD WND-DEL PP	999.7	RH INCOMPATIBILITY RXN
674.32	OB SURG COMP NEC-DEL PP	999.8	TRANSFUSION REACTION NEC
785.50	SHOCK NOS	999.9	COMP MED CARE NEC & NOS
785.51	CARDIOGENIC SHOCK		