THE HEALTHCARE COSTS OF HAVING A BABY

Submitted to:
The March of Dimes

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REPORT:

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Abstract

The purpose of this study is to estimate the costs of prenatal, delivery-related, and post-partum healthcare associated with having a baby in the privately insured population in the United States. This analysis utilized the 2003 - 2005 MarketScan® Commercial Claims and Encounters database, a medical and drug claims database of nearly 10 million individuals with employer-sponsored health insurance. All live-birth deliveries in 2004 were included in this study. Maternity-related services during delivery, the nine months prior to, and the three months following delivery were identified using procedure and diagnosis codes related to maternity care. Costs during this period were summarized as the total costs paid to providers, health plan payments and patient out-of-pocket payments. These costs were further stratified by vaginal births and Cesarean sections, and by type of provider (professional, facility, laboratory, radiology and drug). The average cost of having a baby was $8,802. Health insurance covered the majority of these costs. Approximately one-third of the 45,450 deliveries identified were Cesarean-sections, which were substantially more expensive than vaginal deliveries ($10,958 vs. $7,737). Hospital payments accounted for over half the total costs and one-third of patient out-of-pocket costs. The healthcare related having a baby represents a substantial cost for health plans, employers and families. Quantifying the costs of childbirth and the drivers of these costs, would help individuals, payers and policy makers anticipate the economic impact of having a baby.

Introduction

Pregnancy and childbirth-related conditions make up almost 25 percent of hospitalizations in the United States with approximately 4 million births annually.[1] In recent years, there have been major advances in technology as well as updated guidelines for prenatal care and childbirth such as high resolution sonograms, in-utero surgery, new prenatal and newborn screenings, and growing rates of c-sections, all of which have significant cost implications. While some research has shown that maternity care can result in sizable out-of-pocket costs for families, there is very little in the way of new data that has been collected or published on the costs of having a baby.

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[1] Agency for Healthcare Research and Quality, Hospitalizations Related to Chilbirth, 2003, HCUP, Statistical Brief #11, www.ahrq.gov

The purpose of this study was to quantify the overall costs of healthcare services for having a baby, including all prenatal care services, delivery-related services, and post-partum services for the mother. To quantify these costs, this study analyzed health care claims data for a large population of people with employer sponsored health insurance to understand health spending on maternity-related professional-service, hospitalization, laboratory, imaging, drug, and out-of-pocket costs.

The costs of having a baby are not limited to the hospitalization at the time of delivery. Much of the total cost of having a baby pertains to services provided outside the hospital setting including out-patient prenatal care services in the nine months preceding delivery and post-partum care services in the first few months following delivery. To estimate these costs, inpatient and outpatient utilization and expenditure data must be analyzed throughout pregnancy and following birth.

This report provides an overview of the study's methodology including a description of the data sources, the definition of the study population, the process used to identify maternity-related services, the analysis that were conducted, and results showing the healthcare costs of having a baby.

Data Sources

Thomson Healthcare used its proprietary MarketScan® Research Databases for this project. These databases are constructed from privately insured paid medical and prescription drug claims. The data contributors are generally large self-insured US employers. A total of over 80 employers contribute data to MarketScan. Claims data are received from all of their medical and pharmaceutical insurers. Collectively, the databases incorporate data from over 100 payers, including commercial insurance companies, health plans, and third-party administrators with beneficiaries across the United States.

The retrospective analyses were based the MarketScan Commercial Claims and Encounters (Commercial) Database. Data from three recent years of complete data availability were used to allow for fixed intervals of analysis before and after delivery.

The largest of the MarketScan Databases, the Commercial Database contains the inpatient, outpatient, and outpatient prescription drug experience of several million employees and their dependents (annually), covered under a variety of fee-for-service and capitated health plans, including preferred provider organizations, point of service plans, indemnity plans, and health maintenance organizations. The 2003 - 2005 Commercial Databases were used to conduct the cost analyses in the study.

Selecting Patients

The study's target population was defined as mothers with live births in the 2004 Commercial database. To select births in the MarketScan database, the following DRG and ICD-9-CM diagnosis or procedure codes were used:

Table 1. Delivery/Birth Criteria for Inclusion in Study Population	
Delivery Category	**Associated DRG Codes**
Vaginal Delivery	372, 373, 374, 375
Cesarean Section	370, 371
	Additional associated ICD-9-CM Codes*
Live Births	650, V270, V272, V273, V275, or V276.

