Birth Hospitalization Costs and Days of Care for Mothers and Neonates in California, 2009-2011

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Objective To provide population-based estimates of the hospital-related costs of maternal and newborn care, and how these vary by gestational age and birth weight.

Study design We conducted a retrospective analysis of 2009-2011 California in-hospital deliveries at nonfederal hospitals with the infant and maternal discharge data successfully (96%) linked to birth certificates. Cost-to-charge ratios were used to estimate costs from charges. Physician hospital payments were estimated by mean diagnosis related group-specific reimbursement and costs were adjusted for inflation to December 2017 values. After exclusions for incomplete or missing data, the final sample was 1 265 212.

Results The mean maternal costs for all in-hospital deliveries was $8204, increasing to $13 154 for late preterm (32-36 weeks) and $22 702 for very preterm (<32 weeks) mothers. The mean cost for all newborns was $6389: $2433 for term infants, $22 102 for late preterm, $223 931 for very preterm infants, and $317 982 for extremely preterm infants (<28 weeks). Preterm infants were 8.1% of cases but incurred 60.9% of costs; for very preterm and extremely preterm infants, these shares were 1.0% and 36.5%, and 0.4% and 20.0%, respectively. Overall, mothers incurred 56% of the total costs during the delivery hospitalization.

Conclusions Both maternal and neonatal costs are skewed, with this being much more pronounced for infants. Preterm birth is much more expensive than term delivery, with the additional costs predominately incurred by the infants. The small share of infants who require extensive stays in neonatal intensive care incur a large share of neonatal costs and these costs have increased over time. *(J Pediatr 2019;204:118-25).*

Pregnancy and delivery are the most common reasons for the hospitalization of women of childbearing age, with almost 4 million deliveries annually in the US.[1] Peripartum and newborn infant care, particularly for the extremely premature infant, make up a substantial proportion of the costs of medical care for these patients, with estimates of the costs of preterm birth accounting for almost $26 billion annually.[2] Neonatal and maternal care has continued to evolve over time, including rising rates of cesarean deliveries and more aggressive management and resuscitation of infants born at periviable gestational ages (<24 weeks).[3-5] However, with decreases in mortality and more aggressive resuscitation come greater use of health care resources. Although preterm rates have been relatively constant,[6,7] the neonatal mortality rate has decreased, especially for very preterm infants.[4,8,9] The reduction in very preterm mortality is especially significant, given the very large cost and length of stay (LOS) differences between survivors and deaths.[10]

There currently are few data to quantify the economic impact of these changes in both maternal and neonatal care. The existing studies using data linking mothers to infants and transfers to accurately measure the total costs of delivery are from 2000 or earlier, and thus fail to capture the effects of more recent changes in costs, technologies, and outcomes.[2,10-12] More recent data tend to use hospital charges instead of costs or use unlinked discharge data that cannot measure the economic impact of mothers or infants across the multiple hospitals where they receive care before being discharged home. Because these women and infants tend to be the sickest and most expensive cases, such data may underestimate the impact of certain subgroups of patients.[13] Finally, previous data omit physician costs.

The goal of this project was to provide population-based estimates of the costs and LOS for hospitalizations associated with childbirth, including pregnancy-related maternal hospitalization and infant transfers before discharge home or death. We include both hospital costs, as performed in prior work, and updated methods to include an estimate of physician costs. Further, to provide policymakers and

BW	Birth weight
ICD-9	*International Classification of Diseases, 9th edition, Clinical Modification*
LOS	Length of stay
PPI	Producer price index

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researchers with in-depth data useful for additional analyses, we provide data stratified by gestational age, birth weight (BW), and survival status.

Methods

We used the California Office of Statewide Planning and Development Vital Statistics-Patient Discharge Data to obtain a population-based study cohort of all in-hospital deliveries in that occurred in California nonfederal hospitals between 2009 and 2011. Maternal and infant hospital discharge records were probabilistically linked with birth, infant death, and fetal death certificates to provide linked information for mother-baby pairs. Approximately 96% of in-hospital birth records were successfully linked to maternal and infant hospital discharge abstract data.[14] Although these linkages are officially probabilistic, the vast majority are unique matches and most of the probabilistic linkages are for uncomplicated term infants for whom the nonexact linkages have minimal effect on the analyses conducted for this study. These data include maternal antepartum records for the 9 months before delivery. Infant hospital discharge records include the delivery admission and subsequent transfers until the infant was initially discharged to home or died. This study was approved by the Stanford University Institutional Review Board and the California Department of Health Services Committee for the Protection of Human Subjects.

Cases were selected if the birth certificate was successfully linked to both the maternal delivery record and the infant delivery record or if the fetal death certificate was linked to a maternal hospital record. Maternal prenatal hospitalization records were retained for pregnancy-related prenatal hospitalizations falling within the gestation period of the current pregnancy based on gestational age at birth (fetal death). Prenatal hospitalizations were considered pregnancy related if the recorded major diagnostic category value was 14 (pregnancy, childbirth, and the puerperium), or *International Classification of Diseases, 9th edition, Clinical Modification* (ICD-9) V-codes of 22.*, 23.*, 24.*, 26.*, 27.*, 28.* were recorded and no ICD-9 diagnosis codes 633.*-639.* were recorded.

The BW value from the birth certificate was set to missing in cases where the value was ≥6800 g or <400 g for a live birth. Singleton cases with missing values were replaced with the median BW value for infants of the same gestational age at birth if there was a valid gestational age (n = 74). For gestational age, we used the best obstetric estimate of gestational age when it was available; the LMP gestational age was used for 2436 cases. The gestational age value from the birth certificate (or fetal death certificate) was set to missing in cases indicating a live birth at <22 weeks of gestation or a gestational age of >45 weeks. For survivors, 3317 infant records with a gestational age at discharge <34 weeks of gestation were removed as probable data errors.

ICD-9 procedure codes were used to identify infants who underwent surgical procedures using a procedure classification system developed by the Agency for Healthcare Research and Quality Healthcare Cost and Utilization Project that classifies procedures as major or minor therapeutic or diagnostic procedures.[15] We performed a further review of major therapeutic surgical procedures to flag procedures likely having major costs associated with them (such as a major heart surgery). Flagging such cases was done to assist in the identification of infant cost outliers—big cases with high costs were retained rather than being classified as outliers.

The Office of Statewide Planning and Development annual hospital financial data for 2009-2011 were used to construct cost-to-charge ratios for each hospital and these ratios were used to convert hospital charges recorded in the maternal and infant hospital discharge records to estimated costs.[16] Data on the mean professional/physicians fees for each diagnosis related group and payer source (Medicaid or private insurance) were matched with the diagnosis related groups of each hospital discharge to incorporate estimated professional fees, with separate adjustment factors for Medicaid and private insurance.[17] Although these physician data are fees, not costs, we believe that they represent the best available method for adding an estimate of physician costs to our data. For simplicity, we use the term costs even when this refers to estimates derived from other sources. The Bureau of Labor Statistics producer price index (PPI) was used to adjust costs to December 2017 values.[18,19]

We excluded cases when the estimated costs were clearly inconsistent with the care that was provided. Maternal costs were flagged as data errors and set to missing if hospital costs-per-day were <$500 or >$10 000, or if total hospital costs were <$1000. Neonatal costs were examined separately for survivors, nonsurvivors, and major surgical cases. One surgical case with a total hospital cost-per-day of <$125 was flagged as a data error and hospital costs were set to missing. For nonsurgical cases, for survivors, hospital costs were set to missing if hospital cost-per-day was less than the first percentile for gestational age, because this threshold represented the point at which the costs were clearly in error across all gestations. For survivors with a LOS of ≤5 days, observations with hospital costs per day of >$10 000 were capped at $10 000. For nonsurvivors with a LOS of 2-5 days with hospital costs per day of >$20 000, hospital costs per day were capped at $20 000.

