The Sixth Annual HealthGrades Women's Health in American Hospitals Study

June 2009

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In this report, HealthGrades identifies patient outcomes for maternity care and inhospital treatment of 16 other procedures/diagnoses concerning women's health. The maternity care analysis uses three years of data (2005-2007) 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 risk-adjusted analysis of inhospital treatment of 16 other procedures/diagnoses identifies mortality and complication rates concerning women's health based on three years of Medicare data (2005-2007). The analysis identifies top-performing hospitals in maternity care and women's health 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 *Sixth Annual HealthGrades Women's Health in American Hospitals* study analyzes the quality of care at U.S. hospitals for women and their newborns and for women's health outcomes. The need to better understand the difference in quality outcomes for women seeking maternity care and inhospital treatment for women is essential, given the combined impact these conditions have on the U.S. healthcare system.

Hospitalizations related to childbirth comprise a large portion and cost of U.S. hospital care. About 4.3 million hospital stays are due to obstetrical conditions and nearly one-third of the childbirths in 2006 were delivered via cesarean section (C-section) compared with one-fifth in 1997.[1] 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 obstetrical indications.[2] For many women, hospitalization due to childbirth is their first experience with inpatient care. For these women and their families, it is important to have comparative information about the quality differences that exist among hospital maternity care programs.

Attention is also required regarding medical and surgical conditions for women. Females in the U.S. number 140 million, comprising over half the U.S. population.[3] The Agency for Healthcare Research and Quality (AHRQ) has looked at various discrepancies in quality and safety that appear to exist between women and men, specifically in heart attack and complications after surgery.[3] Additionally, as the population ages chronic conditions requiring hospitalization are increasing. An example of a chronic disease is congestive heart failure. Not only did the number of women being hospitalized with heart failure increase, (from 13.95 hospitalizations per 1,000 in 1980, to 19.58 hospitalizations per 1,000 in 2006), but women had a significantly higher annual percentage increase rate than men (1.55% versus 1.20%, adjusted for age).[4] Because variations in outcomes do exist for women, it is important for the nation to evaluate the consistency of its care, not only when compared to men, but amongst states and hospitals.

Identifying Outcome Trends and Five-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 2005 through 2007.
- Examine the maternal complication trends for vaginal, cesarean section (C-section), and patient-choice C-section deliveries from 2005 through 2007.
- Examine the difference in neonatal mortality between best-, average-, and poor-performing hospitals.
- Identify the best-performing U.S. hospitals in women's health from 2005 through 2007.
- Examine morbidity and mortality trends among the different states for women's health from 2005 through 2007.
- Identify states which have hospitals that provided the best comprehensive women's coverage from 2005 through 2007.

Assessing Maternity Care Outcomes

HealthGrades analyzed all-payer data of approximately 13 million hospital delivery and neonate records from 2005 through 2007 at more than 1,500 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 2009/2010 Methodology* white paper at www.HealthGrades.com.

Assessing Mortality and Complication Outcomes in Women

HealthGrades studied outcomes of disease states and procedures pertaining specifically to women for more than 2.6 million discharges using Medicare data from all 50 states from 2005 through 2007. This study identifies the top 20% of eligible hospitals specific to the care and treatment of women for 16 procedures/diagnoses and highlights differences and trends in mortality and complication outcomes between the best and worst hospitals. More information on the women's health methodology can be found in the following *Women's Health Methodology Brief* section, or in the *HealthGrades Women's Health Excellence Award™2009/2010 Methodology* white paper at www.HealthGrades.com.

Summary of Findings

Maternity Care Outcomes

If all hospitals, among the 19 states studied, performed at the level of best-performing hospitals, 182,129 women may have avoided developing one or more inhospital major obstetrics complications (2005 – 2007).

HealthGrades analyzed approximately 13 million hospital delivery and neonate records from 2005 through 2007 in more than 1,500 hospitals in 19 all-payer states and found:

- Best-performing hospitals had fewer complications compared with poor-performing hospitals:
  - The best-performing hospitals had 52% fewer maternal complications among women who had vaginal births compared to poor-performing hospitals and 76% fewer complications among women who had C-sections. Patient-choice C-sections had the largest difference at 84% between best- and poor-performing hospitals.
  - If all hospitals, among the 19 states studied, performed at the level of the best-performing hospitals from 2005 through 2007, 182,129 women may have avoided developing one or more inhospital major obstetrics complications.
- Best-performing hospitals had a 56% lower weight-stratified neonatal mortality compared to poor-performing hospitals.
- C-section rates average approximately 32% among the 19 states studied with a range between 22% and 37%.

Women's Health Outcomes

A total of 18,089 lives could have been saved and 6,849 complications avoided if all eligible hospitals performed at the level of the best-performing hospitals in women's health (2005 – 2007).

HealthGrades analyzed more than 2.6 million hospitalizations using Medicare data from all 50 states from 2005 through 2007. To be included in the analysis, hospitals had to have an open heart program and treat significant numbers of women for stroke. (Hospitals that transferred out more than 10% of their stroke patients were excluded.) As well, hospitals had to have a significant patient population in at least six additional cohorts from all areas (pulmonary, cardiac, vascular, orthopedics and spine).

Women's Health outcomes were separated into several aspects of care: Women's Medicine (heart attack, congestive heart failure, pneumonia, chronic obstructive pulmonary disease, and stroke); Women's Cardiovascular Procedures (coronary bypass surgery, peripheral vascular bypass, coronary interventional procedures, resection/replacement of abdominal aortic aneurysm, carotid surgery, and valve replacement); and Women's Bone & Joint Health (total knee and total hip replacement surgeries, spinal surgeries, and hip fracture repair).

- Improvement in mortality and morbidity for top-performing hospitals was 33% compared with the poor-performing hospitals with a range between 28% and 36% for the above groups.
- Among eligible hospitals, a total of 18,089 lives could have been saved and 6,849 complications avoided if all eligible hospitals performed at the level of the best-performing hospitals in women's health.

Comprehensive Women's Health

Only 15 hospitals provided the best comprehensive coverage in both maternity care and women's health.

An elite number of hospitals provided the best comprehensive coverage in both maternity care and women's health.

- Of all the hospitals who were top-performing hospitals in either maternity care or women's health, only 15 hospitals (6.97%) were among our best performers in both aspects of care.

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 which make their data available. The data represent three years of discharges (2005 through 2007). These data were chosen because they represent all discharges for the associated states. The 19 all-payer states evaluated were as follows: Arizona, California, Florida, Iowa, Maine, Maryland, Massachusetts, Nevada, New Jersey, New York, Pennsylvania, Oregon, Rhode Island, Texas, Utah, Vermont, Virginia, Washington, and Wisconsin.

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

- Volume of vaginal and cesarean section (C-section) single live-born deliveries;
- 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 mortality rate stratified into eight birth weight categories.

For each factor, hospitals are ranked and a percentile score is calculated. Volume is ranked high to low, complications are ranked low to high, and newborn mortality is ranked based on a combined z-score for the mortality rates of the eight birth weight categories.

The four factors were weighted using predetermined weights based on consensus from a physician panel. Each factor's percentile score was multiplied by its weight and then summed to create an overall score.

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 2009/2010* available at www.HealthGrades.com.

Women's Health Methodology Brief

To help consumers evaluate and compare hospital performance in women's health, HealthGrades analyzed patient outcomes data for virtually every hospital in the country. HealthGrades used Medicare inpatient data from the MedPAR database (purchased from the Centers for Medicare and Medicaid Services) for years 2005 through 2007.

Ratings were based upon HealthGrades' risk-adjustment methodology. The purpose of risk adjustment is to obtain fair statistical comparisons between disparate populations or groups. Significant differences in demographic and clinical risk factors are found among patients treated in different hospitals. Risk adjustment of the data is needed to make accurate and valid comparisons of clinical outcomes at different hospitals.

HealthGrades analyzed the following 16 procedures/diagnoses (cohorts) for each hospital's female patients:

Mortality-Based Cohorts

- Chronic Obstructive Pulmonary Disease
- Coronary Bypass Surgery
- Coronary Interventional Procedures (PTCA/Angioplasty, Stent)
- Heart Attack
- Heart Failure
- Pneumonia
- Resection / Replacement of Abdominal Aorta
- Stroke
- Valve Replacement Surgery

Complication-Based Cohorts

- Back and Neck Surgery (*with* Spinal Fusion)
- Back and Neck Surgery (*without* Spinal Fusion)
- Carotid Surgery
- Hip Fracture Repair
- Peripheral Vascular Bypass
- Total Hip Replacement
- Total Knee Replacement

HealthGrades used the following steps to determine Women's Health Excellence Award™ recipients:

1. For each patient cohort, unique statistical, female-only models were developed using logistic regression. For most mortality cohorts, separate models were created for inhospital mortality, inhospital +1 month, and inhospital +6 months mortality. (Chronic obstructive pulmonary disease and heart failure do not have inhospital +1 month mortality models.) See *Women's Health Excellence Award™ Methodology 2009/2010* white paper at www.HealthGrades.com for details on the modeling process.

2. The statistical models were checked for validity and finalized. All of the models were highly significant, with p values not greater than 0.0001. These cohort specific models were then used to estimate the probability of death or complication for each patient in the cohort.

3. For each hospital, cohort, and outcome, the observed and predicted numbers were summed and a z-score was calculated. Thus, the complication-based cohorts had a single z-score but most mortality-based cohorts had three z-scores (inhospital, inhospital +1 month, inhospital +6 months).

4. The straight average of all z-scores for a hospital was calculated for all cohorts in which that particular hospital had at least 30 female cases over the three-year period and at least five female cases in the most recent year. The eligible hospitals were then rank ordered by their average z-score and the top 20% of eligible hospitals were recognized with a Women's Health Excellence Award™.

Maternity Care Findings

HealthGrades' sixth 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, 218 hospitals received a HealthGrades five-star rating for their maternity care programs. Of these, 145 had complication rates and weight-stratified neonatal mortality low enough to place them among the top 10% of hospitals studied. These 145 hospitals are recipients of the HealthGrades 2009/2010 Maternity Care Excellence Award™ (see *Appendix F* for a complete list of award recipients; visit www.HealthGrades.com for hospital ratings).

Best-performing Hospitals Outperformed all Others for Maternal Complications

If all hospitals, among the 19 states studied, performed at the level of best-performing hospitals, 182,129 women may have avoided developing one or more inhospital major obstetrics complications (2005 – 2007).

Best-performing (five-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 the 2008 *HealthGrades Women's Health in American Hospitals Study.*

- For women having vaginal births, the best-performing hospitals had 52% fewer complications compared to poor-performing hospitals and 32% fewer complications compared to average-performing hospitals. The most frequent complications among women who had a vaginal delivery from 2005 through 2007 were third-degree perineal lacerations (2.89%) and injury to pelvic organs (2.79%) (see *Appendices A* and *B*).
- For women undergoing all types of C-section deliveries, the best-performing hospitals had 76% fewer complications compared to poor-performing hospitals and 47% fewer complications compared to average-performing hospitals. The most frequent complications among women who had a C-section delivery from 2005 through 2007 were postpartum hemorrhage (1.43%) and postpartum infections (0.94%) (see *Appendices A* and *B*).
- Among women who had C-sections without a medical indication ("patient-choice" C-sections), best-performing hospitals had lower complication rates than poor-performing hospitals. Specifically, best-performing hospitals had an average complication rate of 2% compared to 12.5% for poor-performing hospitals and 4.5% for average-performing hospitals (see *Appendix A*).
- If all hospitals performed at the level of the best-performing hospitals from 2005 through 2007 across the 19 states studied, 182,129 women may have avoided developing one or more inhospital major maternal obstetrics complications associated with vaginal or C-section delivery (see *Appendix A*).

Complication Rates Have Improved Over Time

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

- Complication rates have decreased between 2005 and 2007 for vaginal delivery and C-section, including patient-choice C-section. The rate of improvement is higher in the five-star hospitals compared with the one-star hospitals. Difference in rate of improvement ranged from 14.5% in vaginal delivery to 68.4% in patient-choice C-section.

Table 1: Maternity Care Complication Rate of Improvement

Maternity Care Outcomes Performance	Year	Vaginal	C-section	Patient-choice C-section
One-star	2005	17.23%	11.26%	12.59%
	2007	15.45%	10.36%	11.96%
	% Difference	10.30%	7.90%	4.97%
Five-star	2005	8.46%	2.78%	2.13%
	2007	7.44%	2.38%	1.79%
	% Difference	12.10%	14.40%	15.74%
Improvement Between One-star and Five-star Hospitals		14.50%	45.00%	68.40%

Four States Have Lowest Complication Rates for All Delivery Types

Four states, Florida, California, New Jersey and Texas are among the top five all-payer states with the lowest complication rates for each of the three delivery types.

- Florida, California, New Jersey and Texas are among the top five all-payer states that have the lowest complication rates for both modalities of delivery: vaginal delivery and C-section deliveries (including patient-choice C-section).

Table 2: Maternity Care Complication Rates by All-payer States

Vaginal Delivery		C-section Delivery		Patient-choice C-section Delivery	
State	Complication Rate	State	Complication Rate	State	Complication Rate
Florida	9.35%	Nevada	3.29%	Nevada	3.11%
New York	9.58%	New Jersey	3.51%	New Jersey	3.30%
New Jersey	10.20%	Florida	3.88%	Florida	3.36%
California	10.26%	California	4.28%	California	3.80%
Texas	10.95%	Texas	4.46%	Texas	4.17%
Rhode Island	11.28%	Virginia	4.79%	Iowa	4.34%
Utah	11.37%	Vermont	4.99%	Wisconsin	4.57%
Massachusetts	11.82%	Iowa	5.08%	Virginia	4.62%
Nevada	11.87%	Arizona	5.09%	Pennsylvania	4.73%
Virginia	12.19%	Maryland	5.21%	New York	4.85%
Wisconsin	12.75%	Maine	5.40%	Maryland	4.86%
Maryland	13.21%	New York	5.41%	Washington	5.04%
Arizona	13.21%	Pennsylvania	5.47%	Arizona	5.26%
Washington	13.97%	Wisconsin	5.49%	Massachusetts	5.30%
Iowa	14.06%	Washington	5.76%	Rhode Island	5.46%
Oregon	14.14%	Utah	5.80%	Maine	5.66%
Pennsylvania	14.55%	Massachusetts	6.23%	Oregon	5.85%
Maine	15.16%	Oregon	6.38%	Vermont	6.06%
Vermont	17.77%	Rhode Island	6.56%	Utah	6.66%

C-section Rates Account for One-third of All Deliveries in the 19 All-payer States

Three all-payer states, Florida, New Jersey and Nevada, have the highest rates of C-section and patient-choice C-section deliveries.

- C-section rates average approximately 32% among the 19 all-payer states with a range between 21.7% and 36.9%.
- States with high C-section rates had a tendency to have a higher rate of patient-choice C-sections with a correlation coefficient of .869.
- Florida, New Jersey and Nevada are all-payer states among the top five states with the highest rates of C-section and patient-choice C-section.