* To ensure live births do not include stillborns, records including any of the following ICD-9-CM Codes were excluded: 630 – 637, 639, 6330 – 6332, 6338 – 6362, 6364 – 6372, 6564.

For inclusion in the study population, we required that mothers be continuously enrolled over the entire 9-month prenatal and 3-month postpartum interval (e.g., one full year of continuous enrollment). We also required that mothers have prescription drug coverage for the entire 12 month period. Because full and partial capitation arrangements would distort the calculation of the average "costs" of having a baby, we excluded patients covered by managed care insurance arrangements. Thus, the study focused on the employer-insured, fee-for-service population.

The study was limited to live births, including complicated or premature births.

The study distinguished between vaginal births and cesarean sections, separately aggregating maternity-related costs for the two populations. To focus on the maternity-related costs only, we only aggregated costs for female patients aged 15 to 45 years old.

Identifying Maternity-Related Services

To quantify the costs of having a baby, inpatient and outpatient utilization and expenditure data were analyzed for the 9 months (270 days) preceding birth and the 3 months (90 days) following birth. Only prenatal and postpartum services relating explicitly to maternity care and provided in this time window were included in the cost analyses. Services related to other conditions were excluded.

The following process was used to identify maternity-related services. Our Senior Nosologist (national expert on disease classification) and a Clinical Support Consultant (certified clinical coding expert) prepared an initial list of clearly-defined maternity-related diagnosis codes and service codes. Professional service and facility claims were examined for the presence of this set of maternity-related procedures codes among the following broad categories:

- Anesthesia
- Maternity Care and Delivery – Antepartum Services
- Introduction and Repair

- Vaginal Delivery – Antepartum and Postpartum Care
- Cesarean Delivery
- Delivery After Previous Cesarean Delivery
- Radiology – Obstetrical
- Pathology and Laboratory – Organ or Disease-Oriented Panels
- Small Subset of HCPCS codes for In Utero Procedures.

While many of these procedures clearly reflect maternity-related services, the few that did not were required to appear on a claim with pregnancy or delivery-related diagnosis code as the first-listed code (e.g., 640.00-656.33, 656.50-676.94, V22.0-V24.2, V72.42, and V26.0-V28.9). All claims that did not have these targeted procedure codes were written to a separate file for further review.

The first class of claims that was integrated back into the analysis pool was outpatient department claims. Since it is common to bill such services using UB-Revenue codes, a new inclusion criterion was designed to capture these health-care services. The criterion required the first-listed diagnosis code to be among the previously mentioned list of targeted codes.

Our coding experts reviewed comprehensive frequency distributions of all remaining procedure codes that appeared on facility or professional claims with a pregnancy or delivery-related diagnosis code as the first listed. This resulted in the final criterion applied to these claims (i.e., all remaining procedure codes associated with the targeted diagnosis codes were included as actual pregnancy and maternity-related services provided to the study population). The final resulting list of coded criteria for identifying maternity-related services is presented in Table 2.

It was not possible to isolate maternity-related prescription drugs, since many drugs have multiple indications and are prescribed for many purposes. For this reason, we included all outpatient prescriptions in the calculation of outpatient drug costs. This is likely to slightly overstate the costs of maternity-related drugs.