The **Figure** (available at www.jpeds.com) outlines how these criteria affected the study sample. Of the 1 562 901 in-hospital deliveries, 1 499 769 (96%) were linked to both maternal and infant discharge abstracts. There were 6470 cases excluded owing to missing or excluded BW or gestational age. The main reason cases were excluded was missing hospital charge data, which eliminated 203 096 cases (>85% of the excluded cases). Of these, 98% were excluded because they included ≥1 stays at a hospital operated by the Kaiser Permanente health system, which does not report hospital charges. An additional 24 991 cases were excluded because either the maternal or infant costs were considered to be outliers relative to their disease state, as described elsewhere in this article. Cases were retained only if cost and LOS information were available for both the mother and infant (only maternal costs were required for the fetal deaths). The final sample included 1 265 212 retained cases.

In addition to reporting the estimated costs, LOSs, and mortality for all infants, we report these by gestational age and BW groups. For gestational age, we used the following groups: <25, 25-27, 28-32, 32-36, 37-38, 39-41, and >41 weeks. We also provided summary groups for extremely preterm (<28 weeks), very preterm (<32 weeks), and any preterm (<37 weeks). For BW, we report on the following groups: <1000, <1500, 1000-1499, 1500-2499, <2500, and ≥2500. For each of the tables reported in the results, there is a corresponding table available online that reports by week of gestational age and narrower BW intervals.

Results

Table I reports the number of maternal cases, live births, number of the live births that were multiple births, the number of fetal and infant deaths, and the mean maternal and infant LOS for all cases and for each of the gestational age and BW groups described (see **Table II** [available at www.jpeds.com] for more detailed data). For LOS, we also report the standard deviation, median, and IQR. The final sample includes 1 245 622 deliveries (includes fetal deaths), 1 260 457 live births, and 4755 fetal deaths. There were 19 280 maternal deliveries and 37 649 live births that were from a multiple delivery. The deaths are predominately preterm (77.7%), with 60.4% of the deaths being very preterm and one-half (50.1%) being extremely preterm.

Table III reports the newborn costs until hospital discharge; these data are reported for all infants, including multiple births, by gestational age and BW (see **Table IV** [available at www.jpeds.com] for more detailed data). The mean and median costs per case declined dramatically as gestational age and BW increase, from a mean total cost of $350 000 for the smallest infants to about $2500 for term infants. In aggregate, the 8.1% of the live births that are preterm (<37 weeks) incur 60.9% of all newborn costs. Of these, the 1.0% who are very preterm (<32 weeks) incur 36.5% of all newborn costs, and the 0.4% who are extremely preterm (<28 weeks) incur 20.0% of newborn costs. This increase in the proportion of costs for each of these groups is modest compared with our data from 2000, when preterm infants, very preterm, and extremely preterm infants incurred 54%, 34%, and 19% of costs, respectively.[12] When the overall cost distribution is considered (data not shown) the results are even more skewed; the 1.2% of cases with costs of >$100 000 incur 51.0% of all infant costs. Conversely, 87.2% of the infants with costs of <$3000 incur only 15.8% of all newborn costs. We also provide this for survivors (**Table V**; available at www.jpeds.com), deaths (**Table VI**; available at www.jpeds.com), singletons (**Table VII**; available at www.jpeds.com), and multiple births (**Table VIII**; available at www.jpeds.com).

Table IX reports total maternal costs for all live births, which includes the costs of pregnancy-related prenatal hospitalizations (see **Table X** [available at www.jpeds.com] for more detailed data). The mean maternal costs for term deliveries were $7600-$7900. These costs were slightly higher for late preterm deliveries ($9600) and much higher for very preterm deliveries ($13 200-$23 300). The maternal costs are much less skewed than the infant costs; 76.5% of them were <$10 000 and these cases incurred 53.0% of all maternal costs. There were many fewer expensive cases and these cases had a much smaller share of total maternal costs; the 2.1% of the cases that exceeded $25 000 incurred 11.0% of costs. **Table IX** also provides separate information on the frequency and costs of pregnancy-related prenatal hospitalizations. About 5.5% of the maternal cases had ≥1 pregnancy-related prenatal hospitalizations and the women who had such admissions averaged 1.2 admissions. These prenatal hospitalizations represent only those cases that were officially classified as a hospital admission and do not include those cases where a woman was observed on the obstetric ward for a few hours but not officially admitted to the hospital. **Table XI** (available at www.jpeds.com) includes the cases that results in a fetal death. Summary information about the differences in maternal costs by type of delivery are reported in **Table XII** (available at www.jpeds.com). As would be expected, maternal costs were markedly higher for cesarean deliveries; the mean cost was $11 006 vs $6754 for vaginal deliveries and these differences were greater for preterm deliveries.

Table XIII provides data on how costs are split between hospitals and physicians by gestational age and BW (see **Table XIV** [available at www.jpeds.com] for more detailed data). For each cell, we report the number of cases and mean hospital and physician costs separately for mothers and infants. Overall, physician costs are 31% of total costs for mothers and 18% of the total costs for newborns. The physician's share of total costs is almost unchanged as gestational age changes for both mothers and infants; the infant physician share increases to 29% for extremely preterm cases, and the maternal physician share decreases to 29% for these cases.

Table XV (available at www.jpeds.com) reports the combined maternal and infant costs.

Discussion

These data provide a population-based update to the birth hospitalization costs and days of care for mothers and neonates. These cost estimates also include physician costs, which have been lacking in most previous studies. Maternal and especially newborn costs are sensitive to gestational age and BW, with the highest average costs accruing for infants born with a gestational age <28 weeks and for mothers delivering between 28 and 36 weeks of gestation. Newborn costs, especially those for the most preterm infants, are also sensitive to changes in survival. Compared with prior work,[12] the increase in survival among premature infants is the driver behind the 7% increase in the share of infant costs incurred by preterm infants.

Our data show how the costs for maternity and neonatal care have increased in the 10 years since we previously reported these population-based costs for California.[12] The mean maternal cost increased from $3641 to $8204 and the mean infant cost increased from $3567 to $6389. Our previous estimates did not include estimated physician reimbursement; if physician fees are excluded, the mean maternal cost is $5660

Table I. Deliveries, mortality, and maternal/newborn LOS by gestational age and BW*,†