Table 3: Top Five All-payer States with Highest C-section Rates

Top Five All-payer States	C-section Rate
Florida	36.85%
New Jersey	36.66%
Texas	34.70%
Virginia	34.28%
Nevada	33.13%

Table 4: Top Five All-payer States with Highest Patient-choice C-section Rates

Top Five All-payer States	Patient-choice C-section Rate
Florida	2.86%
New York	2.85%
Nevada	2.63%
New Jersey	2.52%
Massachusetts	2.38%

- From 2005 through 2007 the rate of patient-choice C-sections has increased an average of 8.70%.

Table 5: Patient-choice C-section Rate Increase

	2005	2006	2007
Patient-choice C-section	2.07%	2.21%	2.25%

Neonatal Mortality is Lower in Best-performing Hospitals

- Best-performing hospitals had 56.4% lower weight-stratified neonatal mortality compared to poor-performing hospitals and 39.4% lower mortality than average-performing hospitals (see *Appendix C*).

Women's Health Findings

HealthGrades recognized 169 hospitals as HealthGrades 2009/2010 Women's Health Excellence Award™ recipients.

In the 50 states studied, 19.7% of hospitals were eligible for the women's health award. Of eligible hospitals, 169 were among the top 20% of hospitals studied. These hospitals are recipients of the HealthGrades 2009/2010 Women's Health Excellence Award™.

Women's Health outcomes were separated into several aspects of care:

Women's Bone and Joint Health

- Back and Neck Surgery (with Spinal Fusion)
- Back and Neck Surgery (without Spinal Fusion)
- Hip Fracture Repair
- Total Hip Replacement
- Total Knee Replacement

Women's Medicine

- Chronic Obstructive Pulmonary Disease
- Heart Attack
- Heart Failure
- Pneumonia
- Stroke

Women's Cardiovascular

- Carotid Surgery
- Coronary Bypass Surgery
- Coronary Interventional Procedures (PTCA/Angioplasty, Stent)
- Peripheral Vascular Bypass
- Resection / Replacement of Abdominal Aorta
- Valve Replacement Surgery

- Improvement in mortality and morbidity between best-performing hospitals compared with poor-performing hospitals ranged from 27.8% to 36.1% (see also *Appendix E*).

Table 6: Women's Health Difference Between Top- and Poor-performing Hospitals

Category	Difference Between Top 20% and Lowest 20%*	Observed-to-Expected Ratio Bottom 20%	Observed-to-Expected Ratio Top 20%
Women's Medicine	36.1%	1.20	0.77
Women's Cardiovascular	33.7%	1.25	0.83
Women's Bone & Joint Health	27.8%	1.21	0.87

* Methodology = [(O/E one-star)-(O/E five-star)/O/E one-star] X 100%

Colorado was the only state that was in the top 10 for all three women's health categories.

- One state, Colorado, was in the top 10 (lowest mortality and morbidity) for all three categories of women's health. Florida, Michigan, Montana, Ohio, and South Dakota ranked among the top 10 in at least two out of three categories of women's health (see *Appendix D*).

If all eligible hospitals performed at the level of Women's Health Excellence hospitals across the 16 procedures and diagnoses studies, 18,089 lives could have potentially been saved, and 6,849 major complications could have been avoided from 2005 through 2007.

- If all eligible hospitals performed at the level of Women's Health Excellence hospitals across the 16 procedures and diagnoses studies, 18,089 lives (25%) could have potentially been saved, and 6,849 major complications (11%) could have been avoided from 2005 through 2007 (see *Appendix E*).
- Eighty-two percent (14,930) of the potentially preventable deaths were associated with just four diagnoses:

1) Pneumonia (4,165)
2) Stroke (3,774)
3) Heart Failure (3,651)
4) Heart Attack (3,340)

Comprehensive Women's Care

Of the 215 hospitals in the 19 all-payer states that were either in the top 10% of maternity care or top 20% for women's health, only 15 hospitals (6.97%) fulfilled both criteria indicating that they provided comprehensive and exemplary medical coverage.

- A top comprehensive women's health hospital is a hospital that is recognized with a Women's Health Excellence Award™ and that is in the top 10% in maternity care.
- California has the most hospitals with comprehensive women's health coverage (of all 19 all-payer states considered) followed by Florida.

Six all-payer states have hospitals that provided comprehensive and exemplary medical coverage for women's care (both maternity care and women's health).

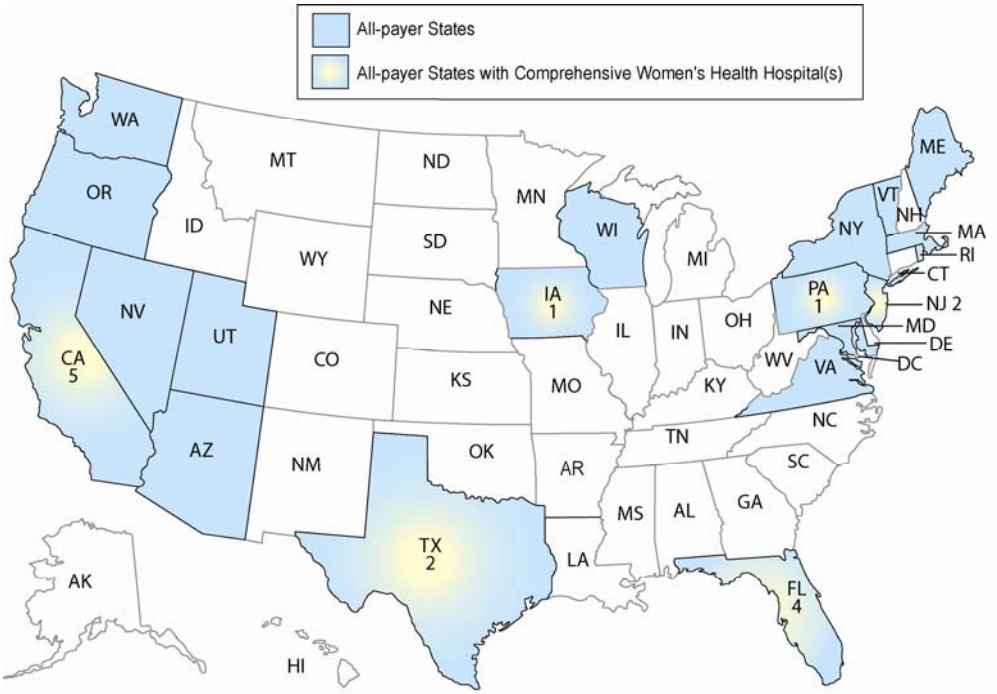

Table 7: States with Comprehensive Women's Health Hospitals

State	Number of Comprehensive Women's Health Hospitals	Hospital	City
California	5	Anaheim Memorial Hospital	Anaheim
		Glendale Adventist Medical Center	Glendale
		Good Samaritan Hospital	Los Angeles
		Garfield Medical Center	Monterey Park
		Huntington Memorial Hospital	Pasadena
Florida	4	Baptist Hospital of Miami Inc	Miami
		Mercy Hospital	Miami
		NCH Healthcare System	Naples
		Sarasota Memorial Hospital	Sarasota
New Jersey	2	Saint Barnabas Medical Center	Livingston
		Valley Hospital	Ridgewood
Texas	2	Saint David's Medical Center	Austin
		Seton Medical Center	Austin
Iowa	1	Mercy Medical Center-Des Moines	Des Moines
Pennsylvania	1	Conemaugh Valley Memorial Hospital	Johnstown

Interpretation of Results

The study focuses on two major areas of care for women—maternity care and women's health—as these represent the gamut of women's healthcare needs. The study highlights that large variations in care exist for both maternity care and women's health.

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 unexpected complications have decreased between 2005 and 2007, the difference in complication rates between the best- and poor-performing hospitals is 52% for vaginal deliveries, 76% for C-sections, and 84% for patient-choice C-section. Given that the largest variability occurs in patient-choice C-section, it is also a concerning trend that the prevalence of maternal choice C-section has been increasing over time. Finally, this inconsistency is seen when comparing the different states; those with the lowest complication rates have almost half the complications compared with states that had the highest complication rates.

There are also differences between the best-performing and poor-performing hospitals when observing the three aspects of women's health. Indeed this lack of consistency is seen by the fact that only one state was among the top 10 states with the lowest morbidity and mortality for Women's Medicine, Bone and Joint Health, and Cardiovascular procedures for women. In fact, more than 82% of the lives that could potentially have been saved were associated with just four diagnoses: pneumonia, stroke, heart attack and congestive heart failure.

Given the relative inconsistencies in maternity care programs and hospitals treating women's health issues, it is not surprising that very few hospitals have outstanding performance in both areas. What we have seen at a state level is that these hospitals tend to cluster around certain areas of the country.

In conclusion, this study demonstrates that quality patient outcomes for women among U.S. hospitals are not equal. Wide gaps in quality outcomes continue to exist. All patients need to take a more active role in their healthcare by seeking out quality outcomes information and including this information in their decision to select a hospital.

Limitations of the Maternity Care Performance Assessment and the Risk-adjustment Models for Women's Health Performance

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 2005 through 2007, our findings may not be generalized to the entire United States or to states that we did not study.

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Health Grades Inc. is the leading independent healthcare 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: Complication Rates by Delivery Type

Delivery Type	Hospital Maternity Care Performance	Number of Deliveries	Observed Inhospital Complication Rate	Number of Women Who Could Have Potentially Avoided Developing One or More Major Obstetrics Complications if Performed at Level of Best Hospitals	Reduction in Complication Rate if Performed at Level of Best Hospitals
Vaginal Delivery	Poor	327,381	16.56%	27,954	52%
Vaginal Delivery	Average	2,959,687	11.79%	111,701	32%
Vaginal Delivery	Best	951,949	8.02%		
C-section Delivery	Poor	135,511	11.01%	11,390	76%
C-section Delivery	Average	1,366,314	4.87%	31,084	47%
C-section Delivery	Best	507,561	2.60%		
Patient-choice C-section Deliveries	Poor	8,239	12.48%	864	84%
Patient-choice C-section Deliveries	Average	89,141	4.50%	2,235	56%
Patient-choice C-section Deliveries	Best	38,730	1.99%		
			Total	182,129	

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

Appendix B: Top Five Maternal Complications by Delivery Type

Delivery Type	ICD-9 Code	Description	Volume	Complication Rate
Vaginal Delivery	664.21	Third-degree perineal laceration	122,441	2.89%
	665.51	Other injury to pelvic organs	118,230	2.79%
	666.12	Other immediate postpartum hemorrhage	97,095	2.29%
	665.41	High vaginal laceration	71,528	1.69%
	664.31	Fourth-degree perineal laceration	33,122	0.78%
C-section Delivery	666.12	Other immediate postpartum hemorrhage	28,733	1.43%
	670.02	Major puerperal infection (postpartum infection)	18,830	0.94%
	674.32	Other obstetrical surgical wound complication	16,459	0.82%
	668.82	Other complications of anesthesia in labor and delivery	6,873	0.34%
	669.42	Other complications of obstetrical surgery and procedures	5,874	0.29%

Appendix C: 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
Poor	493,971	0.33%	0.23%	1.42	56.41%	39.36%
Average	4,562,348	0.15%	0.15%	1.02		
Best	1,549,946	0.08%	0.12%	0.62		

Appendix D: Women's Health Top 10 States by Category

- State that is top 10 in all three aspects of women's health: Colorado.
- States that are top 10 in two out of three aspects of women's health categories: Florida, Michigan, Montana, Ohio, and South Dakota.

Women's Bone and Joint Health		Women's Medicine		Women's Cardiovascular Procedures	
State	O/E Ratio	State	O/E Ratio	State	O/E Ratio
Hawaii	0.56	Arizona	0.70	Colorado	0.69
South Dakota	0.69	Minnesota	0.77	South Dakota	0.74
New Mexico	0.73	Ohio	0.81	Idaho	0.76
Dist. of Columbia	0.76	Florida	0.83	Montana	0.86
Oklahoma	0.82	Utah	0.83	Alaska	0.86
Colorado	0.87	Delaware	0.84	Massachusetts	0.87
Florida	0.88	Maryland	0.84	Texas	0.89
Oregon	0.88	Colorado	0.85	Illinois	0.89
Montana	0.88	Michigan	0.86	Ohio	0.90
Michigan	0.88	Rhode Island	0.86	Connecticut	0.91

*O/E Ratio = Observed-to-Expected Ratio

Appendix E: Women's Health Outcomes Performance

Women's Health Outcomes Performance	Observed Inhospital Mortality / Complication Rate	Expected Inhospital Mortality / Complication Rate	Observed-to-Expected Ratio	95 Percent CI for Ratio	Relative Improvement Best to Poor	Relative Improvement Best to Average	Potential Lives Saved / Complications Avoided
Women's Bone and Joint Health							
Back and Neck Surgery (with Spinal Fusion)							
Best	14.80%	16.49%	0.90	(.86-.94)			
Average	15.54%	15.76%	0.99	(.96-1.01)		8.96%	554
Poor	18.71%	15.43%	1.21	(1.16-1.26)	25.96%		528
						Total	1,082
Back and Neck Surgery (without Spinal Fusion)							
Best	9.88%	10.62%	0.93	(.88-.98)			
Average	10.39%	10.44%	1.00	(.96-1.03)		6.52%	257
Poor	12.36%	10.58%	1.17	(1.11-1.23)	20.34%		229
						Total	486
Hip Fracture Repair							
Best	8.64%	10.02%	0.86	(.83-.89)			
Average	9.67%	9.74%	0.99	(.97-1.01)		13.10%	1,421
Poor	11.17%	9.47%	1.18	(1.14-1.21)	26.89%		1,050
						Total	2,471
Total Hip Replacement							
Best	5.86%	6.75%	0.87	(.82-.91)			
Average	6.43%	6.75%	0.95	(.92-.99)		9.01%	317
Poor	8.57%	6.67%	1.29	(1.22-1.35)	32.52%		370
						Total	687
Total Knee Replacement							
Best	5.41%	6.37%	0.85	(.82-.88)			
Average	6.03%	6.31%	0.96	(.94-.98)		11.19%	973
Poor	7.67%	6.23%	1.23	(1.19-1.27)	31.02%		879
						Total	1,852