Table 2. Maternity-Related Billing Codes	
Procedure Category	**Associated Billing Codes**
Pregnancy Diagnosis Code*	ICD-9-CM: 640.00 – 676.94, V22.0 – V24.2, V72.42
Anesthesia – Obstetric	CPT-4: 01958, 01960, 01961, 01967, 01968
Maternity Care and Delivery – Antepartum Services	CPT-4: 59000, 59001, 59012, 59015, 59020, 59025, 59030, 59050, 59051, 59070, 59072, 59074, 59076, 59160, 59866, 59871, 59898, 59899
Introduction and Repair	CPT-4: 59200†, 59300, 59320, 59325, 59350
Vaginal Delivery – Antepartum and Postpartum Care	CPT-4: 57022, 58605†, 59400, 59409, 59410, 59412, 59414, 59425, 59426, 59430
Cesarean Delivery	CPT-4: 58611†, 59510, 59514, 59515, 59525
Delivery After Previous Cesarean Section	CPT-4: 59610, 59612, 59614, 59618, 59620, 59622
Radiology – Obstetric	CPT-4: 76801, 76802, 76805, 76810 – 76821, 76825 – 76828, 76941 Other CPT-4 not listed above: 70000 – 79999‡
Pathology and Laboratory – Organ or Disease-Oriented Panels	CPT-4: 80055 (includes 85004, 85007, 85009, 85025, 85027, 86592, 86850, 86900, 86901, 87340), 81001 – 81003†, 81025†, 82105†, 82106, 82677†, 82731, 82950†, 84163†, 84443†, 84702†, 85018†, 85025†, 86701†, 87081†, 87086†, 88142†. Other CPT-4 not listed above: 80000 – 89999§
In-Utero Procedures	HCPCS: S0612†, S0613†, S2400 – S2405, S2409, S2411, S8055
Obstetrical Procedures	ICD-9-CM: 72.0 – 74.2, 74.4, 74.99, 75.0 – 75.99
Outpatient Department Services	Claims included if Pregnancy Diagnosis Code* is present regardless of UB-92 Revenue Code value
Other Explicit or High Volume Procedures	CPT-4: 0500F, 0501F, 0502F, 0503F Other CPT-4 not listed above: 36415†, 99000†, 99212 – 99214†
Remaining CPT-4 Procedure Codes	All remaining values not previously listed with Pregnancy Diagnosis Code*

*Must be listed as principal diagnosis or in first diagnosis field.
† Claim must include one of the following ICD-9-CM pregnancy-related diagnosis codes to be valid: 640.00 – 676.94, V22.0 – V24.2, V26.0 – V28.9, or V72.42.
‡ If a valid pregnancy diagnosis code is present, any claims with CPT-4 code values in the 70000 – 79999 range are included in this category.
§ If a valid pregnancy diagnosis code is present, any claims with CPT-4 code values in the 80000 – 89999 range are included in this category.

Summarizing "Costs"

The MarketScan databases include only fully adjudicated and paid claims. Claims that were denied or pending were not included in this study. We reported "costs" as the amount charged by facility (i.e. hospitals and other facilities) or professional providers (i.e. physicians, midwives, nurse practitioners, and other providers) and the amount paid (allowed amount) to such providers. The amount paid was further broken-out as the health-plan payment and patient out-of-pocket payments. Out-of-pocket payments included the amount paid by patients to meet deductible requirements, patient coinsurance, and co-payments.

Analysis

Using the 2003-2005 MarketScan Commercial databases, we identified all maternity-related services provided in the 9-month prenatal period, the delivery hospitalization, and the 3-month postpartum period. We aggregated provider charges and total payments, breaking payments into health-plan payments and patients' out-of-pocket payments. We summarized all charges and payments within the following service categories:

- Professional Service Fees
- Facility Fees
- Laboratory Costs
- Radiology and Imaging Costs
- Outpatient Drug Costs (total drug costs in 12-month analysis window)

The MarketScan payment variable represents the total cost to the payer, which is typically discounted from providers' charges and excludes patient out-of-pocket expenditures. Population weights were developed based on age, sex, and region strata in the 2002 Medical Expenditure Panel Survey (MEPS) Database, and were applied to the MarketScan analysis results to enable generalizations to the national U.S. commercially-insured population. Finally, cases having total maternity-related charges of less than $100 or greater than $50,000 were considered outliers and were excluded from the analysis.