					Newborn mortality group													
	Maternal cases	Live births	Deliveries of multiples		Survivors		In-hospital death		Fetal death		Total maternal LOS				Total newborn LOS			
	n	n	n	(%)	n	(%)	n	(%)	n	(%)	Mean	SD	Median	IQR	Mean	SD	Median	IQR
By gestational age, weeks																		
≤24	2695	1883	258	9.6	754	25.4	1129	38.1	1082	36.5	4.6	5.3	3.0	4.0	54.9	64.0	9.0	112.0
25-27	3366	3182	379	11.3	2695	71.5	1129	38.1	590	15.6	7.6	8.0	5.0	6.0	81.5	40.0	83.0	36.0
28-31	7510	8055	1121	14.9	7719	87.8	487	12.9	737	8.4	8.5	10.1	5.0	6.0	49.8	24.5	46.0	24.0
32-36	81 012	88 985	8841	10.9	88 422	98.1	1129	38.1	1191	1.3	4.8	6.9	3.0	3.0	8.7	11.9	4.0	10.0
37-38	336 080	342 624	7308	2.2	342 279	99.7	563	0.6	650	0.2	2.7	2.4	2.0	1.0	2.7	4.1	2.0	1.0
39-41	808 107	808 873	1360	0.2	808 500	99.9	1129	38.1	490	0.1	2.5	1.5	2.0	1.0	2.4	2.8	2.0	1.0
>41	6852	6855	13	0.2	6844	99.6	373	0.1	15	0.2	2.9	1.4	3.0	2.0	2.6	2.9	2.0	1.0
<28	6061	5065	637	10.5	3449	51.2	1616	24.0	1672	24.8	6.3	7.1	4.0	6.0	71.6	51.9	79.0	95.0
<32	13 571	13 120	1758	13.0	11 168	71.9	1952	12.6	2409	15.5	7.5	8.9	5.0	6.0	58.2	39.0	52.0	44.0
<37	94 583	102 105	10 599	11.2	99 590	94.2	2515	2.4	3600	3.4	5.2	7.3	3.0	3.0	15.0	24.4	4.0	15.0
All deliveries	1 245 622	1 260 457	19 280	1.6	1 257 213	99.4	3244	0.3	4755	0.4	2.8	2.7	2.0	1.0	3.5	8.3	2.0	1.0
By BW, g																		
<1000	6588	5549	834	12.7	3903	52.0	1646	21.9	1964	26.1	6.4	7.3	4.0	6.0	69.7	51.0	76.0	88.0
<1500	13 271	13 017	2035	15.3	11 037	70.9	1980	12.7	2543	16.3	7.5	9.0	5.0	5.0	56.5	40.5	51.0	51.0
1000-1499	6683	7468	1201	18.0	7134	88.7	334	4.2	579	7.2	8.5	10.2	5.0	6.0	46.7	26.6	44.0	30.0
<2500	75 920	84 983	12 143	16.0	82 408	93.1	2575	2.9	3555	4.0	5.4	7.4	3.0	3.0	17.2	26.1	6.0	17.0
1500-2499	62 649	71 966	10 108	16.1	71 371	97.8	595	0.8	1012	1.4	4.9	7.0	3.0	3.0	10.1	13.2	4.0	12.0
≥2500	1 169 702	1 175 474	7137	0.6	1 174 805	99.8	669	0.1	1200	0.1	2.6	2.0	2.0	1.0	2.5	3.3	2.0	1.0

*Data source: 2009-2011 California linked vital statistics—patient discharge data.
†Costs PPI adjusted to December 2017.

Table III. Newborn costs by gestational age and BW*,†

	Live births, n	Total newborn costs, $					Newborn costs per day, $	
		Total	Mean	SD	Median	IQR	Mean	Median
Gestational age group, weeks								
≤24	1883	494 855 663	262 802	339 862	71 329	464 280	4488	3897
25-27	3182	1 115 722 584	350 636	269 326	296 191	270 226	4680	3825
28-31	8055	1 327 398 922	164 792	149 503	123 595	114 818	3275	2698
32-36	88 985	1 966 778 897	22 102	54 961	3208	25 088	1615	1031
37-38	342 624	1 156 140 160	3374	21 571	1135	955	760	546
39-41	808 873	1 968 261 372	2433	13 366	1097	894	729	554
>41	6855	23 926 547	3490	14 688	1260	1205	875	619
<28	5065	1 610 578 247	317 982	300 489	269 974	376 964	4609	3837
<32	13 120	2 937 977 169	223 931	232 676	150 136	210 179	3790	3045
<37	102 105	4 904 756 065	48 036	118 955	6956	39 639	1894	1379
All deliveries	1 260 457	8 053 084 144	6389	39 263	1153	1042	833	565
BW group, g								
Extremely LBW, <1000	5549	1 711 096 197	308 361	300 869	250 711	366 233	4521	3769
Very LBW <1500	13 017	2 859 433 962	219 669	237 120	145 768	223 414	3756	3024
BW 1000-1499	7468	1 148 337 765	153 768	143 393	117 195	123 514	3188	2653
All LBW, <2500	84 983	4 728 079 717	55 636	127 807	11 818	49 178	1987	1551
BW 1500-2499	71 966	1 868 645 755	25 966	58 075	4428	29 872	1667	1169
BW ≥2500	1 175 474	3 325 004 427	2829	16 856	1113	925	749	554

LBW, low BW.
*Data Source: 2009-2011 California linked vital statistics—patient discharge data.
†Costs PPI adjusted to December 2017.

(55% increase) and the mean newborn cost is $5239 (47% increase). Adjusting for inflation, these cost increases are modest; 10.3% for maternal delivery hospitalizations and 4.3% for neonatal hospitalization costs.[18] Some of the increase in maternal costs is likely associated with the increased rate of cesarean deliveries (mean difference of $4550; **Table XII**), which has reversed in more recent years.[20] These differences help to highlight why it is important to periodically update the estimates of the costs of maternal and infant care to account for changes in survival and clinical practice.

Although the overall newborn costs have been essentially constant, those for the smallest infants have increased; after adjustment for physician fees and inflation, the costs for very preterm infants increased by 92.4%. Some of this increase can be attributed to the fact the survival roughly doubled for these smallest infants and the difference is sensitive to gestational age; at the lowest gestational age, the average cost for a survivor is hundreds of thousands more than for nonsurvivors (**Table V** and **Table VI**). But because the mean LOS for these infants only increased by about 10 days, the increased survival does not account for all, or even most, of the 90% increase in costs for these infants. Although our analyses are not designed to identify the causes, this implies that these infants have become significantly more expensive to treat, both overall, and in cost per day. Additional analyses are needed to understand why very preterm infants have become so much more expensive to treat.

The maternal data highlight some important public health trends in maternal child health. First, operative mode of delivery increases the costs of childbirth by 63%, with even greater increases seen in women who deliver prematurely. These costs are secondary to both physician fees, which are increased for operative deliveries, and for the longer LOSs typically seen in women who deliver via cesarean delivery. With growing evidence that many of these deliveries may be occurring in low-risk women,[5,21] the baseline added costs of these deliveries are a concerning trend in maternity care. Second, we found significant economic impact of the women who deliver moderately and late preterm, with similar LOSs for women who deliver at 32-36 weeks of gestation to those who deliver at 24 weeks of gestation or less, and greater overall costs of care.

Neonatal data differ from maternal data in the importance of the outlier patients: for neonates, the 1.2% of infants whose costs were >$100 000 made up 51% of the economic impact of newborn care, whereas the 2.1% of women whose costs were >$25 000 only made up 11% of the maternal costs. These infants are the sickest, smallest infants whose LOSs, medical requirements, and transfers of care within the medical system are the greatest and provide an area of intervention to decrease the economic costs of neonatal care.

There are limitations to our data. They are from California, where hospital costs are higher than the US average. Care patterns and costs could be different in other parts of the country. In 2014, average US hospital costs were 69% of those in California,[22] which can be used as the basis of adjusting our results to obtain estimates of the national average costs for delivery care.[22] When considering aggregate costs, one also needs to consider that preterm rates in California are lower than the national average. Thus, using these data to project national costs would require adjustments for the differences in the gestational age distribution.

There are some limitations to the estimated costs in our study because we did not directly observe either physician or hospital costs. First, the hospital and physician costs are not fully equivalent. The hospital costs are estimated by converting hospital charges to estimated costs using hospital-level cost-to-