Appendix E: Continued

Women's Health Outcomes Performance: Women's Cardiovascular

Women's Health Outcomes Performance	Observed Inhospital Mortality / Complication Rate	Expected Inhospital Mortality / Complication Rate	Observed-to-Expected Ratio	95 Percent CI for Ratio	Relative Improvement Best to Poor	Relative Improvement Best to Average	Potential Lives Saved / Complications Avoided
Women's Cardiovascular							
Carotid Surgery							
Best	6.79%	7.28%	0.93	(.87-.99)			
Average	6.60%	7.10%	0.93	(.89-.97)		-0.26%	-7
Poor	7.74%	7.22%	1.07	(1.01-1.14)	13.02%		120
						Total	113
Coronary Bypass Surgery							
Best	3.28%	4.03%	0.81	(.74-.88)			
Average	3.47%	3.56%	0.97	(.92-1.02)		16.33%	269
Poor	4.70%	3.51%	1.34	(1.25-1.43)	39.32%		240
						Total	509
Coronary Interventional Procedures							
Best	1.12%	1.46%	0.77	(.71-.83)			
Average	1.33%	1.37%	0.98	(.94-1.01)		21.07%	547
Poor	1.70%	1.28%	1.33	(1.26-1.40)	42.17%		414
						Total	961
Peripheral Vascular Bypass							
Best	7.79%	8.84%	0.88	(.75-1.01)			
Average	8.87%	8.57%	1.04	(.96-1.11)		14.91%	93
Poor	12.56%	8.73%	1.44	(1.26-1.62)	38.79%		65
						Total	158
Resection / Replacement of Abdominal Aorta							
Best	3.46%	5.52%	0.63	(.28-.97)			
Average	4.91%	5.71%	0.86	(.65-1.07)		27.18%	20
Poor	6.02%	6.64%	0.91	(.42-1.39)	30.85%		4
						Total	24
Valve Replacement Surgery							
Best	6.61%	8.64%	0.76	(.70-.83)			
Average	7.95%	8.11%	0.98	(.94-1.02)		21.98%	450
Poor	10.44%	7.98%	1.31	(1.22-1.40)	41.60%		242
						Total	692

Appendix E: Continued

Women's Health Outcomes Performance: Women's Medicine

Women's Health Outcomes Performance	Observed Inhospital Mortality / Complication Rate	Expected Inhospital Mortality / Complication Rate	Observed-to-Expected Ratio	95 Percent CI for Ratio	Relative Improvement Best to Poor	Relative Improvement Best to Average	Potential Lives Saved / Complications Avoided
Women's Medicine							
Chronic Obstructive Pulmonary Disease							
Best	1.63%	2.22%	0.73	(.68-.79)			
Average	1.95%	2.08%	0.94	(.90-.97)		21.89%	566
Poor	2.41%	1.90%	1.27	(1.20-1.34)	42.49%		407
						Total	973
Heart Attack							
Best	8.45%	10.07%	0.84	(.81-.87)			
Average	9.33%	9.38%	1.00	(.98-1.01)		15.64%	2,059
Poor	11.15%	9.35%	1.19	(1.16-1.22)	29.57%		1,281
						Total	3,340
Heart Failure							
Best	3.16%	4.28%	0.74	(.71-.77)			
Average	3.73%	3.98%	0.94	(.92-.96)		21.23%	2,154
Poor	4.66%	3.75%	1.24	(1.21-1.28)	40.65%		1,497
						Total	3,651
Pneumonia							
Best	3.74%	5.53%	0.68	(.65-.70)			
Average	4.79%	5.27%	0.91	(.89-.93)		25.66%	2,364
Poor	6.38%	5.07%	1.26	(1.22-1.29)	46.31%		1,801
						Total	4,165
Stroke							
Best	9.39%	11.72%	0.80	(.78-.83)			
Average	11.17%	11.43%	0.98	(.96-.99)		17.95%	2,415
Poor	12.97%	11.49%	1.13	(1.10-1.16)	29.01%		1,359
						Total	3,774

Appendix F: HealthGrades 2009/2010 Maternity Care Excellence Award™ Recipients

The following hospitals are recipients of HealthGrades 2009/2010 Maternity Care Excellence Award™.

HealthGrades 2009/2010 Maternity Care Excellence Award™ Recipients*	City
Arizona	
Arrowhead Hospital	Glendale
Banner Baywood Medical Center	Mesa
Phoenix Baptist Hospital	Phoenix
California	
Anaheim Memorial Hospital	Anaheim
Antelope Valley Hospital	Lancaster
Bakersfield Memorial Hospital	Bakersfield
Bellflower Medical Center	Bellflower
Centinela Freeman Regional Medical Center - Centinela Campus	Inglewood
Central Valley General Hospital	Hanford
Clovis Community Medical Center	Clovis
Coastal Communities Hospital	Santa Ana
Community and Mission Hospital of Huntington Park	Huntington Park
Community Hospital of San Bernardino	San Bernardino
Corona Regional Medical Center	Corona
East Los Angeles Doctors Hospital	Los Angeles
Emanuel Medical Center Inc	Turlock
Foothill Presbyterian Hospital	Glendora
Fountain Valley Regional Hospital and Medical Center	Fountain Valley
Garden Grove Hospital and Medical Center	Garden Grove
Garfield Medical Center	Monterey Park
Glendale Adventist Medical Center	Glendale
Good Samaritan Hospital	Los Angeles
Huntington Memorial Hospital	Pasadena
JFK Memorial Hospital	Indio
Kaweah Delta District Hospital	Visalia
Los Angeles Metropolitan Medical Center	Los Angeles
Madera Community Hospital	Madera
Methodist Hospital of Southern California	Arcadia
Monterey Park Hospital	Monterey Park
Northridge Hospital Medical Center	Northridge

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Continued…

HealthGrades 2009/2010 Maternity Care Excellence Award™ Recipients*	City
California...continued	
O'Connor Hospital	San Jose
Palomar Medical Center	Escondido
Pomona Valley Hospital Medical Center	Pomona
Providence Holy Cross Medical Center	Mission Hills
Providence Saint Joseph Medical Center	Burbank
Providence Tarzana Medical Center	Tarzana
Rideout Memorial Hospital	Marysville
including: Fremont Medical Center	Yuba City
Saint Agnes Medical Center	Fresno
Saint Francis Medical Center	Lynwood
San Joaquin Community Hospital	Bakersfield
Scripps Memorial Hospital - La Jolla	La Jolla
Scripps Mercy Hospital	San Diego
including: Scripps Mercy Hospital - Chula Vista	Chula Vista
South Coast Medical Center	Laguna Beach
Sutter Roseville Medical Center	Roseville
Valley Presbyterian Hospital	Van Nuys
Western Medical Center - Anaheim	Anaheim
Whittier Hospital	Whittier
Florida	
Baptist Hospital of Miami Inc	Miami
Bethesda Memorial Hospital	Boynton Beach
Heart of Florida Regional Medical Center	Davenport
Hialeah Hospital	Hialeah
Kendall Regional Medical Center	Miami
Manatee Memorial Hospital	Bradenton
Memorial Hospital - Miramar	Miramar
Mercy Hospital	Miami
Morton Plant Mease Healthcare Countryside	Safety Harbor
Mount Sinai Medical Center	Miami Beach
including: Mt Sinai Medical Center and Miami Heart Institute	Miami Beach
Munroe Regional Medical Center	Ocala
NCH Healthcare System	Naples
North Florida Regional Medical Center	Gainesville
Osceola Regional Medical Center	Kissimmee
Palms West Hospital	Loxahatchee

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Continued…

HealthGrades 2009/2010 Maternity Care Excellence Award™ Recipients*	City
Florida...continued	
Plantation General Hospital	Plantation
Saint Petersburg General Hospital	Saint Petersburg
Sarasota Memorial Hospital	Sarasota
South Miami Hospital	South Miami
Spring Hill Regional Hospital	Spring Hill
Wellington Regional Medical Center	Wellington
West Boca Medical Center	Boca Raton
Iowa	
Mercy Medical Center - Des Moines	Des Moines
Maryland	
Holy Cross Hospital	Silver Spring
Massachusetts	
Hallmark Health	Medford
including: Melrose-Wakefield Hospital	Melrose
Whidden Memorial Hospital	Everett
Newton-Wellesley Hospital	Newton
Southcoast Hospitals Group - Charlton Memorial	Fall River
including: Southcoast Hospitals Group - Saint Luke's Hospital	New Bedford
Nevada	
Mountainview Hospital	Las Vegas
New Jersey	
Christ Hospital	Jersey City
Englewood Hospital and Medical Center	Englewood
Kimball Medical Center	Lakewood
Monmouth Medical Center	Long Branch
Palisades Medical Center	North Bergen
Saint Barnabas Medical Center	Livingston
Saint Mary's Hospital	Passaic
Saint Michael's Medical Center - Saint James	Newark
University Medical Center at Princeton	Princeton
Valley Hospital	Ridgewood

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Continued…

HealthGrades 2009/2010 Maternity Care Excellence Award™ Recipients*	City
New York	
Bronx-Lebanon Hospital Center	Bronx
Community General Hospital of Greater Syracuse	Syracuse
Faxton-St. Luke's Healthcare	Utica
including: Faxton - Children's Hospital	Utica
Forest Hills Hospital	Forest Hills
Glens Falls Hospital	Glens Falls
Good Samaritan Hospital of Suffern	Suffern
Lawrence Hospital Center	Bronxville
Lenox Hill Hospital	New York
Montefiore Medical Center – North Division	Bronx
New York Hospital Medical Center of Queens	Flushing
NY Downtown Hospital	New York
Nyack Hospital	Nyack
Plainview Hospital	Plainview
Richmond University Medical Center	Staten Island
Saint Catherine of Siena Hospital	Smithtown
Saint Charles Hospital	Port Jefferson
Saint John's Riverside Hospital - Andrus Pavilion	Yonkers
including: Saint John's Riverside Hospital - Park Care Pavilion	Yonkers
Southside Hospital	Bay Shore
St. Luke's Cornwall Hospital	Newburgh
Vassar Brothers Medical Center	Poughkeepsie
White Plains Hospital Center	White Plains
Pennsylvania	
Conemaugh Valley Memorial Hospital	Johnstown
Doylestown Hospital	Doylestown
Uniontown Hospital	Uniontown
Westmoreland Regional Hospital	Greensburg
Texas	
Clear Lake Regional Medical Center	Webster
Corpus Christi Medical Center	Corpus Christi
Cypress Fairbanks Medical Center Hospital	Houston
Dallas Regional Medical Center	Mesquite

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Continued…

HealthGrades 2009/2010 Maternity Care Excellence Award™ Recipients*	City
Texas...continued	
Del Sol Medical Center	El Paso
East Texas Medical Center - Athens	Athens
Fort Duncan Regional Medical Center	Eagle Pass
Knapp Medical Center	Weslaco
Las Palmas Medical Center	El Paso
Memorial Hermann Healthcare System	Houston
Memorial Hermann Memorial City Hospital	Houston
Memorial Hermann The Woodlands Hospital	The Woodlands
Methodist Charlton Medical Center	Dallas
Methodist Willowbrook Hospital	Houston
Midland Memorial Hospital	Midland
Northeast Medical Center Hospital	Humble
Odessa Regional Medical Center	Odessa
Providence Memorial Hospital	El Paso
Saint David's Medical Center	Austin
Saint David's North Austin Medical Center	Austin
Saint Luke's Community Medical Center - The Woodlands	The Woodlands
Seton Medical Center	Austin
Seton Southwest Healthcare Center	Austin
Southwest General Hospital	San Antonio
Twelve Oaks Medical Center	Houston
Valley Regional Medical Center	Brownsville
Utah	
McKay-Dee Hospital Center	Ogden
Ogden Regional Medical Center	Ogden
Utah Valley Regional Medical Center	Provo
Virginia	
Inova Fair Oaks Hospital	Fairfax
Martha Jefferson Hospital	Charlottesville
Reston Hospital Center	Reston
Sentara Leigh Hospital	Norfolk
Washington	
Overlake Hospital Medical Center	Bellevue
Saint Joseph Medical Center	Tacoma

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Appendix G: HealthGrades 2009/2010 Women's Health Excellence Award™ Recipients

The following hospitals are recipients of HealthGrades 2009/2010 Women's Health Excellence Award™.

HealthGrades 2009/2010 Women's Health Excellence Award™ Recipients*	City
Alabama	
D C H Regional Medical Center	Tuscaloosa
Arizona	
Mayo Clinic Hospital	Phoenix
Northwest Medical Center	Tucson
California	
Anaheim Memorial Hospital	Anaheim
California Pacific Medical Center - Pacific	San Francisco
Cedars-Sinai Medical Center	Los Angeles
El Camino Hospital	Mountain View
Garfield Medical Center	Monterey Park
Glendale Adventist Medical Center	Glendale
Good Samaritan Hospital	Los Angeles
Huntington Memorial Hospital	Pasadena
John Muir Medical Center - Concord Campus	Concord
Saint Vincent Medical Center	Los Angeles
Sequoia Hospital	Redwood City
Sharp Chula Vista Medical Center	Chula Vista
UCLA Medical Center	Los Angeles
Colorado	
Centura Health-Penrose Saint Francis Health Services	Colorado Springs
North Colorado Medical Center	Greeley
Poudre Valley Hospital	Fort Collins
Connecticut	
Danbury Hospital	Danbury
Hartford Hospital	Hartford
Hospital of Saint Raphael	New Haven
Yale-New Haven Hospital	New Haven
Delaware	
Christiana Care Health System - Christiana Hospital	Newark

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Continued…

HealthGrades 2009/2010 Women's Health Excellence Award™ Recipients*	City
Florida	
Baptist Hospital of Miami Inc	Miami
Baptist Medical Center	Jacksonville
Bay Medical Center	Panama City
Charlotte Regional Medical Center	Punta Gorda
Delray Medical Center	Delray Beach
Flagler Hospital	Saint Augustine
Florida Hospital Orlando	Orlando
including: Winter Park Memorial Hospital	Winter Park
Halifax Medical Center	Daytona Beach
Holmes Regional Medical Center	Melbourne
Holy Cross Hospital	Fort Lauderdale
JFK Medical Center	Atlantis
Largo Medical Center	Largo
Lawnwood Regional Medical Center and Heart Institute	Fort Pierce
Lee Memorial Hospital	Fort Myers
Mayo Clinic	Jacksonville
Mercy Hospital	Miami
Morton Plant Hospital	Clearwater
NCH Healthcare System	Naples
Ocala Regional Medical Center/West Marion Hospital	Ocala
Palm Beach Gardens Medical Center	Palm Beach Gardens
Regional Medical Center - Bayonet Point	Hudson
Sarasota Memorial Hospital	Sarasota
Georgia	
Memorial University Medical Center	Savannah
Northeast Georgia Medical Center	Gainesville
including: Northeast Georgia Medical Center - Lanier Park Campus	Gainesville
Piedmont Hospital	Atlanta
Illinois	
Advocate Good Samaritan Hospital	Downers Grove
Alexian Brothers Medical Center	Elk Grove Village
Central DuPage Hospital	Winfield
Evanston Hospital	Evanston
including: Highland Park Hospital	Highland Park
Mercy Hospital and Medical Center	Chicago
Northwest Community Hospital	Arlington Heights