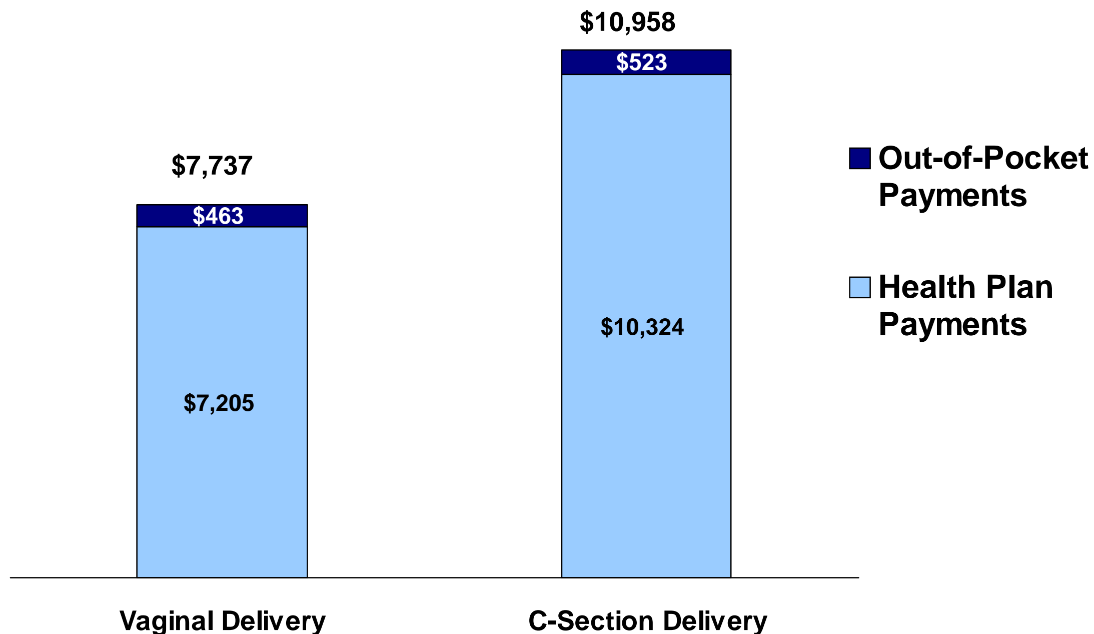
Results

Total Estimated Costs: Figure 1 and Table 3 present the results of the cost analyses. A total of 43,450 deliveries were analyzed including 29,083 vaginal deliveries and 14,367 cesarean deliveries. "Costs" were represented by (1) professional service, facility, laboratory, radiology/imaging, and pharmacy charges as appearing on the healthcare claims, by (2) the actual payments made by employers for the services in each category, and by (3) the out-of-pocket payments made by patients. Payment amounts are perhaps the best measure of true cost to employers, plans, and patients. Overall, the expenditures for maternity care averaged $7,737 for a vaginal delivery in 2004, and $10,958 for Cesarean section. The higher cost of Cesarean section included $2,090 in additional expenditures for the hospital stay and $723 in additional payments for professional fees, resulting from the longer length of hospital stay and additional facility and professional services. Nationally, Cesarean sections accounted for 29 percent of births in 2004 (NCHS final natality 2004).

The average costs for cesarean deliveries were almost 50% higher than those for vaginal deliveries. This was true for virtually all analyzed cost categories. It is important to note that the trimming of outliers has had an attenuating effect on the observed means. Overall, 842 outlier cases (about 2% of all cases in the study) were deleted (all but 30 of these were for charges greater than $50,000). Mothers with extremely difficult pregnancies, deliveries, or postpartum recovery may not be fully represented in these averages.

Payments were significantly lower than charges in all cost categories. This was primarily because of negotiated discounts between health plans and providers, but may also represent the difference between health plan fee schedules and provider charges. Payer discounts on provider charges averaged close to 50% overall (higher on facility and laboratory charges); total payments averaged only slightly more than 50% of total charges. Out-of-pocket payments were relatively small in these employer-insured populations.

Figure 1. Average Expenditures (Total Allowed Costs)* for Maternity Care by Source of Payment, 2004