Table IX. Maternal costs by gestational age and BW*,†

	Maternal cases, n	Live births, n	Visits		Maternal prenatal hospitalization costs, $					Total maternal hospitalization costs (prenatal + delivery),				
			Any prenatal, n	Total prenatal, n	Total	Mean	SD	Median	IQR	Total	Mean	SD	Median	IQR
By gestational age, weeks														
≤24	1701	1883	345	397	2 074 150	7031	8253	4463	5788	27 262 370	15 832	15 493	10 828	13 034
25-27	2819	3182	689	864	4 315 907	7241	7935	4224	7012	66 530 509	23 311	22 832	16 287	18 997
28-31	6805	8055	1883	2414	14 007 466	9096	13 348	4958	7540	166 938 852	24 163	27 157	15 840	18 173
32-36	79 871	88 985	14 070	18 518	112 533 373	9361	15 680	4834	6941	1 055 492 860	13 154	17 660	8837	8238
37-38	335 449	342 624	21 597	26 444	142 585 339	6860	11 694	3809	5031	2 658 457 157	7920	6688	6534	4846
39-41	807 617	808 873	29 669	34 122	172 204 673	5829	8835	3516	4533	6 150 045 721	7611	5180	6456	4737
>41	6837	6855	375	423	1 735 356	4628	5473	3027	3850	65 972 605	9638	6595	7868	6629
<28	4520	5065	1034	1261	6 390 057	7172	8037	4347	6722	93 792 879	20 497	20 700	14 106	16 845
<32	11 325	13 120	2917	3675	20 397 523	8391	11 720	4760	7101	260 731 731	22 702	24 851	15 163	17 627
<37	91 196	102 105	16 987	22 193	132 930 896	9198	15 091	4820	6978	1 316 224 591	14 350	18 977	9311	9394
All deliveries	1 241 099	1 260 457	68 628	83 182	449 456 263	6898	11 464	3843	5172	10 190 700 074	8204	7708	6626	5023
By BW, g														
<1000	4787	5549	1170	1437	6 991 174	7336	8340	4461	6755	102 658 251	21 401	22 121	14 813	17 139
<1500	10 921	13 017	2902	3682	20 267 240	8793	13 842	4863	7442	253 999 879	23 036	25 648	15 437	17 460
1000-1499	6134	7468	1732	2245	13 276 066	9820	16 590	5147	7969	151 341 628	24 296	28 001	15 758	17 801
<2500	72 590	84 983	13 839	18 137	106 264 247	9548	15 747	4922	7214	1 097 404 268	15 031	19 530	9719	9910
1500-2499	61 669	71 966	10 937	14 455	85 997 007	9746	16 203	4944	7156	843 404 389	13 607	17 856	9131	8557
≥2500	1 168 509	1 175 474	54 789	65 045	343 192 016	6352	10 280	3681	4813	9 093 295 806	7777	6018	6504	4812

*Data source: 2009-2011 California linked vital statistics—patient discharge data.
†Costs PPI adjusted to December 2017.

Table XIII. Mean maternal and newborn hospital and professional costs*,†

	Maternal count, n	Total maternal hospital costs, mean $	Total maternal MD costs, mean $	Live births, n	Total newborn hospital costs, mean $	Total newborn MD costs, mean $
Obstetrician estimate of gestational age group, weeks						
≤24	2695	9814	4145	1883	216 834	51 332
25-27	3366	15 332	6111	3182	286 881	67 155
28-31	7510	16 341	6498	8055	136 201	30 165
32-36	81 012	9344	3796	88 985	18 635	3704
37-38	336 080	5459	2464	342 624	2887	566
39-41	808 107	5165	2448	808 873	2107	397
>41	6852	6584	3049	6855	2995	589
<28	6061	12 877	5236	5065	260 840	61 273
<32	13 571	14 794	5934	13 120	184 318	42 174
<37	94 583	10 134	4106	102 105	39 924	8647
All	1 245 622	5631	2582	1 260 457	5387	1113
BW group, g	1 239 034	5590	2567	1 254 908	4293	854
Extremely LBW, <1000	6588	13 242	5362	5549	252 851	59 667
Very LBW <1500	13 271	14 951	5949	13 017	180 644	41 387
BW 1000-1499	6683	16 630	6526	7468	126 992	27 805
All LBW, <2500	75 920	10 569	4280	84 983	46 230	10 058
BW 1500-2499	62 649	9632	3923	71 966	21 917	4392
BW ≥2500	1 169 702	5309	2471	1 175 474	2435	466

*Data source: 2009-2011 California linked vital statistics—patient discharge data.
†Costs PPI adjusted to December 2017.

charge ratios; physician costs are estimated by the average payments to physicians, measured separately for privately insurance and Medicaid. In addition to not being equivalent, each of these methods of estimating costs has limitations. For hospital costs, it is possible that these ratios do not reflect the actual difference between costs and charges for care provided in neonatal and obstetric units. However, these methods have been used for estimating neonatal and obstetric unit hospital costs in prior work. There is no way to know the extent that this method may bias the estimates, but we expect that any bias will be moderate. For physician costs, we are making the assumption that the actual physician revenue is a reasonable proxy for costs.

Our results are also sensitive to the choice of index to adjust for inflation, but there is no "perfect" index to adjust hospital costs for inflation.[19] It has been demonstrated that the medical component of the consumer price index significantly overstates actual medical care inflation. Because the results of our analysis are the production costs of care for mothers and neonates, a PPI is more consistent with our intent. PPIs also have limitations because they are based on revenue to producers and there are significant disconnects between revenue and production costs for hospitals, which vary greatly across different types of insurance. Although the Bureau of Labor Statistics recently started reporting separate hospital PPIs for different types of insurance, these data do not extend back to 2000, which would preclude the comparisons that we make with our previous work. **Table XVI** (available at www.jpeds.com) shows how the different measures would affect the inflation adjustments for 2010-2017 and 1999-2017. In general, with the exception of the medical component of the consumer price index, the effect of the choice of index on the inflation adjustment is small. Of note, there is no consistency over which measure has the higher inflation adjustment; for example, the overall PPI has a larger inflation adjustment than the Hospital Services PPI for 1999-2017, but a lower adjustment for 2010-2017.

The exclusion of all Kaiser cases owing to a lack of cost information is also a potential source of bias, because these cases are predominantly patients with private insurance. However, the share of patients with private insurance is still large (48%) and the net effect of this exclusion is modest; if all of the Kaiser cases had been included, privately insured patients would make up 54% of the sample.

Our exclusion of infant readmissions does result in the exclusion of some costs that could be considered related to delivery. Although the greatest volume of these cases is probably related to neonatal jaundice, the impact of excluding the jaundice cases should be moderate, given their relatively low cost.[23] Conversely, there are cases of readmission incurring much higher costs, such as infants readmitted for major cardiac surgery. Also, the sickest infants born at the youngest gestational ages have the highest risk of a hospital readmission, which adds to the economic burden of these high severity patients.[24]

In conclusion, our data demonstrate that maternal and infant costs are sensitive to the timing of delivery, the mode of delivery, and changes in survival, especially for the sickest of infants. Even with these increasing costs, neonatal intensive care remains a highly cost-effective intervention when compared with other interventions.[25-27] Such data highlight the persistent economic impact of childbirth in the US and areas for further intervention in the face of ongoing changes in survival and technology. ■

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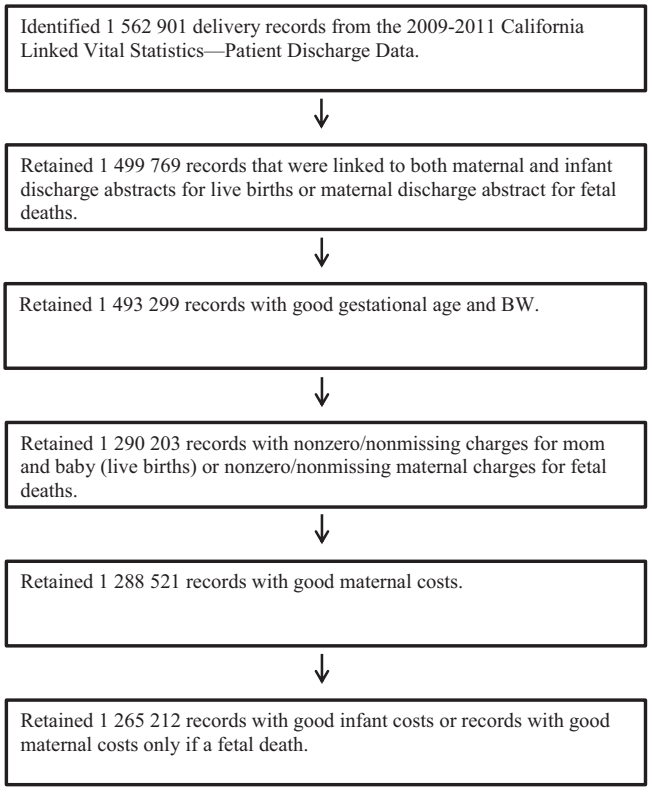

Figure. Derivation of the study sample.