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Continued…

HealthGrades 2009/2010 Women's Health Excellence Award™ Recipients*	City
Illinois...continued	
OSF Saint Anthony Medical Center	Rockford
Palos Community Hospital	Palos Heights
Provena Saint Joseph Medical Center	Joliet
Resurrection Medical Center	Chicago
Rush University Medical Center	Chicago
Saint Joseph Hospital	Chicago
Saint Mary and Elizabeth Medical Center - Division Campus	Chicago
Sherman Hospital	Elgin
Skokie Hospital	Skokie
Swedish Covenant Hospital	Chicago
Indiana	
Clarian Health Partners Incorporated	Indianapolis
including: Indiana University Medical Center	Indianapolis
Methodist Hospital Inc	Gary
including: Methodist Hospital - Southlake	Merrillville
Reid Hospital and Health Care Services	Richmond
Saint Joseph Regional Medical Center - South Bend	South Bend
Saint Margaret Mercy Healthcare Centers	Hammond
Saint Vincent Indianapolis Hospital	Indianapolis
The Community Hospital	Munster
Iowa	
Mercy Medical Center - Sioux City	Sioux City
Mercy Medical Center - Des Moines	Des Moines
Mercy Medical Center - North Iowa	Mason City
Saint Luke's Hospital	Cedar Rapids
Kansas	
Galichia Heart Hospital	Wichita
Providence Medical Center	Kansas City
Via Christi Regional Medical Center	Wichita
Kentucky	
Baptist Hospital East	Louisville
Jewish Hospital	Louisville
including: Saints Mary & Elizabeth Hospital	Louisville
Saint Joseph - London	London
St. Elizabeth Medical Center	Edgewood

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Continued…

HealthGrades 2009/2010 Women's Health Excellence Award™ Recipients*	City
Louisiana	
Southwest Medical Center	Lafayette
Willis Knighton Medical Center	Shreveport
Maryland	
Peninsula Regional Medical Center	Salisbury
Massachusetts	
North Shore Medical Center - Salem Hospital	Salem
including: North Shore Medical Center - Union Hospital	Lynn
Michigan	
Borgess Medical Center	Kalamazoo
including: Pipp Community Hospital	Plainwell
Bronson Methodist Hospital	Kalamazoo
Genesys Regional Medical Center	Grand Blanc
Henry Ford Macomb Hospital	Clinton Township
Munson Medical Center	Traverse City
Providence Hospital	Southfield
Sinai-Grace Hospital	Detroit
Spectrum Health Butterworth Hospital	Grand Rapids
including: Spectrum Health Blodgett Hospital	Grand Rapids
William Beaumont Hospital	Royal Oak
William Beaumont Hospital - Troy	Troy
Minnesota	
Fairview Southdale Hospital	Edina
Methodist Hospital	Minneapolis
North Memorial Health Care	Robbinsdale
Saint Luke's Hospital	Duluth
United Hospitals	Saint Paul
Missouri	
St. Luke's Hospital	Chesterfield
New Hampshire	
Dartmouth - Hitchcock Medical Center	Lebanon
New Jersey	
Hackensack University Medical Center	Hackensack
Jersey Shore University Medical Center	Neptune
Saint Barnabas Medical Center	Livingston
Valley Hospital	Ridgewood

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Continued…

HealthGrades 2009/2010 Women's Health Excellence Award™ Recipients*	City
New York	
Maimonides Medical Center	Brooklyn
North Shore University Hospital	Manhasset
including: North Shore University Hospital - Syosset	Syosset
University Hospital Stony Brook	Stony Brook
North Dakota	
Altru Hospital	Grand Forks
Saint Alexius Medical Center	Bismarck
Ohio	
Akron General Medical Center	Akron
Christ Hospital	Cincinnati
EMH Regional Medical Center	Elyria
Fairview Hospital	Cleveland
Good Samaritan Hospital	Cincinnati
Hillcrest Hospital	Mayfield Heights
Kettering Medical Center	Kettering
Lake Hospital	Painesville
Miami Valley Hospital	Dayton
Mount Carmel Health	Columbus
Parma Community General Hospital	Parma
Saint Elizabeth Health Center	Youngstown
Southwest General Health Center	Middleburg Heights
The Toledo Hospital	Toledo
Trumbull Memorial Hospital	Warren
Oregon	
Saint Charles Medical Center - Bend	Bend
Pennsylvania	
Conemaugh Valley Memorial Hospital	Johnstown
Easton Hospital	Easton
Hamot Medical Center	Erie
Lankenau Hospital	Wynnewood
Lancaster General Hospital	Lancaster
Lehigh Valley Hospital	Allentown
Mercy Hospital Scranton	Scranton
Saint Luke's Hospital	Bethlehem
including: Saint Luke's Hospital - Allentown Campus	Allentown
The Reading Hospital and Medical Center	Reading

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Continued…

HealthGrades 2009/2010 Women's Health Excellence Award™ Recipients*	City
Pennsylvania...continued	
Thomas Jefferson University Hospitals	Philadelphia
including: Methodist Hospital	Philadelphia
South Carolina	
AnMed Health	Anderson
South Dakota	
Sanford USD Medical Center	Sioux Falls
Tennessee	
Baptist Memorial Hospital	Memphis
Memorial Healthcare System	Chattanooga
Saint Thomas Hospital	Nashville
Texas	
Baptist Health System	San Antonio
including: Saint Luke's Lutheran Hospital	San Antonio
Christus Santa Rosa Healthcare - San Antonio	San Antonio
Doctors Hospital at Renaissance	Edinburg
Harlingen Medical Center	Harlingen
Rio Grande Regional Hospital	McAllen
Saint David's Medical Center	Austin
Saint Luke's Episcopal Hospital	Houston
Seton Medical Center	Austin
South Texas Health - McAllen Medical Center/Heart Hospital	McAllen
The Methodist Hospital	Houston
including: Diagnostic Center Hospital	Houston
Valley Baptist Medical Center	Harlingen
Utah	
St. Mark's Hospital	Salt Lake City
Virginia	
Bon Secours Memorial Regional Medical Center	Mechanicsville
Centra Health	Lynchburg
CJW Medical Center	Richmond
Henrico Doctors' Hospital - Forest	Richmond
including: Henrico Doctors' Hospital - Parham	Richmond
Inova Alexandria Hospital	Alexandria
Sentara Norfolk General Hospital	Norfolk

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Continued…

HealthGrades 2009/2010 Women's Health Excellence Award™ Recipients*	City
Washington	
Providence Regional Medical Center - Everett	Everett
West Virginia	
Charleston Area Medical Center	Charleston
Wisconsin	
Aspirus Wausau Hospital	Wausau
Bellin Memorial Hospital	Green Bay
Columbia Saint Mary's Hospital - Milwaukee	Milwaukee
including: Columbia Saint Mary's Hospital - Columbia	Milwaukee
Gundersen Lutheran Medical Center	La Crosse
Saint Joseph's Hospital	Marshfield

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

Patient Definitions	ICD-9 Procedure/Diagnosis Codes and Criteria
Maternity Care	
Cesarean Section with Single Birth	Procedure Codes: 74.0 74.1, 74.2, 74.4, 74.99 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: 37.5, 37.51, 37.52, 37.53, 37.54, 37.62, 37.63
Vaginal Delivery with Single Birth	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, V23.7, or V27.1 through V27.9; excluding patients with procedure codes: 37.5, 37.51, 37.52, 37.53, 37.54, 37.62, 37.63, or 74.0 through 74.99
Patient-choice C-section	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 73.0, 73.01, 73.09, 73.1, 73.4); and did not have a previous cesarean section (previous cesarean section diagnosis code: 654.21); and did not have any of the following diagnosis codes for these twelve clinical conditions: 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* 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).

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, v237, v31*, v32*, v33*, v34*, v35*, v36*, v37* 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, v237, v31*, v32*, v33*, v34*, v35*, v36*, v37* 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, v237, v31*, v32*, v33*, v34*, v35*, v36*, v37* 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, v237, v31*, v32*, v33*, v34*, v35*, v36*, v37* 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, v237, v31*, v32*, v33*, v34*, v35*, v36*, v37* 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, v237, v31*, v32*, v33*, v34*, v35*, v36*, v37* 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, v237, v31*, v32*, v33*, v34*, v35*, v36*, v37* 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* 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.

Patient Definitions	ICD-9 Procedure/Diagnosis Codes and Criteria
Back and Neck Surgery (Spinal Fusion)	Inclusions
	Principal Procedure: 81.00, 81.01, 81.02, 81.03, 81.04, 81.05, 81.06, 81.07, 81.08, 81.61, 81.62, 81.63, 81.64
	Exclusions
	Procedures (Primary or Secondary): 03.02, 37.51, 37.52, 37.53, 37.54, 37.5, 78.69, 81.3, 81.30, 81.31, 81.32, 81.33, 81.34, 81.35, 81.36, 81.37, 81.38, 81.39, 81.65, 81.66, 84.58, 84.59, 84.60, 84.61, 84.62, 84.63, 84.64, 84.65, 84.66, 84.67, 84.68, 84.69 Principal Diagnoses: 996.4, 996.40, 996.41, 996.42, 996.43, 996.44, 996.47, 996.49, 996.78 Diagnoses (Primary or Secondary): 198.5, 722.80, 722.81, 722.82, 722.83, 996.45, 996.46, V42.0, V42.1, V42.4, V42.6, V42.7, V42.81, V42.82, V42.83, V42.84, V42.89, V42.9, V45.4
Back and Neck Surgery (except Spinal Fusion)	Inclusions
	Principal Procedure: 03.09, 03.53, 80.50, 80.51, 80.59, 84.59, 84.60, 84.61, 84.62, 84.63, 84.64, 84.65
	Exclusions
	Procedures (Primary or Secondary): 03.02, 37.5, 37.51, 37.52, 37.53, 37.54, 78.49, 78.69, 81.00, 81.01, 81.02, 81.03, 81.04, 81.05, 81.06, 81.07, 81.08, 81.09, 81.3, 81.30, 81.31, 81.32, 81.33, 81.34, 81.35, 81.36, 81.37, 81.38, 81.39, 81.61, 81.62, 81.63, 81.64, 81.65, 81.66, 84.66, 84.67, 84.68, 84.69 Principal Diagnoses: 996.4, 996.40, 996.41, 996.42, 996.43, 996.44, 996.47, 996.49, 996.78 Diagnoses (Primary or Secondary): 198.5, 722.80, 722.81, 722.82, 722.83, 996.45, 996.46, V42.0, V42.1, V42.4, V45.4, V42.6, V42.7, V42.81, V42.82, V42.83, V42.84, V42.89, V42.9, V54.0, V54.01, V54.09
Carotid Surgery	Inclusions
	Principal Procedure: 00.61, 00.63, 38.12, 39.72, 39.74
	Exclusions
	Procedures (Primary or Secondary): 36.1, 36.10, 36.11, 36.12, 36.13, 36.14, 36.15, 36.16, 36.17, 36.19, 37.5, 37.51, 37.52, 37.53, 37.54, 37.62, 37.63, 38.08, 38.16, 38.18, 38.36, 39.24, 39.25, 39.29, 39.59, 39.90 Diagnoses (Primary or Secondary): 430, V42.0, V42.1, V42.4, V42.6, V42.7, V42.81, V42.82, V42.83, V42.84, V42.89, V42.9
Chronic Obstructive Pulmonary Disease (COPD)	Inclusions
	Principal Diagnosis: 491.1, 491.20, 491.21, 491.8, 491.9, 492.8, 493.20, 493.21, 493.22, 494, 494.0, 494.1, 496 Diagnosis (Primary or Secondary): 491.22
	Exclusions
	Procedures (Primary or Secondary): 37.5, 37.51, 37.52, 37.53, 37.54, 37.62, 37.63 Diagnoses (Primary or Secondary): 196.0, 196.1, 196.2, 196.3, 196.5, 196.6, 196.8, 196.9, 197.0, 197.1, 197.2, 197.3, 197.4, 197.5, 197.6, 197.7, 197.8, 198.0, 198.1, 198.2, 198.3, 198.4, 198.5, 198.6, 198.7, 198.8, 198.81, 198.82, 198.89, 480.3, 480.8, V42.0, V42.1, V42.4, V42.6, V42.7, V42.81, V42.82, V42.83, V42.84, V42.89, V42.9, V66.7

Patient Definitions	ICD-9 Procedure/Diagnosis Codes and Criteria
Coronary Bypass Surgery	Inclusions
	Principal Procedure: 36.10, 36.11, 36.12, 36.13, 36.14, 36.15, 36.16, 36.19
	Exclusions
	Procedures (Primary or Secondary): 35.1, 35.10, 35.11, 35.12, 35.13, 35.14, 35.2, 35.20, 35.21, 35.22, 35.23, 35.24, 35.25, 35.26, 35.27, 35.28, 35.55, 36.33, 36.34, 37.5, 37.51, 37.52, 37.53, 37.54, 37.62, 37.63, 38.12, 38.34, 38.44, 38.64, 39.71, 44.12 Diagnoses (Primary or Secondary): 414.06, 414.07, 441.00, 441.01, 441.02, 441.03, V42.0, V42.1, V42.4, V42.6, V42.7, V42.81, V42.82, V42.83, V42.84, V42.89, V42.9
Coronary Interventional Procedures	Inclusions
	Principal Procedure: 00.66, 36.01, 36.02, 36.05, 36.06, 36.07, 36.09
	Exclusions
	Procedures (Primary or Secondary): 35.1, 35.10, 35.11, 35.12, 35.13, 35.14, 35.2, 35.20, 35.21, 35.22, 35.23, 35.24, 35.25, 35.26, 35.27, 35.28, 36.10, 36.11, 36.12, 36.13, 36.14, 36.15, 36.16, 36.19, 37.5, 37.51, 37.52, 37.53, 37.54, 37.62, 37.63 Diagnoses (Primary or Secondary): 414.06, 414.07, V42.0, V42.1, V42.4, V42.6, V42.7, V42.81, V42.82, V42.83, V42.84, V42.89, V42.9
Heart Attack	Inclusions
	Principal Diagnosis: 410.01, 410.11, 410.21, 410.31, 410.41, 410.51, 410.61, 410.71, 410.81, 410.91
	Exclusions
	Procedures (Primary or Secondary): 37.5, 37.51, 37.52, 37.53, 37.54, 37.62, 37.63 Diagnoses (Primary or Secondary): 196.0, 196.1, 196.2, 196.3, 196.5, 196.6, 196.8, 196.9, 197.0, 197.1, 197.2, 197.3, 197.4, 197.5, 197.6, 197.7, 197.8, 198.0, 198.1, 198.2, 198.3, 198.4, 198.5, 198.6, 198.7, 198.8, 198.81, 198.82, 198.89, 414.06, 414.07, V42.0, V42.1, V42.4, V42.6, V42.7, V42.81, V42.82, V42.83, V42.84, V42.89, V42.9, V66.7
Heart Failure	Inclusions
	Principal Diagnosis: 398.91, 402.01, 402.11, 402.91, 404.01, 404.03, 404.11, 404.13, 404.91, 404.93, 428.0, 428.1, 428.2, 428.20, 428.21, 428.22, 428.23, 428.3, 428.30, 428.31, 428.32, 428.33, 428.4, 428.40, 428.41, 428.42, 428.43, 428.9
	Exclusions
	Procedures (Primary or Secondary): 37.5, 37.51, 37.52, 37.53, 37.54, 37.62, 37.63, 39.95 Diagnoses (Primary or Secondary): 196.0, 196.1, 196.2, 196.3, 196.5, 196.6, 196.8, 196.9, 197.0, 197.1, 197.2, 197.3, 197.4, 197.5, 197.6, 197.7, 197.8, 198.0, 198.1, 198.2, 198.3, 198.4, 198.5, 198.6, 198.7, 198.8, 198.81, 198.82, 198.89, 414.06, 414.07, V42.0, V42.1, V42.4, V42.6, V42.7, V42.81, V42.82, V42.83, V42.84, V42.89, V42.9, V66.7