*Third party payments (COB) are not represented

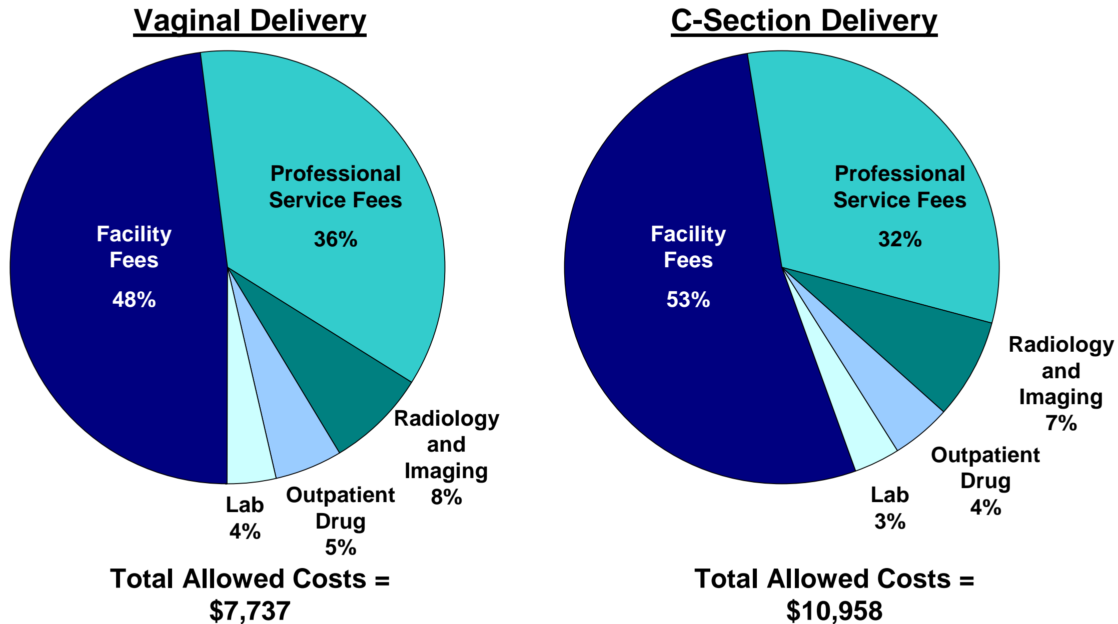
Table 3. Nationally Weighted Mean Maternity Costs for Livebirths in 2004: 9-month pre and 3-month post delivery period (Employer, FFS, Continuously Enrolled -- 5,554,963 Covered Lives in 2004). Costs also broken down into cost categories - with mean costs and corresponding percentages of total costs reported.

	Vaginal Delivery	Cesarean Delivery	Overall
Number of Women	**29,083**	**14,367**	**43,450**
Total Maternity-Related Expenditures			
Provider Charges	$14,352	$21,213	$16,619
Total Paid Amount (includes OOP)	7,737	10,958	8,802
Health-Plan Payments	7,205	10,324	8,236
Out-of-Pocket Payments	463	523	483
Cost Breakdown (% of Total)			
Professional Service Fees			
Provider Charges	4,352 (30.3%)	6,021 (28.4%)	4,903 (29.5%)
Total Paid Amount (includes OOP)	2,764 (35.7%)	3,487 (31.8%)	3,003 (34.1%)
Health-Plan Payments	2,648 (36.8%)	3,352 (32.5%)	2,881 (35.0%)
Out-of-Pocket Payments	97 (21.0%)	109 (20.9%)	101 (21.0%)
Facility Fees			
Provider Charges	7,772 (54.2%)	12,223 (57.6%)	9,243 (55.6%)
Total Paid Amount (includes OOP)	3,717 (48.0%)	5,807 (53.0%)	4,408 (50.1%)
Health-Plan Payments	3,515 (48.8%)	5,564 (53.9%)	4,192 (50.9%)
Out-of-Pocket Payments	156 (33.8%)	166 (31.8%)	160 (33.1%)
Laboratory			
Provider Charges	666 (4.6%)	818 (3.9%)	716 (4.3%)
Total Paid Amount (includes OOP)	287 (3.7%)	360 (3.3%)	311 (3.5%)
Health-Plan Payments	241 (3.3%)	310 (3.0%)	264 (3.2%)
Out-of-Pocket Payments	45 (9.7%)	49 (9.3%)	46 (9.6%)
Radiology and Imaging			
Provider Charges	1,115 (7.8%)	1,569 (7.4%)	1,265 (7.6%)
Total Paid Amount (includes OOP)	596 (7.7%)	819 (7.5%)	670 (7.6%)
Health-Plan Payments	531 (7.4%)	744 (7.2%)	601 (7.3%)
Out-of-Pocket Payments	61 (13.2%)	68 (13.1%)	63 (13.1%)
Outpatient Drug			
Provider Charges	447 (3.1%)	583 (2.7%)	492 (3.0%)
Total Paid Amount (includes OOP)	374 (4.8%)	485 (4.4%)	411 (4.7%)
Health-Plan Payments	270 (3.7%)	354 (3.4%)	298 (3.6%)
Out-of-Pocket Payments	103 (22.3%)	130 (24.9%)	112 (23.3%)

*Excluded Patients with charges >$50,000 or <$100 (N=842)

Figure 2 presents the contribution of each service type to the total costs. The cost breakdown shows that a little over half of the total charges and payments were due to facility fees such as payments to hospitals. Physicians' professional fees accounted for a little less than a third of the total charges and payments. Overall, hospital services accounted for 50.1% of expenditures, followed by physician care and other professional services at 34.1%, with 7.6% for radiology and imaging, 4.7% for outpatient drugs and 3.5% for laboratory services comprising the remainder. These proportions were similar for vaginal and Cesarean section deliveries.