Table II. Deliveries, mortality, and maternal/infant LOS*

					Mortality group											
			Deliveries of multiples		Survivors		In-hospital death		Total maternal LOS				Total newborn LOS			
	Maternal cases, n	Live births, n	n	(%)	n	(%)	n	(%)	Mean	SD	Median	IQR	Mean	SD	Median	IQR
Gestational age in completed weeks																
22	317	351	32	10.1	26	7.4	325	92.6	3.7	4.2	2.0	3.0	15.0	46.2	1.0	0.0
23	586	649	68	11.6	208	32.1	441	68.0	5.2	6.0	3.0	4.0	46.0	62.7	2.0	108.0
24	798	883	89	11.2	520	58.9	363	41.1	6.7	6.2	5.0	6.0	77.2	61.7	94.0	116.0
25	855	962	105	12.3	745	77.4	217	22.6	7.8	7.4	5.0	7.0	87.8	48.2	95.0	41.0
26	928	1038	108	11.6	881	84.9	157	15.1	8.6	7.9	6.0	9.0	82.7	38.4	85.0	32.0
27	1036	1182	141	13.6	1069	90.4	113	9.6	9.0	8.9	6.0	7.0	75.2	32.5	74.0	27.0
28	1213	1435	186	15.3	1338	93.2	97	6.8	9.4	10.4	6.0	7.0	66.6	28.4	64.0	25.0
29	1440	1681	225	15.6	1599	95.1	82	4.9	9.4	9.9	6.0	7.0	56.6	23.7	53.0	20.0
30	1825	2149	282	15.5	2071	96.4	78	3.6	9.3	11.2	6.0	6.0	48.0	21.2	45.0	17.0
31	2327	2790	405	17.4	2711	97.2	79	2.8	8.5	10.1	5.0	6.0	38.6	18.2	35.0	16.0
32	3692	4388	635	17.2	4295	97.9	93	2.1	8.3	10.2	5.0	6.0	29.5	15.1	27.0	13.5
33	5589	6601	949	17.0	6508	98.6	93	1.4	7.4	9.5	5.0	4.0	20.8	14.1	18.0	11.0
34	11 522	13 266	1621	14.1	13 150	99.1	116	0.9	6.4	8.9	4.0	3.0	12.8	12.2	11.0	11.0
35	19 111	21 401	2255	11.8	21 296	99.5	105	0.5	4.6	6.4	3.0	2.0	7.1	9.8	4.0	7.0
36	39 957	43 329	3351	8.4	43 173	99.6	156	0.4	3.8	4.9	3.0	2.0	4.2	7.4	3.0	2.0
37	96 127	100 075	3957	4.1	99 911	99.8	164	0.2	3.0	3.1	2.0	1.0	3.0	5.2	2.0	1.0
38	239 322	242 549	3339	1.4	242 368	99.9	181	0.1	2.6	1.9	2.0	1.0	2.5	3.5	2.0	1.0
39	428 873	429 703	977	0.2	429 495	100.0	208	0.1	2.5	1.5	2.0	1.0	2.4	3.0	2.0	1.0
40	296 857	297 185	313	0.1	297 065	100.0	120	0.0	2.5	1.4	2.0	1.0	2.3	2.7	2.0	1.0
41	81 887	81 985	70	0.1	81 940	100.0	45	0.1	2.8	1.7	3.0	1.0	2.4	2.8	2.0	1.0
42	6169	6183	9	0.2	6175	99.9	8	0.1	2.9	1.4	3.0	2.0	2.5	2.9	2.0	1.0
43	473	476	3	0.6	474	99.6	2	0.4	2.7	1.8	2.0	1.0	2.7	3.1	2.0	2.0
44	147	148	1	0.7	147	99.3	1	0.7	2.4	1.0	2.0	1.0	2.9	4.3	2.0	1.0
45	48	48	0	0.0	48	100.0	-	-	2.3	0.9	2.0	1.0	2.3	1.5	2.0	0.5
All	1 241 099	1 260 457	19 121	1.5	1 257 213	99.7	3244	0.3	2.8	2.7	2.0	1.0	3.5	8.3	2.0	1.0

(*continued*)

Table II. Continued

	Maternal cases, n	Live births, n	Deliveries of multiples		Mortality group: Survivors		Mortality group: In-hospital death		Total maternal LOS				Total newborn LOS			
			n	(%)	n	(%)	n	(%)	Mean	SD	Median	IQR	Mean	SD	Median	IQR
BW group, g																
<500	353	397	46	13.0	82	20.7	315	79.4	5.5	5.5	4.0	5.0	32.5	58.1	1.0	21.0
500-599	748	831	83	11.1	323	38.9	508	61.1	5.9	6.1	4.0	5.0	52.6	63.6	8.0	108.0
600-699	829	939	94	11.3	573	61.0	366	39.0	7.2	6.9	5.0	6.0	75.0	58.6	91.0	112.0
700-799	878	978	103	11.7	775	79.2	203	20.8	7.8	7.2	6.0	6.0	85.1	47.4	91.0	48.0
800-899	843	966	136	16.1	826	85.5	140	14.5	8.5	7.8	6.0	7.0	81.8	39.7	85.0	37.0
900-999	991	1116	114	11.5	1020	91.4	96	8.6	9.3	9.7	6.0	7.0	72.8	32.6	72.0	31.0
1000-1099	955	1105	132	13.8	1022	92.5	83	7.5	8.8	8.8	6.0	6.0	62.6	29.5	62.0	28.0
1100-1199	1067	1262	186	17.4	1183	93.7	79	6.3	9.7	11.4	6.0	6.0	56.8	28.0	54.0	30.0
1200-1299	1076	1282	174	16.2	1216	94.9	66	5.2	9.2	10.4	6.0	6.0	50.7	23.4	50.0	25.0
1300-1399	1417	1663	223	15.7	1602	96.3	61	3.7	8.7	10.3	5.0	6.0	43.1	25.1	41.0	25.0
1400-1499	1386	1672	232	16.7	1613	96.5	59	3.5	8.9	10.9	5.0	5.0	37.7	21.6	35.0	23.0
1500-1599	1800	2167	347	19.3	2119	97.8	48	2.2	8.1	10.3	5.0	5.0	33.4	20.6	31.0	21.0
1600-1699	1839	2219	360	19.6	2163	97.5	56	2.5	7.8	9.8	5.0	5.0	28.2	16.4	25.0	20.0
1700-1799	2462	3007	466	18.9	2957	98.3	50	1.7	7.5	9.7	5.0	4.0	24.0	15.2	21.0	17.0
1800-1899	3263	3903	675	20.7	3846	98.5	57	1.5	6.6	8.6	4.0	3.0	19.2	15.3	16.0	16.0
1900-1999	3548	4287	715	20.2	4233	98.7	54	1.3	6.5	8.9	4.0	3.0	16.4	14.7	14.0	15.0
2000-2249	14 836	17 343	2456	16.6	17 179	99.1	164	1.0	5.3	7.4	4.0	3.0	10.3	11.7	7.0	11.0
2250-2499	32 250	35 680	3397	10.5	35 511	99.5	169	0.5	3.9	5.2	3.0	2.0	5.6	8.9	3.0	3.0
2500-2749	67 400	70 948	3426	5.1	70 806	99.8	142	0.2	3.1	3.8	3.0	1.0	3.4	5.6	2.0	1.0
2750-2999	150 074	152 824	2930	2.0	152 684	99.9	140	0.1	2.7	2.6	2.0	1.0	2.6	3.9	2.0	1.0
3000-3249	239 748	241 354	1606	0.7	241 220	99.9	134	0.1	2.6	1.8	2.0	1.0	2.4	3.3	2.0	1.0
3250-3499	266 796	267 527	721	0.3	267 424	100.0	103	0.0	2.5	1.6	2.0	1.0	2.4	3.0	2.0	1.0
3500-3749	216 315	216 594	313	0.1	216 521	100.0	73	0.0	2.6	1.6	2.0	1.0	2.4	2.6	2.0	1.0
3750-3999	130 749	130 853	114	0.1	130 821	100.0	32	0.0	2.6	1.5	2.0	1.0	2.4	2.7	2.0	1.0
≥4000	99 476	99 540	72	0.1	99 494	100.0	46	0.1	2.7	1.5	3.0	1.0	2.7	3.3	2.0	1.0

*2009-2011 California linked data, matched good cost/LOS cases only, by gestational age and BW (live births only).