Patient Definitions	ICD-9 Procedure/Diagnosis Codes and Criteria
Hip Fracture Repair	Inclusions
	Principal Procedure: 79.05, 79.15, 79.25, 79.35, 81.52
	Exclusions
	Procedures (Primary or Secondary): 00.85, 37.51, 37.52, 37.53, 37.54, 37.5, 78.65, 78.66, 78.67, 80.05, 80.06, 81.54, 81.55 Procedures (Secondary): 81.51, 81.53 Principal Diagnoses: 996.4, 996.40, 996.41, 996.42, 996.43, 996.44, 996.47, 996.49, 996.78 Diagnoses (Primary or Secondary): 800.6, 820.9, 820.10, 820.11, 820.12, 820.13, 820.19, 820.20, 820.30, 820.31, 820.32, 821.00, 821.01, 821.1, 821.10, 821.11, 821.2, 821.20,821.21, 821.22, 821.23, 821.29, 821.3, 821.30, 821.31, 821.32, 821.33, 821.39, 996.45, 996.46, V42.0, V42.1, V42.4, V42.6, V42.7, V42.81, V42.82, V42.83, V42.84, V42.89, V42.9, V66.7 Diagnoses (Secondary *when occurs with V1588, V424, V4364, V4365, V454, V5401, V5402, V5409*): 996.4, 996.40, 996.41, 996.42, 996.43, 996.44, 996.47, 996.49
Peripheral Vascular Bypass	Inclusions
	Principal Procedure: 39.29 Principal Diagnosis: 250.60, 250.61, 250.62, 250.63, 250.70, 250.71, 250.72, 250.73, 250.80, 250.81, 250.82, 250.83, 440.20, 440.21, 440.22, 440.23, 440.24, 440.29, 440.30, 440.32, 442.2, 442.3, 443.89, 443.9, 444.22, 444.81, 445.02, 447.1, 681.10, 682.6, 682.7, 686.8, 707.10, 707.12, 707.13, 707.14, 707.15, 707.19, 707.8, 730.06, 730.07, 730.16, 730.17, 730.18, 730.26, 730.27, 785.4, 902.53, 904.41
	Exclusions
	Procedures (Primary or Secondary): 37.5, 37.51, 37.52, 37.53, 37.54, 37.62, 37.63, 39.25, 39.49 Principal Diagnoses: 445.01, 996.74 Diagnoses (Primary or Secondary): 440.31, V42.0, V42.1, V42.4, V42.6, V42.7, V42.81, V42.82, V42.83, V42.84, V42.89, V42.9
Pneumonia	Inclusions
	Principal Diagnosis: 481, 482.0, 482.1, 482.2, 482.30, 482.31, 482.32, 482.39, 482.40, 482.41, 482.49, 482.81, 482.82, 482.83, 482.84, 482.89, 482.9, 483.0, 483.1, 483.8, 485, 486, 487.0
	Exclusions
	Procedures (Primary or Secondary): 37.5, 37.51, 37.52, 37.53, 37.54, 37.62, 37.63 Diagnoses (Primary or Secondary): 196.0, 196.1, 196.2, 196.3, 196.5, 196.6, 196.8, 196.9, 197.0, 197.1, 197.2, 197.3, 197.4, 197.5, 197.6, 197.7, 197.8, 198.0, 198.1, 198.2, 198.3, 198.4, 198.5, 198.6, 198.7, 198.8, 198.81, 198.82, 198.89, 480.3, V42.0, V42.1, V42.4, V42.6, V42.7, V42.81, V42.82, V42.83, V42.84, V42.89, V42.9, V66.7
Resection / Replacement of Abdominal Aorta	Inclusions
	Principal Procedure: 38.34, 38.44, 38.64, 39.71
	Exclusions
	Procedures (Primary or Secondary): 00.61, 35.10, 35.11, 35.12, 35.13, 35.14, 35.20, 35.21, 35.22, 35.23, 35.24, 35.25, 35.26, 35.27, 35.28, 36.1, 36.10, 36.11, 36.12, 36.13, 36.14, 36.15, 36.16, 36.17, 36.19, 37.5, 37.51, 37.52, 37.53, 37.54, 37.62, 37.63, 38.08, 38.16, 38.18, 38.36, 38.45, 39.24, 39.25, 39.29, 39.50, 39.59 Procedures (Secondary only): 38.34, 38.44, 38.64, 39.71 Diagnoses (Primary or Secondary): 441.00, 441.01, 441.02, 441.03, 441.1, 441.2, 441.6, 441.7, 441.9, V42.0, V42.1, V42.4, V42.6, V42.7, V42.81, V42.82, V42.83, V42.84, V42.89, V42.9

Patient Definitions	ICD-9 Procedure/Diagnosis Codes and Criteria
Stroke	Inclusions
	Principal Diagnosis: 430, 431, 432.9, 433.01, 433.11, 433.21, 433.31, 433.81, 433.91, 434.01, 434.11, 434.91, 436
	Exclusions
	Procedures (Primary or Secondary): 37.5, 37.51, 37.52, 37.53, 37.54, 37.62, 37.63 Diagnoses (Primary or Secondary): 196.0, 196.1, 196.2, 196.3, 196.5, 196.6, 196.8, 196.9, 197.0, 197.1, 197.2, 197.3, 197.4, 197.5, 197.6, 197.7, 197.8, 198.0, 198.1, 198.2, 198.3, 198.4, 198.5, 198.6, 198.7, 198.8, 198.81, 198.82, 198.89, 432.1, V42.0, V42.1, V42.4, V42.6, V42.7, V42.81, V42.82, V42.83, V42.84, V42.89, V42.9, V66.7
Total Hip Replacement	Inclusions
	Principal Procedure: 00.85, 00.86, 00.87, 81.51
	Exclusions
	Procedures (Primary or Secondary): 00.70, 00.71, 00.72, 00.73, 00.80, 00.81, 00.82, 00.83, 00.84, 37.5, 37.51, 37.52, 37.53, 37.54, 78.65, 78.67, 80.05, 80.06, 81.53, 81.54, 81.55 Diagnoses (Primary only): 996.4, 996.40, 996.41, 996.42, 996.43, 996.44, 996.47, 996.49, 996.78 Diagnoses (Primary or Secondary): 820.09, 820.8, 996.45, 996.46, E800, E800.0, E800.1, E800.2, E800.3, E800.8, E800.9, E801, E801.0, E801.1, E801.2, E801.3, E801.8, E801.9, E802, E802.0, E802.1, E802.2, E802.3, E802.8, E802.9, E803, E803.0, E803.1, E803.2, E803.3, E803.8, E803.9, E804, E804.0, E804.1, E804.2, E804.3, E804.8, E804.9, E805, E805.0, E805.1, E805.2, E805.3, E805.8, E805.9, E806, E806.0, E806.1, E806.2, E806.3, E806.8, E806.9, E807, E807.0, E807.1, E807.2, E807.3, E807.8, E807.9, E810, E810.0, E810.1, E810.2, E810.3, E810.4, E810.5, E810.6, E810.7, E810.8, E810.9, E811, E811.0, E811.1, E811.2, E811.3, E811.4, E811.5, E811.6, E811.7, E811.8, E811.9, E812, E812.0, E812.1, E812.2, E812.3, E812.4, E812.5, E812.6, E812.7, E812.8, E812.9, E813, E813.0, E813.1, E813.2, E813.3, E813.4, E813.5, E813.6, E813.7, E813.8, E813.9, E814, E814.0, E814.1, E814.2, E814.3, E814.4, E814.5, E814.6, E814.7, E814.8, E814.9, E815, E815.0, E815.1, E815.2, E815.3, E815.4, E815.5, E815.6, E815.7, E815.8, E815.9, E816, E816.0, E816.1, E816.2, E816.3, E816.4, E816.5, E816.6, E816.7, E816.8, E816.9, E817, E817.0, E817.1, E817.2, E817.3, E817.4, E817.5, E817.6, E817.7, E817.8, E817.9, E818, E818.0, E818.1, E818.2, E818.3, E818.4, E818.5, E818.6, E818.7, E818.8, E818.9, E819, E819.0, E819.1, E819.2, E819.3, E819.4, E819.5, E819.6, E819.7, E819.8, E819.9, E820, E820.0, E820.1, E820.2, E820.3, E820.4, E820.5, E820.6, E820.7, E820.8, E820.9, E821, E821.0, E821.1, E821.2, E821.3, E821.4, E821.5, E821.6, E821.7, E821.8, E821.9, E822, E822.0, E822.1, E822.2, E822.3, E822.4, E822.5, E822.6, E822.7, E822.8, E822.9, E823, E823.0, E823.1, E823.2, E823.3, E823.4, E823.5, E823.6, E823.7, E823.8, E823.9, E824, E824.0, E824.1, E824.2, E824.3, E824.4, E824.5, E824.6, E824.7, E824.8, E824.9, E825, E825.0, E825.1, E825.2, E825.3, E825.4, E825.5, E825.6, E825.7, E825.8, E825.9, E826, E826.0, E826.1, E826.2, E826.3, E826.4, E826.8, E826.9, E827, E827.0, E827.2, E827.3, E827.4, E827.8, E827.9, E828, E828.0, E828.2, E828.4, E828.8, E828.9, E829, E829.0, E829.4, E829.8, E829.9, E830, E830.0, E830.1, E830.2, E830.3, E830.4, E830.5, E830.6, E830.8, E830.9, E831, E831.0, E831.1, E831.2, E831.3, E831.4, E831.5, E831.6, E831.8, E831.9, E832, E832.0, E832.1, E832.2, E832.3, E832.4, E832.5, E832.6, E832.8, E832.9, E833, E833.0, E833.1, E833.2, E833.3, E833.4, E833.5, E833.6, E833.8, E833.9, E834, E834.0, E834.1, E834.2, E834.3, E834.4, E834.5, E834.6, E834.8, E834.9, E835, E835.0, E835.1, E835.2, E835.3, E835.4, E835.5, E835.6, E835.8, E835.9, E836, E836.0, E836.1, E836.2, E836.3, E836.4, E836.5, E836.6, E836.8, E836.9, E837, E837.0, E837.1, E837.2, E837.3, E837.4, E837.5, E837.6, E837.8, E837.9, E838, E838.0, E838.1, E838.2, E838.3, E838.4, E838.5, E838.6, E838.8, E838.9, E840, E840.0, E840.1, E840.2, E840.3, E840.4, E840.5, E840.6, E840.7, E840.8, E840.9, E841, E841.0, E841.1, E841.2, E841.3, E841.4, E841.5, E841.6, E841.7, E841.8, E841.9, E842, E842.6,

	E842.7, E842.8, E842.9, E843, E843.0, E843.1, E843.2, E843.3, E843.4, E843.5, E843.6, E843.7, E843.8, E843.9, E844, E844.0, E844.1, E844.2, E844.3, E844.4, E844.5, E844.6, E844.7, E844.8, E844.9, E845, E845.0, E845.8, E845.9, E846, E847, E848, E849, E849.0, E849.1, E849.2, E849.3, E849.4, E849.5, E849.6, E849.7, E849.8, E849.9, E880, E880.0, E880.1, E880.9, E881, E881.0, E881.1, E882, E883, E883.0, E883.1, E883.2, E883.9, E884, E884.0, E884.1, E884.2, E884.3, E884.4, E884.5, E884.6, E884.9, E885, E885.0, E885.1, E885.2, E885.3, E885.4, E885.9, E886, E886.0, E886.9, E887, E888, E888.0, E888.1, E888.8, E888.9, E890.0, E890.8, E891.0, E891.8, E916, E917.0, E917.1, E917.2, E917.3, E917.4, E917.5, E917.6, E917.7, E917.8, E917.9, E918, E919.0, E919.1, E919.2, E919.3, E919.4, E919.5, E919.6, E919.7, E919.8, E919.9, E920, E920.0, E920.1, E920.2, E920.3, E920.4, E920.5, E920.8, E920.9, E921, E921.0, E921.1, E921.8, E921.9, E922, E922.0, E922.1, E922.2, E922.3, E922.4, E922.5, E922.8, E922.9, E923, E923.0, E923.1, E923.2, E923.8, E923.9, E928.8, E928.9, E929, E929.0, E929.1, E929.2, E929.3, E929.4, E929.5, E929.8, E929.9, E955.0, E955.1, E955.2, E955.3, E955.4, E955.5, E955.6, E955.7, E955.9, E956, E957.0, E957.1, E957.2, E957.9, E958.0, E958.5, E958.6, E960.0, E965.0, E965.1, E965.2, E965.3, E965.4, E965.5, E965.6, E965.7, E965.8, E965.9, E966, E968.1, E968.2, E968.5, E968.6, E969, E970, E971, E973, E974, E977, E985, E985.0, E985.1, E985.2, E985.3, E985.4, E985.5, E985.6, E985.7, E986, E987, E987.0, E987.1, E987.2, E987.9, E988, E988.0, E988.5, E988.6, E989, V15.5, V42.0, V42.1, V42.4, V42.6, V42.7, V42.81, V42.82, V42.83, V42.84, V42.89, V42.9, V58.43, V58.49
Total Knee Replacement	Inclusions
	Principal Procedure: 81.54
	Exclusions
	Procedures (Primary or Secondary): 00.74, 00.75, 00.76, 00.80, 00.81, 00.82, 00.83, 00.84, 37.5, 37.51, 37.52, 37.53, 37.54, 78.65, 78.67, 80.05, 80.06, 81.51, 81.52, 81.53, 81.55 Principal Diagnoses: 996.4, 996.40, 996.41, 996.42, 996.43, 996.44, 996.47, 996.49, 996.78 Diagnoses (Primary or Secondary): 996.45, 996.46, V42.0, V42.1, V42.4, V42.6, V42.7, V42.81, V42.82, V42.83, V42.84, V42.89, V42.9
Valve Replacement Surgery	Inclusions
	Procedures (Primary or Secondary): 35.20, 35.21, 35.22, 35.23, 35.24, 35.25, 35.26, 35.27, 35.28
	Exclusions
	Procedures (Primary or Secondary): 35.55, 36.33, 36.34, 37.5, 37.51, 37.52, 37.53, 37.54, 37.62, 37.63, 38.12, 38.34, 38.44, 38.64, 39.71, 44.12 Diagnoses (Primary or Secondary): 414.06, 414.07, 441.00, 441.01, 441.02, 441.03, 441.2, V42.0, V42.1, V42.4, V42.6, V42.7, V42.81, V42.82, V42.83, V42.84, V42.89, V42.9