Figure 2. Distribution of Average Expenditures (Total Allowed Costs)* for Maternity Care by Type of Service, 2004



* Totals do not add to 100% because of rounding

Regional Differences: Figure 3 and Table 4 present regional differences in the costs of having a baby. Because of the distribution of the MarketScan fee-for-service population, the sample was disproportionately large in the South and North Central. However, as described above, the mean charges and payments were calculated based on national population weights so that they were regionally and demographically representative. As the table indicates, maternity costs were highest in the Northeast and in the West. The same relationships between the costs of cesarean and vaginal deliveries and between charges and payments were observed in all regions.

Figure 3. Average Expenditures (Total Allowed Costs) for Maternity Care by Geographic Region, 2004

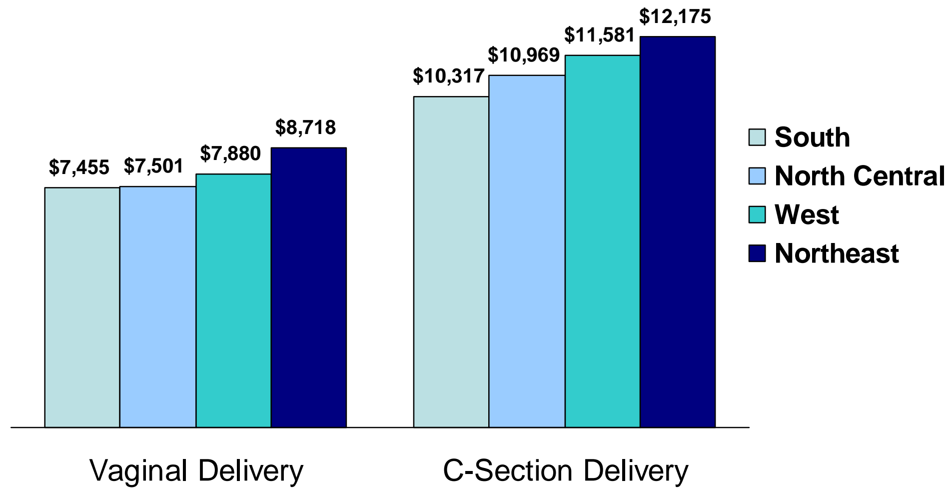


Table 4. Nationally Weighted Mean Maternity Costs for Livebirths in 2004: 9-month pre and 3-month post delivery period (Employer, FFS, Continuously Enrolled -- 5,554,963 Covered Lives in 2004), by Geographical Region

	Vaginal Delivery	Cesarean Delivery	Overall
South	**N=12,744**	**N=7,323**	**N=20,067**
Provider Charges	$13,768	$19,817	$15,985
Total Paid Amount (includes OOP)	7,455	10,317	8,504
Health-Plan Payments	6,821	9,594	7,838
Out-of-Pocket Payments	559	610	578
North Central	**N=9,531**	**N=4,048**	**N=13,579**
Provider Charges	$13,060	$19,588	$15,038
Total Paid Amount (includes OOP)	7,501	10,969	8,552
Health-Plan Payments	7,125	10,503	8,149
Out-of-Pocket Payments	326	378	342
West	**N=3,783**	**N=1,578**	**N=5,361**
Provider Charges	$15,608	$25,125	$18,457
Total Paid Amount (includes OOP)	7,880	11,581	8,988
Health-Plan Payments	7,155	10,681	8,211
Out-of-Pocket Payments	605	661	622
Northeast	**N=2,448**	**N=1,166**	**N=3,614**
Provider Charges	$17,082	$24,692	$19,552
Total Paid Amount (includes OOP)	8,718	12,175	9,840
Health-Plan Payments	8,288	11,702	9,396
Out-of-Pocket Payments	383	429	398

*Excluded Patients with charges >$50,000 or <$100

Cost Distributions: Table 5 presents the quartile distribution of maternity-related charges and payments by cost category. The medians were lower than the means reported above, indicating that the cost distribution is positively skewed. The trimming of outliers, described above, had an attenuating effect on the upper extremes of the distribution, but it had a smaller impact on these non-parametric statistics than on the means reported above.