Table IV. Newborn costs*

	Live births	Total newborn costs, $					Newborn costs/day, $	
	n	Total	Mean	SD	Median	IQR	Mean	Median
Gestational age in completed weeks								
22	351	24 652 306	70 234	237 359	559	1287	1745	557
23	649	142 556 390	219 655	314 534	22 696	440 917	4520	3961
24	883	327 646 967	371 061	351 515	337 975	509 178	5555	4571
25	962	393 271 216	408 806	307 788	369 184	323 941	5201	4326
26	1038	372 412 367	358 779	262 885	312 110	249 395	4844	3873
27	1182	350 039 000	296 141	227 641	242 737	197 894	4112	3426
28	1435	351 133 715	244 692	188 261	196 463	167 739	3759	3119
29	1681	325 837 182	193 835	143 121	156 289	121 957	3479	2934
30	2149	325 229 989	151 340	140 769	116 046	88 504	3165	2591
31	2790	325 198 036	116 558	111 631	88 868	72 754	2989	2450
32	4388	381 320 365	86 901	92 958	64 468	55 777	2875	2379
33	6601	389 116 565	58 948	72 843	41 735	37 938	2754	2301
34	13 266	459 120 137	34 609	61 494	24 018	30 252	2314	2036
35	21 401	376 826 027	17 608	47 664	3613	18 746	1615	1059
36	43 329	360 395 802	8318	36 887	1546	2494	1099	639
37	100 075	465 418 087	4651	27 663	1220	1144	846	568
38	242 549	690 722 073	2848	18 455	1105	886	725	538
39	429 703	1 045 697 345	2434	14 413	1103	873	704	539
40	297 185	690 522 574	2324	11 490	1065	884	740	565
41	81 985	232 041 453	2830	13 967	1190	1074	823	602
42	6183	20 973 517	3392	14 210	1251	1190	868	617
43	476	1 882 972	3956	12 464	1269	1297	911	609
44	148	940 707	6356	32 293	1333	1335	1022	685
45	48	129 351	2695	6584	1348	1292	897	764
All	1 260 457	8 053 084 144	6389	39 263	1153	1042	833	565
BW group, g								
<500	397	66 281 751	166 957	335 084	1608	124 975	3 375	1510
500-599	831	207 867 322	250 141	337 161	63 772	450 110	4522	3889
600-699	939	334 348 652	356 069	334 340	326 416	500 329	5228	4408
700-799	978	378 904 094	387 428	303 918	341 603	327 263	4953	4135
800-899	966	353 997 882	366 457	279 308	316 643	271 971	4791	4010
900-999	1116	309 005 181	276 886	219 191	224 128	201 403	3999	3308
1000-1099	1105	248 588 531	224 967	181 474	182 427	170 528	3642	3041
1100-1199	1262	248 215 139	196 684	161 653	153 732	145 142	3492	2873
1200-1299	1282	219 051 194	170 867	139 705	135 772	127 617	3377	2764
1300-1399	1663	224 088 089	134 749	132 908	103 183	100 037	2962	2505
1400-1499	1672	196 322 490	117 418	110 494	88 552	89 758	3033	2506
1500-1599	2167	214 676 945	99 066	105 407	72 780	74 826	2816	2379
1600-1699	2219	181 948 009	81 996	86 181	60 384	66 025	2809	2316
1700-1799	3007	199 769 094	66 435	71 538	48 352	53 861	2631	2233
1800-1899	3903	208 447 459	53 407	78 460	35 478	45 892	2468	2151
1900-1999	4287	192 286 577	44 853	65 946	29 464	40 561	2398	2051
2000-2249	17 343	463 626 397	26 733	53 871	12 773	31 117	1867	1592
2250-2499	35 680	444 774 029	12 466	42 382	1756	8516	1267	693
2500-2749	70 948	402 403 751	5672	27 832	1268	1260	904	583
2750-2999	152 824	508 407 478	3327	19 737	1124	942	767	553
3000-3249	241 354	640 954 598	2656	18 008	1081	873	726	547
3250-3499	267 527	647 809 644	2421	15 928	1077	871	719	546
3500-3749	216 594	509 279 986	2351	12 168	1093	893	724	549
3750-3999	130 853	320 297 202	2448	10 994	1129	932	743	558
≥4000	99 540	331 732 650	3333	17 109	1248	1121	824	584

*2009-2011 California linked data, matched good cost/LOS cases only, by gestational age and BW (live births only), costs adjusted to December, 2017.

Table V. Newborn costs, survivors only*

	Live births, n	Total newborn costs, $					Newborn costs/day, $	
		Total	Mean	SD	Median	IQR	Mean	Median
Gestational age in completed weeks								
22	26	18 552 327	713 551	278 558	706 060	308 858	4658	4743
23	208	123 854 006	595 452	248 527	534 252	263 931	4607	4389
24	520	290 187 727	558 053	301 505	480 393	324 295	4512	4122
25	745	360 888 863	484 415	266 709	431 438	274 280	4423	4096
26	881	348 743 191	395 849	228 087	336 104	238 867	4117	3667
27	1069	336 232 339	314 530	218 934	257 120	188 841	3714	3307
28	1338	340 581 455	254 545	170 495	205 866	163 097	3518	3052
29	1599	318 276 739	199 047	139 444	161 337	120 848	3265	2896
30	2071	311 146 889	150 240	115 667	117 426	87 695	2968	2566
31	2711	316 056 474	116 583	105 465	89 821	71 993	2864	2424
32	4295	370 284 131	86 213	78 838	65 057	55 127	2777	2369
33	6508	381 694 131	58 650	70 087	41 832	37 707	2681	2292
34	13 150	447 188 586	34 007	56 180	24 021	30 094	2268	2031
35	21 296	367 096 490	17 238	44 018	3592	18 649	1586	1052
36	43 173	350 064 172	8108	35 568	1544	2460	1076	638
37	99 911	448 177 401	4486	25 308	1219	1141	836	567
38	242 368	675 921 921	2789	16 591	1105	885	721	537
39	429 495	1 022 439 555	2381	13 297	1102	873	701	538
40	297 065	683 906 492	2302	11 228	1065	883	738	565
41	81 940	228 963 944	2794	13 046	1190	1073	821	602
42	6175	20 938 199	3391	14 218	1251	1187	866	617
43	474	1 880 572	3967	12 489	1269	1313	909	609
44	147	940 165	6396	32 399	1343	1328	1025	685
45	48	129 351	2695	6584	1348	1292	897	764
All	1 257 213	7 764 145 121	6176	37 156	1151	1037	819	565
BW group, g								
<500	82	47 348 422	577 420	308 092	550 884	294 438	4512	4213
500-599	323	181 025 844	560 452	298 451	509 316	325 139	4482	4206
600-699	573	298 820 780	521 502	271 177	465 939	319 435	4470	4144
700-799	775	355 606 680	458 847	280 694	393 403	285 284	4336	3949
800-899	826	334 818 993	405 350	262 205	344 024	258 080	4224	3798
900-999	1020	293 451 858	287 698	192 408	236 649	191 787	3564	3214
1000-1099	1022	238 306 452	233 177	168 410	192 502	169 515	3320	2970
1100-1199	1183	240 379 106	203 195	155 932	160 734	142 917	3241	2822
1200-1299	1216	212 255 333	174 552	131 409	139 658	125 027	3165	2722
1300-1399	1602	220 618 073	137 714	131 547	106 272	99 051	2845	2491
1400-1499	1613	192 169 476	119 138	108 217	90 112	89 101	2909	2485
1500-1599	2119	208 864 124	98 567	95 368	73 664	74 619	2749	2374
1600-1699	2163	179 764 805	83 109	86 448	61 246	65 435	2726	2310
1700-1799	2957	195 769 996	66 206	65 116	48 539	53 602	2576	2230
1800-1899	3846	200 638 408	52 168	66 561	35 590	45 503	2392	2145
1900-1999	4233	187 557 523	44 308	62 471	29 506	40 235	2312	2040
2000-2249	17 179	454 226 314	26 441	53 004	12 807	31 000	1819	1586
2250-2499	35 511	426 760 025	12 018	38 453	1750	8307	1239	691
2500-2749	70 806	388 950 395	5493	25 075	1267	1253	894	583
2750-2999	152 684	492 994 792	3229	17 341	1124	941	762	552
3000-3249	241 220	627 702 158	2602	15 906	1080	872	722	547
3250-3499	267 424	639 308 656	2391	15 480	1077	871	717	546
3500-3749	216 521	504 756 719	2331	11 942	1092	893	722	549
3750-3999	130 821	316 781 571	2421	10 435	1129	931	741	558
≥4000	99 494	325 268 616	3269	15 718	1248	1120	821	584