Appendix I: Major Complications

Major Complications – Maternity Care Vaginal Delivery

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

Major Complications – Maternity Care C-section Delivery

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

Major Complications – Back and Neck Surgery (Spinal Fusion)

Major Complications – Back and Neck Surgery (Spinal Fusion)			
038	SEPTICEMIA	482.32	GROUP B STREP PNEUMONIA
038.0	STREPTOCOCCAL SEPTICEMIA	482.39	STREP PNEUMONIA NEC
038.1	STAPH SEPTICEMIA	482.4	STAPHYLOCOCCAL PNEUMONIA
038.10	STAPH SEPTICEMIA NOS	482.40	STAPH PNEUMONIA NOS
038.11	STAPH AUREUS SEPTICEMIA	482.41	STAPH AUREUS PNEUMONIA
038.19	STAPH SEPTICEMIA NEC	482.49	STAPH PNEUMONIA NEC
038.2	PNEUMOCOCCAL SEPTICEMIA	482.81	PNEUMONIA D/T ANAEROBES
038.3	ANAEROBIC SEPTICEMIA	482.82	E. COLI PNEUMONIA
038.4	GRAM-NEG SEPTICEMIA NEC	482.83	GRAM-NEG PNEUMONIA NEC
038.40	GRAM-NEG SEPTICEMIA NOS	482.84	LEGIONNAIRES' DISEASE
038.41	H. INFLUENZAE SEPTICEMIA	482.89	BACTERIAL PNEUMONIA NEC
038.42	E. COLI SEPTICEMIA	482.9	BACTERIAL PNEUMONIA NOS
038.43	PSEUDOMONAS SEPTICEMIA	483	PNEUMONIA ORGANISM NEC
038.44	SERRATIA SEPTICEMIA	483.0	M. PNEUMONIAE PNEUMONIA
038.49	GRAM-NEG SEPTICEMIA NEC	483.1	CHLAMYDIAL PNEUMONIA
038.8	SEPTICEMIA NEC	483.8	PNEUMONIA D/T ORG NEC
038.9	SEPTICEMIA NOS	484	PNEUM IN OTH INF DIS
292.81	DRUG-INDUCED DELIRIUM	484.1	PNEUMONIA IN CMV DISEASE
293.0	DELIRIUM D/T CCE	484.3	PNEUMONIA IN WHOOP COUGH
410.01	ANTEROLAT AMI-INITIAL	484.5	PNEUMONIA IN ANTHRAX
410.11	ANT AMI NEC-INITIAL	484.6	PNEUM IN ASPERGILLOSIS
410.21	INFEROLAT AMI-INITIAL	484.7	PNEUM IN SYST MYCOSESNEC
410.31	INFEROPOST AMI-INITIAL	484.8	PNEUM IN INFECT DIS NEC
410.41	INF AMI NEC-INITIAL	485	BRONCHOPNEUMONIA ORG NOS
410.51	LAT AMI NEC-INITIAL	486	PNEUMONIA ORGANISM NOS
410.61	POSTERIOR AMI-INITIAL	507.0	FOOD/VOMIT PNEUMONITIS
410.71	SUBEND INFARCT-INITIAL	511.9	PLEURAL EFFUSION NOS
410.81	AMI NEC-INITIAL EPISODE	518.5	POSTTR PULMON INSUFF
410.91	AMI NOS-INITIAL EPISODE	518.7	TRALI
415.11	IATRO PULM EMBOL/INFARCT	518.81	AC RESPIRATORY FAILURE
415.19	PULMON EMBOL/INFARCT NEC	584.5	AC RF W TUBULAR NEPHR
480	VIRAL PNEUMONIA	584.8	ACUTE RENAL FAILURE NEC
480.0	ADENOVIRAL PNEUMONIA	584.9	ACUTE RENAL FAILURE NOS
480.1	RSV PNEUMONIA	995.91	SEPSIS
480.2	PARINFLUENZA VIRAL PNEUM	995.92	SEVERE SEPSIS
480.3	SARS PNEUMONIA	996.4	MECH COMP INT ORTH DEV
480.8	VIRAL PNEUMONIA NEC	996.40	MECH COMP INT ORTH NOS
480.9	VIRAL PNEUMONIA NOS	996.42	DISLOCATION JOINT PROSTH
481	PNEUMOCOCCAL PNEUMONIA	996.41	MECH LOOSENING JT PROSTH
482	OTHER BACT PNEUMONIA	996.43	PROSTH JOINT FAILURE
482.0	K. PNEUMONIAE PNEUMONIA	996.44	PERI-PROSTHETIC FRACTURE
482.1	PSEUDOMONAL PNEUMONIA	996.47	MECH COMP JT PROSTH NEC
482.2	H. INFLUENZAE PNEUMONIA	996.49	MECH COMP INT ORTH NEC
482.3	STREPTOCOCCAL PNEUMONIA	996.77	COMP NEC D/T JT PROSTH
482.4	PNEUMONIA-STAPHYLOCOCCUS	996.78	COMP NEC ORTH DEV NEC
482.30	STREP PNEUMONIA NOS	997.02	IATROGEN CV INFARCT/HEM
482.31	GROUP A STREP PNEUMONIA	997.09	NERV SYST SURG COMP NEC

Major Complications – Back and Neck Surgery (Spinal Fusion) (continued)

Major Complications – Back and Neck Surgery (Spinal Fusion) continued			
997.1	SURG COMP-HEART	998.2	ACCIDENTAL OP LACERATION
997.3	SURG COMP-RESP NEC	998.3	POSTOP WOUND DISRUPTION
997.4	SURG COMP-DIGESTIVE	998.31	DISRUPT INTERNAL OP WND
997.5	SURG COMP-URINARY NEC	998.32	DISRUPT EXTERNAL OP WND
998.0	POSTOPERATIVE SHOCK	998.59	POSTOP INFECTION NEC
998.11	HEMORRHAGE COMP PX		

Dependent Complications – Back and Neck Surgery (Spinal Fusion)

Must occur with 997.1 Cardiac Complications			
427.0	PSVT	428.23	AC & CHR SYSTOLIC HF
427.1	PVT	428.3	DIASTOLIC HEART FAILURE
427.31	ATRIAL FIBRILLATION	428.30	DIASTOLIC HF NOS
427.32	ATRIAL FLUTTER	428.31	ACUTE DIASTOLIC HF
427.89	OTH CARDIAC DYSRHYTHMIAS	428.33	AC & CHR DIASTOLIC HF
427.9	CARDIAC DYSRHYTHMIA NOS	428.4	SYSTOLIC & DIASTOLIC HF
428.0	CHF NOS	428.40	SYS & DIASTOLIC HF NOS
428.1	LEFT HEART FAILURE	428.41	AC SYS & DIASTOLIC HF
428.2	SYSTOLIC HEART FAILURE	428.43	ACCHR SYS & DIASTOLIC HF
428.20	SYSTOLIC HF NOS	428.9	HEART FAILURE NOS
428.21	ACUTE SYSTOLIC HF		
Must occur with 997.4 Digestive System Complications			
560.1	PARALYTIC ILEUS		
Must occur with 997.5 Urinary Complications			
593.9	RENAL/URETER DISORD NOS	788.20	RETENTION OF URINE NOS
599.0	URINARY TRACT INF NOS	788.29	RETENTION OF URINE NEC

Major Complications – Back and Neck Surgery (except Spinal Fusion)

Major Complications – Back and Neck Surgery (except Spinal Fusion)			
038	SEPTICEMIA	482.8	BACTERIAL PNEUMONIA NEC
038.0	STREPTOCOCCAL SEPTICEMIA	482.81	PNEUMONIA D/T ANAEROBES
038.1	STAPH SEPTICEMIA	482.82	E. COLI PNEUMONIA
038.10	STAPH SEPTICEMIA NOS	482.83	GRAM-NEG PNEUMONIA NEC
038.11	STAPH AUREUS SEPTICEMIA	482.84	LEGIONNAIRES' DISEASE
038.19	STAPH SEPTICEMIA NEC	482.89	BACTERIAL PNEUMONIA NEC
038.2	PNEUMOCOCCAL SEPTICEMIA	482.9	BACTERIAL PNEUMONIA NOS
038.3	ANAEROBIC SEPTICEMIA	483	PNEUMONIA ORGANISM NEC
038.4	GRAM-NEG SEPTICEMIA NEC	483.0	M. PNEUMONIAE PNEUMONIA
038.40	GRAM-NEG SEPTICEMIA NOS	483.1	CHLAMYDIAL PNEUMONIA
038.41	H. INFLUENZAE SEPTICEMIA	483.8	PNEUMONIA D/T ORG NEC
038.42	E. COLI SEPTICEMIA	484	PNEUM IN OTH INF DIS
038.43	PSEUDOMONAS SEPTICEMIA	484.1	PNEUMONIA IN CMV DISEASE
038.44	SERRATIA SEPTICEMIA	484.3	PNEUMONIA IN WHOOP COUGH
038.49	GRAM-NEG SEPTICEMIA NEC	484.5	PNEUMONIA IN ANTHRAX
038.8	SEPTICEMIA NEC	484.6	PNEUM IN ASPERGILLOSIS
038.9	SEPTICEMIA NOS	484.7	PNEUM IN SYST MYCOSESNEC
292.81	DRUG-INDUCED DELIRIUM	484.8	PNEUM IN INFECT DIS NEC
293.0	DELIRIUM D/T CCE	485	BRONCHOPNEUMONIA ORG NOS
410.01	ANTEROLAT AMI-INITIAL	486	PNEUMONIA ORGANISM NOS
410.11	ANT AMI NEC-INITIAL	507.0	FOOD/VOMIT PNEUMONITIS
410.21	INFEROLAT AMI-INITIAL	511.9	PLEURAL EFFUSION NOS
410.31	INFEROPOST AMI-INITIAL	518.5	POSTTR PULMON INSUFF
410.41	INF AMI NEC-INITIAL	518.7	TRALI
410.51	LAT AMI NEC-INITIAL	518.81	AC RESPIRATORY FAILURE
410.61	POSTERIOR AMI-INITIAL	584.5	AC RF W TUBULAR NEPHR
410.71	SUBEND INFARCT-INITIAL	584.8	ACUTE RENAL FAILURE NEC
410.81	AMI NEC-INITIAL EPISODE	584.9	ACUTE RENAL FAILURE NOS
410.91	AMI NOS-INITIAL EPISODE	995.91	SEPSIS
480	VIRAL PNEUMONIA	995.92	SEVERE SEPSIS
480.0	ADENOVIRAL PNEUMONIA	996.4	MECH COMP INT ORTH DEV
480.1	RSV PNEUMONIA	996.40	MECH COMP INT ORTH NOS
480.2	PARINFLUENZA VIRAL PNEUM	996.41	MECH LOOSENING JT PROSTH
480.3	SARS PNEUMONIA	996.42	DISLOCATION JOINT PROSTH
480.8	VIRAL PNEUMONIA NEC	996.43	PROSTH JOINT FAILURE
480.9	VIRAL PNEUMONIA NOS	996.44	PERI-PROSTHETIC FRACTURE
481	PNEUMOCOCCAL PNEUMONIA	996.47	MECH COMP JT PROSTH NEC
482	OTHER BACT PNEUMONIA	996.49	MECH COMP INT ORTH NEC
482.0	K. PNEUMONIAE PNEUMONIA	996.77	COMP NEC D/T JT PROSTH
482.1	PSEUDOMONAL PNEUMONIA	996.78	COMP NEC ORTH DEV NEC
482.2	H. INFLUENZAE PNEUMONIA	997.00	NERV SYST SURG COMP NOS
482.3	STREPTOCOCCAL PNEUMONIA	997.02	IATROGEN CV INFARCT/HEM
482.30	STREP PNEUMONIA NOS	997.09	NERV SYST SURG COMP NEC
482.31	GROUP A STREP PNEUMONIA	997.1	SURG COMP-HEART
482.32	GROUP B STREP PNEUMONIA	997.3	SURG COMP-RESP NEC
482.39	STREP PNEUMONIA NEC	997.4	SURG COMP-DIGESTIVE
482.4	STAPHYLOCOCCAL PNEUMONIA	997.5	SURG COMP-URINARY NEC
482.40	STAPH PNEUMONIA NOS	998.11	HEMORRHAGE COMP PX
482.41	STAPH AUREUS PNEUMONIA	998.2	ACCIDENTAL OP LACERATION
482.49	STAPH PNEUMONIA NEC	998.59	POSTOP INFECTION NEC

Dependent Complications – Back and Neck Surgery (except Spinal Fusion)

Must occur with 997.1 Cardiac Complications			
427.0	PSVT	428.23	AC & CHR SYSTOLIC HF
427.1	PVT	428.3	DIASTOLIC HEART FAILURE
427.31	ATRIAL FIBRILLATION	428.30	DIASTOLIC HF NOS
427.89	OTH CARDIAC DYSRHYTHMIAS	428.31	ACUTE DIASTOLIC HF
427.9	CARDIAC DYSRHYTHMIA NOS	428.33	AC & CHR DIASTOLIC HF
428.0	CHF NOS	428.4	SYSTOLIC & DIASTOLIC HF
428.1	LEFT HEART FAILURE	428.40	SYS & DIASTOLIC HF NOS
428.2	SYSTOLIC HEART FAILURE	428.41	AC SYS & DIASTOLIC HF
428.20	SYSTOLIC HF NOS	428.9	HEART FAILURE NOS
428.21	ACUTE SYSTOLIC HF		
Must occur with 997.4 Digestive System Complications			
560.1	PARALYTIC ILEUS		
Must occur with 997.5 Urinary Complications			
593.9	KIDNEY & URETER DIS, NOS	788.20	RETENTION OF URINE, NOS
599.0	URINARY TRACT INF NOS	788.29	RETENTION OF URINE, NEC