Table 5. Nationally Weighted Maternity Costs for Livebirths in 2004: 9-month pre and 3-month post delivery period (Employer, FFS, Continuously Enrolled -- 5,554,963 Covered Lives in 2004)

	Vaginal Delivery			**Cesarean Delivery**			**Overall**		
Number of Women	**29,083**			**14,367**			**43,450**		
	25th Percentile	*Median*	*75th Percentile*	*25th Percentile*	*Median*	*75th Percentile*	*25th Percentile*	*Median*	*75th Percentile*
Total Maternity-Related Expenditures									
Provider Charges	$10,028	$12,843	$16,802	$15,270	$19,329	$25,433	$11,129	$14,717	$20,169
Total Paid Amount (includes OOP)	5,739	6,973	8,778	8,105	9,870	12,536	6,199	7,833	10,234
Health-Plan Payments	5,288	6,532	8,284	7,557	9,363	11,948	5,749	7,348	9,691
Out-of-Pocket Payments	177	365	611	210	420	677	187	382	635
Cost Breakdown									
Professional Service Fees									
Provider Charges	3,233	4,045	5,081	4,497	5,518	6,972	3,539	4,483	5,786
Total Paid Amount (includes OOP)	2,163	2,632	3,190	2,729	3,262	3,973	2,320	2,814	3,485
Health-Plan Payments	2,053	2,549	3,094	2,619	3,156	3,872	2,210	2,722	3,377
Out-of-Pocket Payments		15	106		20	140		15	120
Facility Fees									
Provider Charges	4,730	6,587	9,357	7,876	10,766	15,073	5,345	7,769	11,507
Total Paid Amount (includes OOP)	2,419	3,191	4,298	3,751	5,058	6,816	2,702	3,649	5,297
Health-Plan Payments	2,238	3,046	4,100	3,573	4,881	6,604	2,508	3,497	5,092
Out-of-Pocket Payments		77	250		63	250		75	250
Laboratory									
Provider Charges	178	517	957	276	646	1,138	212	555	1,018
Total Paid Amount (includes OOP)	73	202	385	114	259	477	87	220	416
Health-Plan Payments	34	148	323	77	204	408	45	166	351
Out-of-Pocket Payments			48			55			50
Radiology and Imaging									
Provider Charges	360	670	1,205	475	861	1,633	395	725	1,343
Total Paid Amount (includes OOP)	217	385	675	272	486	883	231	416	742
Health-Plan Payments	159	332	610	216	427	807	172	362	670
Out-of-Pocket Payments			84			98			89
Outpatient Drug									
Provider Charges	73	184	404	98	238	551	80	200	446
Total Paid Amount (includes OOP)	60	153	329	80	194	445	66	165	363
Health-Plan Payments	12	66	197	21	90	277	15	73	220
Out-of-Pocket Payments	21	64	138	30	82	170	25	70	149

*Excluded Patients with charges >$50,000 or <$100

Limitations

As this analysis was limited to a convenience sample, the MarketScan data are not reflective of the entire US Population. The majority of Commercial and Medicare Supplemental data were from large, self-insured employers and are not regionally representative of the national population. In this study, the data were weighted to account for the difference is regional distribution between MarketScan and the national employer-sponsored insured population. This study did not include Medicaid, which finances over 40% of births nationwide, the uninsured, insured that pay with cash, and individuals with individual private insurance. As such, this database represented women with fewer cost barriers to care than the general population.

Conclusions

The healthcare services related to having a baby represents a substantial cost for health plans, employers and families. For privately-insured women of child-bearing age, these costs often account for the highest proportion of medical and drug expenditures. This study found that among women with employer-sponsored insurance, health plans covered the majority of costs. Maternity costs also extend beyond the hospitalization, as professional, ancillary, and outpatient drugs costs accounted for nearly half of total costs.

This study provided the maternity-care estimate at one period of time for a specific population. Similar evaluations should be conducted for other populations, such as Medicaid and the uninsured. As medical technology evolves and healthcare coverage change, additional analysis will be required to understand their effect on maternity costs. Quantifying the costs of childbirth and the drivers of these costs, would help individuals, payers and policy makers anticipate the economic impact of having a baby.