*2009-2011 California linked data, matched good cost/LOS cases only, by gestational age and BW (live births only), costs adjusted to December, 2017.

Table VI. Newborn costs, in-hospital deaths*

	Live births, n	Total newborn costs, $					Newborn costs/day, $	
		Total	Mean	SD	Median	IQR	Mean	Median
Gestational age in completed weeks								
22	325	6 099 979	18 769	137 860	525	823	1512	516
23	441	18 702 384	42 409	135 625	2459	26 507	4479	2425
24	363	37 459 240	103 194	220 334	25 112	88 696	7050	6957
25	217	32 382 353	149 227	298 415	36 160	148 069	7871	7437
26	157	23 669 176	150 759	338 551	40 597	139 758	8926	7735
27	113	13 806 662	122 183	235 802	47 622	123 706	7880	6587
28	97	10 552 260	108 786	323 364	18 589	72 896	7071	6166
29	82	7 560 442	92 201	173 911	31 012	99 620	7640	6647
30	78	14 083 100	180 553	438 436	25 343	62 273	8379	7655
31	79	9 141 562	115 716	243 163	25 076	105 361	7256	6286
32	93	11 036 234	118 669	347 722	12 361	91 220	7417	5936
33	93	7 422 434	79 811	181 031	25 922	66 499	7888	6385
34	116	11 931 551	102 858	265 658	21 415	71 149	7504	6011
35	105	9 729 537	92 662	255 011	15 670	44 849	7492	5716
36	156	10 331 630	66 228	156 861	9957	49 026	7398	5037
37	164	17 240 686	105 126	258 963	16 578	71 906	6868	5366
38	181	14 800 152	81 769	286 416	10 843	63 434	6515	4585
39	208	23 257 791	111 816	228 805	20 948	75 008	6990	5681
40	120	6 616 082	55 134	110 404	8472	49 050	5678	2905
41	45	3 077 509	68 389	205 295	5436	34 184	5175	3399
42	8	35 318	4415	4567	3205	3647	3052	2305
43	2	2400	1200	1021	1200	1444	1200	1200
44	1	542	542	†	542	0	542	542
All	3244	288 939 023	89 069	238 988	11 299	68 404	6319	5298
BW group, g								
<500	315	18 933 329	60 106	248 325	910	3684	3079	865
500-599	508	26 841 478	52 838	170 811	2337	32 245	4547	2337
600-699	366	35 527 872	97 071	248 591	18 800	80 244	6416	6024
700-799	203	23 297 413	114 766	224 863	29 469	116 190	7307	7196
800-899	140	19 178 889	136 992	267 432	39 561	143 532	8134	7251
900-999	96	15 553 324	162 014	390 135	40 229	112 423	8622	6947
1000-1099	83	10 282 079	123 880	281 179	21 552	82 864	7598	6453
1100-1199	79	7 836 033	99 190	209 114	25 159	96 410	7257	6229
1200-1299	66	6 795 861	102 968	238 589	30 513	90 572	7294	6225
1300-1399	61	3 470 016	56 886	145 483	7367	52 702	6035	4383
1400-1499	59	4 153 014	70 390	154 699	18 419	50 554	6413	5858
1500-1599	48	5 812 821	121 100	318 855	11 230	59 517	5743	6017
1600-1699	56	2 183 203	38 986	61 789	10 966	47 563	6035	5108
1700-1799	50	3 999 098	79 982	240 774	15 813	67 226	5881	4072
1800-1899	57	7 809 052	137 001	342 824	15 709	90 369	7649	5578
1900-1999	54	4 729 054	87 575	195 404	21 267	66 882	9151	6826
2000-2249	164	9 400 083	57 318	108 353	9556	70 327	6890	5143
2250-2499	169	18 014 004	106 592	244 921	15 489	80 344	7114	5716
2500-2749	142	13 453 356	94 742	256 948	6976	40 801	5977	2720
2750-2999	140	15 412 686	110 091	294 037	16 435	89 035	6925	5635
3000-3249	134	13 252 440	98 899	346 795	15 179	53 781	7181	6050
3250-3499	103	8 500 987	82 534	175 313	20 547	61 945	8213	5370
3500-3749	73	4 523 267	61 963	113 687	18 284	55 845	7851	6794
3750-3999	32	3 515 631	109 863	197 001	20 894	114 987	8642	6944
≥4000	46	6 464 034	140 522	286 332	13 234	91 921	7485	7268

*2009-2011 California linked data, matched good cost/LOS cases only, by gestational age and BW (live births only), costs adjusted to December, 2017.
†Indicates that there was only one observation, so the standard deviation is not defined.