Major Complications – Carotid Surgery

Major Complications – Carotid Surgery			
410.01	ANTEROLAT AMI-INITIAL	482.89	BACTERIAL PNEUMONIA NEC
410.11	ANT AMI NEC-INITIAL	482.9	BACTERIAL PNEUMONIA NOS
410.21	INFEROLAT AMI-INITIAL	483	PNEUMONIA ORGANISM NEC
410.51	LAT AMI NEC-INITIAL	483.0	M. PNEUMONIAE PNEUMONIA
410.61	POSTERIOR AMI-INITIAL	483.1	CHLAMYDIAL PNEUMONIA
410.71	SUBEND INFARCT-INITIAL	483.8	PNEUMONIA D/T ORG NEC
410.81	AMI NEC-INITIAL EPISODE	484	PNEUM IN OTH INF DIS
410.91	AMI NOS-INITIAL EPISODE	484.1	PNEUMONIA IN CMV DISEASE
427.5	CARDIAC ARREST	484.3	PNEUMONIA IN WHOOP COUGH
480	VIRAL PNEUMONIA	484.5	PNEUMONIA IN ANTHRAX
480.0	ADENOVIRAL PNEUMONIA	484.6	PNEUM IN ASPERGILLOSIS
480.1	RSV PNEUMONIA	484.7	PNEUM IN SYST MYCOSESNEC
480.2	PARINFLUENZA VIRAL PNEUM	484.8	PNEUM IN INFECT DIS NEC
480.3	SARS PNEUMONIA	485	BRONCHOPNEUMONIA ORG NOS
480.8	VIRAL PNEUMONIA NEC	486	PNEUMONIA ORGANISM NOS
480.9	VIRAL PNEUMONIA NOS	507.0	FOOD/VOMIT PNEUMONITIS
481	PNEUMOCOCCAL PNEUMONIA	518.5	POSTTR PULMON INSUFF
482	OTHER BACT PNEUMONIA	518.7	TRALI
482.0	K. PNEUMONIAE PNEUMONIA	518.81	AC RESPIRATORY FAILURE
482.1	PSEUDOMONAL PNEUMONIA	780.01	COMA
482.2	H. INFLUENZAE PNEUMONIA	951.7	INJURY HYPOGLOSSAL NERVE
482.3	STREPTOCOCCAL PNEUMONIA	957.1	INJURY TO NERVE NEC
482.30	STREP PNEUMONIA NOS	997.00	NERV SYST SURG COMP NOS
482.31	GROUP A STREP PNEUMONIA	997.01	CNS SURG COMP
482.32	GROUP B STREP PNEUMONIA	997.02	IATROGEN CV INFARCT/HEM
482.39	STREP PNEUMONIA NEC	997.09	NERV SYST SURG COMP NEC
482.4	STAPHYLOCOCCAL PNEUMONIA	997.1	SURG COMP-HEART
482.40	STAPH PNEUMONIA NOS	997.3	SURG COMP-RESP NEC
482.41	STAPH AUREUS PNEUMONIA	997.4	SURG COMP-DIGESTIVE
482.49	STAPH PNEUMONIA NEC	997.5	SURG COMP-URINARY NEC
482.8	BACTERIAL PNEUMONIA NEC	997.91	SURG COMP-HYPERTENSION
482.81	PNEUMONIA D/T ANAEROBES	998.0	POSTOPERATIVE SHOCK
482.82	E. COLI PNEUMONIA	998.11	HEMORRHAGE COMP PX
482.83	GRAM-NEG PNEUMONIA NEC	998.2	ACCIDENTAL OP LACERATION
482.84	LEGIONNAIRES' DISEASE	998.59	POSTOP INFECTION NEC

Dependent Complications – Carotid Surgery

Must occur with 997.02 Nervous System Complications			
434.11	CEREBRAL EMBOLISM-INFRCT	434.91	CEREBR ART OCCL-INFARCTN
Must occur with 997.1 Cardiac Complications			
427.1	PVT	428.3	DIASTOLIC HEART FAILURE
427.31	ATRIAL FIBRILLATION	428.30	DIASTOLIC HF NOS
427.89	OTH CARDIAC DYSRHYTHMIAS	428.31	ACUTE DIASTOLIC HF
428.0	CHF NOS	428.33	AC & CHR DIASTOLIC HF
428.1	LEFT HEART FAILURE	428.4	SYSTOLIC & DIASTOLIC HF
428.2	SYSTOLIC HEART FAILURE	428.40	SYS & DIASTOLIC HF NOS
428.20	SYSTOLIC HF NOS	428.41	AC SYS & DIASTOLIC HF
428.21	ACUTE SYSTOLIC HF	428.43	ACCHR SYS & DIASTOLIC HF
428.23	AC & CHR SYSTOLIC HF	428.9	HEART FAILURE NOS

Dependent Complications – Carotid Surgery (continued)

Must occur with 997.4 Digestive System Complications			
560.1	PARALYTIC ILEUS		
Must occur with 997.5 Urinary Complications			
584.5	AC RF W TUBULAR NEPHR	593.9	RENAL/URETER DISORD NOS
584.8	ACUTE RENAL FAILURE NEC	599.0	URINARY TRACT INF NOS
584.9	ACUTE RENAL FAILURE NOS	788.20	RETENTION OF URINE NOS
Must occur with 998.59 Postoperative Infection			
038	SEPTICEMIA	038.40	GRAM-NEG SEPTICEMIA NOS
038.0	STREPTOCOCCAL SEPTICEMIA	038.41	H. INFLUENZAE SEPTICEMIA
038.1	STAPH SEPTICEMIA	038.42	E. COLI SEPTICEMIA
038.10	STAPH SEPTICEMIA NOS	038.43	PSEUDOMONAS SEPTICEMIA
038.11	STAPH AUREUS SEPTICEMIA	038.44	SERRATIA SEPTICEMIA
038.19	STAPH SEPTICEMIA NEC	038.49	GRAM-NEG SEPTICEMIA NEC
038.2	PNEUMOCOCCAL SEPTICEMIA	038.8	SEPTICEMIA NEC
038.3	ANAEROBIC SEPTICEMIA	038.9	SEPTICEMIA NOS
038.4	OTH GRAM-NEG SEPTICEMIA		

Major Complications – Hip Fracture Repair

Major Complications – Hip Fracture Repair			
292.81	DRUG-INDUCED DELIRIUM	996.78	COMP NEC ORTH DEV NEC
293.0	DELIRIUM D/T CCE	997.02	IATROGEN CV INFARCT/HEM
415.11	IATRO PULM EMBOL/INFARCT	997.1	SURG COMP-HEART
415.19	PULMON EMBOL/INFARCT NEC	997.3	SURG COMP-RESP NEC
512.1	IATROGENIC PNEUMOTHORAX	997.4	SURG COMP-DIGESTIVE
518.5	POSTTR PULMON INSUFF	997.5	SURG COMP-URINARY NEC
518.7	TRALI	998.0	POSTOPERATIVE SHOCK
785.59	SHOCK W/O TRAUMA NEC	998.11	HEMORRHAGE COMP PX
996.77	COMP NEC D/T JT PROSTH	998.59	POSTOP INFECTION NEC

Dependent Complications – Hip Fracture Repair

Must occur with 997.1 Cardiac Complications			
410.01	ANTEROLAT AMI-INITIAL	427.89	OTH CARDIAC DYSRHYTHMIAS
410.11	ANT AMI NEC-INITIAL	428.0	CHF NOS
410.21	INFEROLAT AMI-INITIAL	428.1	LEFT HEART FAILURE
410.31	INFEROPOST AMI-INITIAL	428.20	SYSTOLIC HF NOS
410.41	INF AMI NEC-INITIAL	428.21	ACUTE SYSTOLIC HF
410.51	LAT AMI NEC-INITIAL	428.23	AC & CHR SYSTOLIC HF
410.61	POSTERIOR AMI-INITIAL	428.30	DIASTOLIC HF NOS
410.71	SUBEND INFARCT-INITIAL	428.31	ACUTE DIASTOLIC HF
410.81	AMI NEC-INITIAL EPISODE	428.33	AC & CHR DIASTOLIC HF
410.91	AMI NOS-INITIAL EPISODE	428.40	SYS & DIASTOLIC HF NOS
427.0	PSVT	428.41	AC SYS & DIASTOLIC HF
427.1	PVT	428.43	ACCHR SYS & DIASTOLIC HF
427.31	ATRIAL FIBRILLATION	428.9	HEART FAILURE NOS
427.32	ATRIAL FLUTTER		

Dependent Complications – Hip Fracture Repair (continued)

Must occur with 997.3 Respiratory Complications			
480	VIRAL PNEUMONIA	482.81	PNEUMONIA D/T ANAEROBES
480.0	ADENOVIRAL PNEUMONIA	482.82	E. COLI PNEUMONIA
480.1	RSV PNEUMONIA	482.83	GRAM-NEG PNEUMONIA NEC
480.2	PARINFLUENZA VIRAL PNEUM	482.84	LEGIONNAIRES' DISEASE
480.3	SARS PNEUMONIA	482.89	BACTERIAL PNEUMONIA NEC
480.8	VIRAL PNEUMONIA NEC	482.9	BACTERIAL PNEUMONIA NOS
480.9	VIRAL PNEUMONIA NOS	483	PNEUMONIA ORGANISM NEC
481	PNEUMOCOCCAL PNEUMONIA	483.0	M. PNEUMONIAE PNEUMONIA
482	OTH BACTERIAL PNEUMONIA	483.1	CHLAMYDIAL PNEUMONIA
482.0	K. PNEUMONIAE PNEUMONIA	483.8	PNEUMONIA D/T ORG NEC
482.1	PSEUDOMONAL PNEUMONIA	484	PNEUM IN OTH INF DIS
482.2	H. INFLUENZAE PNEUMONIA	484.1	PNEUM IN CMV DISEASE
482.3	STREPTOCOCCAL PNEUMONIA	484.3	PNEUMONIA IN WHOOP COUGH
482.30	STREP PNEUMONIA NOS	484.5	PNEUMONIA IN ANTHRAX
482.31	GROUP A STREP PNEUMONIA	484.6	PNEUM IN ASPERGILLOSIS
482.32	GROUP B STREP PNEUMONIA	484.7	PNEUM IN SYST MYCOSESNEC
482.39	STREP PNEUMONIA NEC	484.8	PNEUM IN INFECT DIS NEC
482.4	STAPHYLOCOCCAL PNEUMONIA	485	BRONCHOPNEUMONIA ORG NOS
482.40	STAPH PNEUMONIA NOS	486	PNEUMONIA ORGANISM NOS
482.41	STAPH AUREUS PNEUMONIA	507.0	FOOD/VOMIT PNEUMONITIS
482.49	STAPH PNEUMONIA NEC	518.82	OTHER PULMONARY INSUFF
482.8	BACTERIAL PNEUMONIA NEC	518.84	AC & CHR RESP FAILURE
Must occur with 997.4 Digestive System Complications with Accidental Puncture			
560.1	PARALYTIC ILEUS		
Must occur with 997.5 Urinary Complications			
584.5	AC REN FAIL-LES TUBL, NEC	593.9	KIDNEY & URETER DIS, NOS
584.8	AC REN FAIL-PATH LES, NEC	599.0	URINARY TRACT INF NOS
584.9	ACUTE RENAL FAILURE, NOS	788.20	RETENTION OF URINE, NOS
Must occur with 998.59 Postoperative Infection			
038	SEPTICEMIA	038.42	E. COLI SEPTICEMIA
038.0	STREPTOCOCCAL SEPTICEMIA	038.43	PSEUDOMONAS SEPTICEMIA
038.1	STAPH SEPTICEMIA	038.44	SERRATIA SEPTICEMIA
038.10	STAPH SEPTICEMIA NOS	038.49	GRAM-NEG SEPTICEMIA NEC
038.11	STAPH AUREUS SEPTICEMIA	038.8	SEPTICEMIA NEC
038.19	STAPH SEPTICEMIA NEC	038.9	SEPTICEMIA NOS
038.2	PNEUMOCOCCAL SEPTICEMIA	041.4	E. COLI INFECT NOS
038.3	ANAEROBIC SEPTICEMIA	785.52	SEPTIC SHOCK
038.40	GRAM-NEG SEPTICEMIA NOS	995.91	SEPSIS
038.41	H. INFLUENZAE SEPTICEMIA		

Major Complications – Peripheral Vascular Bypass

Major Complications – Peripheral Vascular Bypass			
518.5	POSTTR PULMON INSUFF	997.5	SURG COMP-URINARY NEC
518.7	TRALI	998.0	POSTOPERATIVE SHOCK
997.1	SURG COMP-HEART	998.11	HEMORRHAGE COMP PX
997.3	SURG COMP-RESP NEC	998.2	ACCIDENTAL OP LACERATION
997.4	SURG COMP-DIGESTIVE	998.59	POSTOP INFECTION NEC
Must occur with 997.1 Cardiac Complications			
410.01	ANTEROLAT AMI-INITIAL	428.2	SYSTOLIC HEART FAILURE
410.11	ANT AMI NEC-INITIAL	428.20	SYSTOLIC HF NOS
410.21	INFEROLAT AMI-INITIAL	428.21	ACUTE SYSTOLIC HF
410.51	LAT AMI NEC-INITIAL	428.23	AC & CHR SYSTOLIC HF
410.61	POSTERIOR AMI-INITIAL	428.3	DIASTOLIC HEART FAILURE
410.71	SUBEND INFARCT-INITIAL	428.30	DIASTOLIC HF NOS
410.81	AMI NEC-INITIAL EPISODE	428.31	ACUTE DIASTOLIC HF
410.91	AMI NOS-INITIAL EPISODE	428.33	AC & CHR DIASTOLIC HF
427.1	PVT	428.4	SYSTOLIC & DIASTOLIC HF
427.31	ATRIAL FIBRILLATION	428.40	SYS & DIASTOLIC HF NOS
427.32	ATRIAL FLUTTER	428.41	AC SYS & DIASTOLIC HF
427.89	OTH CARDIAC DYSRHYTHMIAS	428.43	ACCHR SYS & DIASTOLIC HF
428.0	CHF NOS	428.9	HEART FAILURE NOS
428.1	LEFT HEART FAILURE		

Dependent Complications – Peripheral Vascular Bypass

Must occur with 997.3 Respiratory Complications			
480	VIRAL PNEUMONIA	482.81	PNEUMONIA D/T ANAEROBES
480.0	ADENOVIRAL PNEUMONIA	482.82	E. COLI PNEUMONIA
480.1	RSV PNEUMONIA	482.83	GRAM-NEG PNEUMONIA NEC
480.2	PARINFLUENZA VIRAL PNEUM	482.84	LEGIONNAIRES' DISEASE
480.3	SARS PNEUMONIA	482.89	BACTERIAL PNEUMONIA NEC
480.8	VIRAL PNEUMONIA NEC	482.9	BACTERIAL PNEUMONIA NOS
480.9	VIRAL PNEUMONIA NOS	483	PNEUMONIA ORGANISM NEC
481	PNEUMOCOCCAL PNEUMONIA	483.0	M. PNEUMONIAE PNEUMONIA
482	OTHER BACT PNEUMONIA	483.1	CHLAMYDIAL PNEUMONIA
482.0	K. PNEUMONIAE PNEUMONIA	483.8	PNEUMONIA D/T ORG NEC
482.1	PSEUDOMONAL PNEUMONIA	484	PNEUM IN OTH INF DIS
482.2	H. INFLUENZAE PNEUMONIA	484.1	PNEUMONIA IN CMV DISEASE
482.3	STREPTOCOCCAL PNEUMONIA	484.3	PNEUMONIA IN WHOOP COUGH
482.30	STREP PNEUMONIA NOS	484.5	PNEUMONIA IN ANTHRAX
482.31	GROUP A STREP PNEUMONIA	484.6	PNEUM IN ASPERGILLOSIS
482.32	GROUP B STREP PNEUMONIA	484.7	PNEUM IN SYST MYCOSESNEC
482.39	STREP PNEUMONIA NEC	484.8	PNEUM IN INFECT DIS NEC
482.4	STAPHYLOCOCCAL PNEUMONIA	485	BRONCHOPNEUMONIA ORG NOS
482.40	STAPH PNEUMONIA NOS	486	PNEUMONIA ORGANISM NOS
482.41	STAPH AUREUS PNEUMONIA	507.0	FOOD/VOMIT PNEUMONITIS
482.49	STAPH PNEUMONIA NEC	518.81	AC RESPIRATORY FAILURE
482.8	BACTERIAL PNEUMONIA NEC		

Dependent Complications – Peripheral Vascular Bypass (continued)

Must occur with 997.4 Digestive System Complications			
560.1	PARALYTIC ILEUS		
Must occur with 997.5 Urinary Complications			
584.5	AC RF W TUBULAR NEPHR	593.9	RENAL/URETER DISORD NOS
584.8	ACUTE RENAL FAILURE NEC	599.0	URINARY TRACT INF NOS
584.9	ACUTE RENAL FAILURE NOS	788.20	RETENTION OF URINE NOS
Must occur with 998.59 and 998.51 Postoperative Infection with Infected Postoperative Seroma			
041.04	GROUP D STREP INFECTION	041.7	PSEUDOMONAS INFECT NOS
041.11	S. AUREUS INFECTION		
Must occur with 998.59 Postoperative Infection			
038	SEPTICEMIA	038.40	GRAM-NEG SEPTICEMIA NOS
038.0	STREPTOCOCCAL SEPTICEMIA	038.41	H. INFLUENZAE SEPTICEMIA
038.1	STAPH SEPTICEMIA	038.42	E. COLI SEPTICEMIA
038.10	STAPH SEPTICEMIA NOS	038.43	PSEUDOMONAS SEPTICEMIA
038.11	STAPH AUREUS SEPTICEMIA	038.44	SERRATIA SEPTICEMIA
038.19	STAPH SEPTICEMIA NEC	038.49	GRAM-NEG SEPTICEMIA NEC
038.2	PNEUMOCOCCAL SEPTICEMIA	038.8	SEPTICEMIA NEC
038.3	ANAEROBIC SEPTICEMIA	038.9	SEPTICEMIA NOS
038.4	GRAM-NEG SEPTICEMIA NEC	995.92	SEVERE SEPSIS

Major Complications – Total Hip Replacement

Major Complications – Total Hip Replacement			
292.81	DRUG-INDUCED DELIRIUM	484.1	PNEUMONIA IN CMV DISEASE
410.01	ANTEROLAT AMI-INITIAL	484.3	PNEUMONIA IN WHOOP COUGH
410.11	ANT AMI NEC-INITIAL	484.5	PNEUMONIA IN ANTHRAX
410.21	INFEROLAT AMI-INITIAL	484.6	PNEUM IN ASPERGILLOSIS
410.31	INFEROPOST AMI-INITIAL	484.7	PNEUM IN SYST MYCOSESNEC
410.41	INF AMI NEC-INITIAL	484.8	PNEUM IN INFECT DIS NEC
410.51	LAT AMI NEC-INITIAL	485	BRONCHOPNEUMONIA ORG NOS
410.61	POSTERIOR AMI-INITIAL	486	PNEUMONIA ORGANISM NOS
410.71	SUBEND INFARCT-INITIAL	507.0	FOOD/VOMIT PNEUMONITIS
410.81	AMI NEC-INITIAL EPISODE	518.5	POSTTR PULMON INSUFF
410.91	AMI NOS-INITIAL EPISODE	518.7	TRALI
415.11	IATRO PULM EMBOL/INFARCT	518.81	AC RESPIRATORY FAILURE
415.19	PULMON EMBOL/INFARCT NEC	584.5	AC RF W TUBULAR NEPHR
480	VIRAL PNEUMONIA	584.8	ACUTE RENAL FAILURE NEC
480.0	ADENOVIRAL PNEUMONIA	584.9	ACUTE RENAL FAILURE NOS
480.1	RSV PNEUMONIA	707.0	DECUBITUS ULCER
480.2	PARINFLUENZA VIRAL PNEUM	707.00	DECUBITUS ULCER-SITE NOS
480.3	SARS PNEUMONIA	707.01	DECUBITUS ULCER-ELBOW
480.8	VIRAL PNEUMONIA NEC	707.02	DECUBITUS ULCER-UP BACK
480.9	VIRAL PNEUMONIA NOS	707.03	DECUBITUS ULCER-LOW BACK
481	PNEUMOCOCCAL PNEUMONIA	707.04	DECUBITUS ULCER-HIP
482	OTHER BACT PNEUMONIA	707.05	DECUBITUS ULCER-BUTTOCK
482.0	K. PNEUMONIAE PNEUMONIA	707.06	DECUBITUS ULCER-ANKLE
482.1	PSEUDOMONAL PNEUMONIA	707.07	DECUBITUS ULCER-HEEL
482.2	H. INFLUENZAE PNEUMONIA	707.09	DECUBITUS ULCER-SITE NEC
482.3	STREPTOCOCCAL PNEUMONIA	799.1	RESPIRATORY ARREST
482.30	STREP PNEUMONIA NOS	995.92	SEVERE SEPSIS
482.31	GROUP A STREP PNEUMONIA	996.4	MECH COMP INT ORTH DEV
482.32	GROUP B STREP PNEUMONIA	996.40	MECH COMP INT ORTH NOS
482.39	STREP PNEUMONIA NEC	996.41	MECH LOOSENING JT PROSTH
482.4	STAPHYLOCOCCAL PNEUMONIA	996.42	DISLOCATION JOINT PROSTH
482.40	STAPH PNEUMONIA NOS	996.43	PROSTH JOINT FAILURE
482.41	STAPH AUREUS PNEUMONIA	996.44	PERI-PROSTHETIC FRACTURE
482.49	STAPH PNEUMONIA NEC	996.47	MECH COMP JT PROSTH NEC
482.8	BACTERIAL PNEUMONIA NEC	996.77	COMP NEC D/T JT PROSTH
482.81	PNEUMONIA D/T ANAEROBES	996.78	COMP NEC ORTH DEV NEC
482.82	E. COLI PNEUMONIA	997.02	IATROGEN CV INFARCT/HEM
482.83	GRAM-NEG PNEUMONIA NEC	997.1	SURG COMP-HEART
482.84	LEGIONNAIRES' DISEASE	997.3	SURG COMP-RESP NEC
482.89	BACTERIAL PNEUMONIA NEC	997.4	SURG COMP-DIGESTIVE
482.9	BACTERIAL PNEUMONIA NOS	997.5	SURG COMP-URINARY NEC
483	PNEUMONIA ORGANISM NEC	998.0	POSTOPERATIVE SHOCK
483.0	M. PNEUMONIAE PNEUMONIA	998.11	HEMORRHAGE COMP PX
483.1	CHLAMYDIAL PNEUMONIA	998.59	POSTOP INFECTION NEC
483.8	PNEUMONIA D/T ORG NEC	999.8	TRANSFUSION REACTION NEC
484	PNEUM IN OTH INF DIS		

Dependent Complications – Total Hip Replacement

Must occur with 997.1 Cardiac Complications			
427.0	PSVT	428.23	AC & CHR SYSTOLIC HF
427.1	PVT	428.3	DIASTOLIC HEART FAILURE
427.31	ATRIAL FIBRILLATION	428.30	DIASTOLIC HF NOS
427.89	OTH CARDIAC DYSRHYTHMIAS	428.31	ACUTE DIASTOLIC HF
427.9	CARDIAC DYSRHYTHMIA NOS	428.33	AC & CHR DIASTOLIC HF
428.0	CHF NOS	428.4	SYSTOLIC & DIASTOLIC HF
428.1	LEFT HEART FAILURE	428.40	SYS & DIASTOLIC HF NOS
428.2	SYSTOLIC HEART FAILURE	428.41	AC SYS & DIASTOLIC HF
428.20	SYSTOLIC HF NOS	428.43	ACCHR SYS & DIASTOLIC HF
428.21	ACUTE SYSTOLIC HF	428.9	HEART FAILURE NOS
Must occur with 997.4 Digestive Complications			
560.1	PARALYTIC ILEUS		
Must occur with 997.5 Urinary Complications			
593.9	KIDNEY & URETER DIS, NOS	788.20	RETENTION OF URINE, NOS
599.0	URINARY TRACT INFECT, NOS	788.29	RETENTION OF URINE, NEC
Must not occur with any of the following: v1588 HX Fall, v424 Bone Transplant Status, v4364 Hip Replacement Status, v4365 Knee Replacement Status, v454 Arthrodesis Status, v5401 Removal INT Fixation DEV, v5402 Adjust Growth Rod, v5409 INT FIX DEV AFTCARE NEC			
996.49	MECH COMP INT ORTH NEC		

Major Complications – Total Knee Replacement

Major Complications – Total Knee Replacement			
292.81	DRUG-INDUCED DELIRIUM	484.1	PNEUMONIA IN CMV DISEASE
410.01	ANTEROLAT AMI-INITIAL	484.3	PNEUMONIA IN WHOOP COUGH
410.11	ANT AMI NEC-INITIAL	484.5	PNEUMONIA IN ANTHRAX
410.21	INFEROLAT AMI-INITIAL	484.6	PNEUM IN ASPERGILLOSIS
410.31	INFEROPOST AMI-INITIAL	484.7	PNEUM IN SYST MYCOSESNEC
410.41	INF AMI NEC-INITIAL	484.8	PNEUM IN INFECT DIS NEC
410.51	LAT AMI NEC-INITIAL	485	BRONCHOPNEUMONIA ORG NOS
410.61	POSTERIOR AMI-INITIAL	486	PNEUMONIA ORGANISM NOS
410.71	SUBEND INFARCT-INITIAL	507.0	FOOD/VOMIT PNEUMONITIS
410.81	AMI NEC-INITIAL EPISODE	518.5	POSTTR PULMON INSUFF
410.91	AMI NOS-INITIAL EPISODE	518.7	TRALI
415.11	IATRO PULM EMBOL/INFARCT	518.81	AC RESPIRATORY FAILURE
415.19	PULMON EMBOL/INFARCT NEC	584.5	AC RF W TUBULAR NEPHR
480	VIRAL PNEUMONIA	584.8	ACUTE RENAL FAILURE NEC
480.0	ADENOVIRAL PNEUMONIA	584.9	ACUTE RENAL FAILURE NOS
480.1	RSV PNEUMONIA	707.0	DECUBITUS ULCER
480.2	PARINFLUENZA VIRAL PNEUM	707.00	DECUBITUS ULCER-SITE NOS
480.3	SARS PNEUMONIA	707.01	DECUBITUS ULCER-ELBOW
480.8	VIRAL PNEUMONIA NEC	707.02	DECUBITUS ULCER-UP BACK
480.9	VIRAL PNEUMONIA NOS	707.03	DECUBITUS ULCER-LOW BACK
481	PNEUMOCOCCAL PNEUMONIA	707.04	DECUBITUS ULCER-HIP
482	OTHER BACT PNEUMONIA	707.05	DECUBITUS ULCER-BUTTOCK
482.0	K. PNEUMONIAE PNEUMONIA	707.06	DECUBITUS ULCER-ANKLE
482.1	PSEUDOMONAL PNEUMONIA	707.07	DECUBITUS ULCER-HEEL
482.2	H. INFLUENZAE PNEUMONIA	707.09	DECUBITUS ULCER-SITE NEC
482.3	STREPTOCOCCAL PNEUMONIA	799.1	RESPIRATORY ARREST
482.30	STREP PNEUMONIA NOS	995.92	SEVERE SEPSIS
482.31	GROUP A STREP PNEUMONIA	996.4	MECH COMP INT ORTH DEV
482.32	GROUP B STREP PNEUMONIA	996.40	MECH COMP INT ORTH NOS
482.39	STREP PNEUMONIA NEC	996.41	MECH LOOSENING JT PROSTH
482.4	STAPHYLOCOCCAL PNEUMONIA	996.42	DISLOCATION JOINT PROSTH
482.40	STAPH PNEUMONIA NOS	996.43	PROSTH JOINT FAILURE
482.41	STAPH AUREUS PNEUMONIA	996.44	PERI-PROSTHETIC FRACTURE
482.49	STAPH PNEUMONIA NEC	996.47	MECH COMP JT PROSTH NEC
482.8	BACTERIAL PNEUMONIA NEC	996.77	COMP NEC D/T JT PROSTH
482.81	PNEUMONIA D/T ANAEROBES	996.78	COMP NEC ORTH DEV NEC
482.82	E. COLI PNEUMONIA	997.02	IATROGEN CV INFARCT/HEM
482.83	GRAM-NEG PNEUMONIA NEC	997.1	SURG COMP-HEART
482.84	LEGIONNAIRES' DISEASE	997.3	SURG COMP-RESP NEC
482.89	BACTERIAL PNEUMONIA NEC	997.4	SURG COMP-DIGESTIVE
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483.8	PNEUMONIA D/T ORG NEC	999.8	TRANSFUSION REACTION NEC
484	PNEUM IN OTH INF DIS		

Dependent Complications – Total Knee Replacement

Must occur with 997.1 Cardiac Complications			
427.0	PSVT	428.23	AC & CHR SYSTOLIC HF
427.1	PVT	428.3	DIASTOLIC HEART FAILURE
427.31	ATRIAL FIBRILLATION	428.30	DIASTOLIC HF NOS
427.89	OTH CARDIAC DYSRHYTHMIAS	428.31	ACUTE DIASTOLIC HF
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428.21	ACUTE SYSTOLIC HF	428.9	HEART FAILURE NOS
Must occur with 997.4 Digestive System Complications			
560.1	PARALYTIC ILEUS		
Must occur with 997.5 Urinary Complications			
593.9	KIDNEY & URETER DIS, NOS	788.20	RETENTION OF URINE, NOS
599.0	URINARY TRACT INFECT, NOS	788.29	RETENTION OF URINE, NEC
Must not occur with any of the following: v1588 HX Fall, v424 Bone Transplant Status, v4364 Hip Replacement Status, v4365 Knee Replacement Status, v454 Arthrodesis Status, v5401 Removal INT Fixation DEV, v5402 Adjust Growth Rod, v5409 INT FIX DEV AFTCARE NEC			
996.49	MECH COMP INT ORTH NEC		