Table VII. Newborn costs—singletons*

	Live births	Total newborn costs, $					Newborn costs/day, $	
	n	Total	Mean	SD	Median	IQR	Mean	Median
Gestational age in completed weeks based on OB estimate of gestational age from BC								
22	288	21 098 140	73 257	244 093	559	1263	1652	557
23	520	107 982 349	207 658	300 552	16 423	431 851	4125	3734
24	711	256 973 677	361 426	333 003	337 807	503 489	5383	4462
25	754	303 065 552	401 944	290 428	364 938	311 666	4995	4231
26	824	286 921 524	348 206	263 668	299 776	235 878	4693	3753
27	899	267 313 419	297 345	231 968	242 853	198 286	3946	3369
28	1032	247 064 744	239 404	187 981	193 313	166 346	3685	3049
29	1230	234 958 512	191 023	147 076	152 031	119 313	3475	2891
30	1551	227 339 105	146 576	141 290	113 521	81 492	3116	2564
31	1938	218 658 859	112 827	113 041	85 531	66 790	2964	2399
32	3075	267 660 678	87 044	101 104	62 347	55 277	2898	2355
33	4665	273 458 653	58 619	80 983	40 204	36 795	2785	2293
34	9954	330 562 367	33 209	66 478	21 405	30 095	2273	1986
35	16 889	291 288 701	17 247	49 361	2851	17 237	1597	987
36	36 658	301 471 878	8224	38 656	1452	2250	1100	639
37	92 247	428 274 356	4643	28 196	1181	1097	847	569
38	236 088	667 135 409	2826	18 520	1095	870	725	538
39	428 050	1 036 678 986	2422	14 362	1101	872	703	539
40	296 712	686 848 581	2315	11 456	1065	883	739	565
41	81 891	231 384 121	2826	13 966	1189	1073	823	602
42	6168	20 862 136	3382	14 206	1250	1186	868	617
43	470	1 871 184	3981	12 540	1269	1278	911	609
44	146	935 170	6405	32 512	1320	1338	1023	678
45	48	129 351	2695	6584	1348	1292	897	764
All	1 222 808	6 709 937 448	5487	35 502	1133	993	810	563
BW group, g								
<500	312	57 630 320	184 713	355 960	1569	263 803	3332	1462
500-599	667	155 093 973	232 525	311 599	47 140	422 508	4188	3562
600-699	738	252 511 101	342 156	327 716	316 212	481 634	4931	4200
700-799	777	301 183 423	387 623	307 310	342 164	325 229	4796	4054
800-899	710	250 802 116	353 242	259 890	307 927	256 426	4675	3889
900-999	881	243 848 622	276 786	228 122	223 010	197 211	3880	3290
1000-1099	825	182 011 980	220 621	176 545	181 018	165 513	3475	2970
1100-1199	889	172 437 556	193 968	162 474	153 008	142 479	3464	2868
1200-1299	913	155 442 379	170 255	150 279	131 038	125 158	3398	2763
1300-1399	1203	157 555 575	130 969	130 579	100 827	98 679	2904	2469
1400-1499	1159	134 400 530	115 962	109 714	85 510	88 674	3046	2464
1500-1599	1462	147 795 472	101 091	116 201	71 347	75 956	2787	2350
1600-1699	1490	119 762 773	80 378	92 137	57 038	64 554	2821	2269
1700-1799	2010	134 472 535	66 902	77 846	48 208	53 591	2650	2212
1800-1899	2602	141 198 382	54 265	82 874	34 726	48 392	2468	2145
1900-1999	2840	131 950 734	46 462	72 275	29 516	41 150	2455	2058
2000-2249	12 411	343 785 391	27 700	59 777	12 232	30 803	1904	1598
2250-2499	28 905	361 013 329	12 490	45 283	1621	7639	1266	692
2500-2749	64 027	354 650 177	5539	28 413	1215	1172	896	583
2750-2999	147 232	483 647 448	3285	19 702	1106	916	766	553
3000-3249	238 278	628 425 556	2637	17 888	1074	864	725	547
3250-3499	266 229	643 409 834	2417	15 955	1074	868	719	546
3500-3749	216 098	507 311 228	2348	12 167	1091	891	724	550
3750-3999	130 695	319 264 361	2443	10 971	1129	931	743	558
≥4000	99 455	330 332 657	3321	17 009	1248	1121	823	584

BC, birth certificate; *OB*, obstetrician.
*2009-2011 CA linked data, matched good cost/LOS cases only, by OB estimate of gestational age and BW (live births only), costs adjusted to December, 2017.

Table VIII. Newborn costs—multiples*

	Live births, n	Total newborn costs, $					Newborn costs/day, $	
		Total	Mean	SD	Median	IQR	Mean	Median
Gestational age in completed weeks based on OB estimate of gestational age from BC								
22	63	3 554 166	56 415	204 945	577	1594	2170	577
23	129	34 574 041	268 016	362 815	55 472	502 503	6112	5144
24	172	70 673 290	410 891	418 232	338 048	532 251	6266	5184
25	208	90 205 664	433 681	363 561	406 116	398 995	5947	4688
26	214	85 490 844	399 490	256 404	348 097	287 313	5426	4329
27	283	82 725 581	292 317	213 663	240 248	203 482	4639	3570
28	403	104 068 970	258 236	188 534	208 565	185 915	3947	3235
29	451	90 878 670	201 505	131 584	168 389	128 521	3489	3058
30	598	97 890 884	163 697	138 766	125 708	105 386	3292	2692
31	852	106 539 177	125 046	107 941	98 806	79 381	3046	2566
32	1313	113 659 688	86 565	70 312	68 609	56 823	2824	2422
33	1936	115 657 912	59 741	47 852	45 760	40 656	2681	2316
34	3312	128 557 770	38 816	42 917	30 302	29 815	2439	2156
35	4512	85 537 327	18 958	40 666	8316	23 391	1683	1358
36	6671	58 923 924	8833	25 031	2097	3976	1097	637
37	7828	37 143 731	4745	20 351	1755	1527	829	544
38	6461	23 586 664	3651	15 870	1636	1290	746	535
39	1653	9 018 360	5456	24 028	1555	1350	803	539
40	473	3 673 994	7767	24 449	1578	1849	990	602
41	94	657 332	6993	14 468	1631	2552	1116	693
42	15	111 381	7425	15 725	2042	2411	946	681
43	6	11 788	1965	1637	1517	1691	860	594
44	2	5537	2768	2	2768	3	923	923
All	37 649	1 343 146 696	35 675	98 959	2767	27 841	1555	826
BW group, g								
<500	85	8 651 431	101 782	233 957	1698	28 927	3533	1698
500-599	164	52 773 350	321 789	419 162	119 114	510 214	5879	4988
600-699	201	81 837 552	407 152	353 786	354 812	567 651	6317	5121
700-799	201	77 720 670	386 670	291 172	337 975	346 546	5559	4358
800-899	256	103 195 766	403 108	324 953	342 513	321 759	5112	4311
900-999	235	65 156 559	277 262	182 281	232 340	201 269	4442	3423
1000-1099	280	66 576 551	237 773	195 043	193 443	187 140	4131	3216
1100-1199	373	75 777 583	203 157	159 708	155 877	146 259	3558	2885
1200-1299	369	63 608 815	172 382	109 397	142 517	127 483	3324	2765
1300-1399	460	66 532 515	144 636	138 472	113 538	103 703	3113	2596
1400-1499	513	61 921 960	120 706	112 277	92 589	91 062	3003	2570
1500-1599	705	66 881 473	94 867	78 334	74 481	73 835	2875	2485
1600-1699	729	62 185 236	85 302	72 447	65 952	67 578	2785	2409
1700-1799	997	65 296 559	65 493	56 750	49 079	52 240	2594	2298
1800-1899	1301	67 249 078	51 690	68 786	36 516	40 351	2468	2162
1900-1999	1447	60 335 843	41 697	51 180	29 323	38 962	2285	2031
2000-2249	4932	119 841 006	24 299	34 716	13 776	31 800	1775	1582
2250-2499	6775	83 760 699	12 363	26 671	2344	11 644	1270	699
2500-2749	6921	47 753 574	6900	21 697	1847	2178	973	583
2750-2999	5592	24 760 030	4428	20 598	1707	1473	809	547
3000-3249	3076	12 529 042	4073	25 628	1656	1336	785	539
3250-3499	1298	4 399 810	3390	8853	1653	1409	793	547
3500-3749	496	1 968 758	3969	12 690	1700	1395	818	535
3750-3999	158	1 032 841	6537	23 004	1487	1068	847	574
≥4000	85	1 399 994	16 471	64 580	1765	4469	1271	771

*2009-2011 California linked data, matched good cost/LOS cases only, by obstetrician estimate of gestational age and BW (live births only), costs adjusted to December, 2017.

Table X. Maternal costs, does not include fetal deaths*

	Maternal cases, n	Live births, n	Maternal cases with 1 + prenatal hospitalizations, n	Total prenatal hospitalizations, n	Maternal prenatal hospitalization costs, $					Total maternal hospitalization costs (prenatal + delivery), $				
					Total	Mean	SD	Median	IQR	Total	Mean	SD	Median	IQR
Gestational age in completed weeks														
22	317	351	63	72	288 148	5437	5310	3797	5285	3 591 040	11 328	10 599	8063	8357
23	586	649	116	135	745 446	7530	8926	4760	5421	8 749 145	14 854	15 577	10 062	11 169
24	798	883	166	190	1 035 928	7399	8683	4681	6872	14 730 292	18 321	16 616	13 665	15 655
25	855	962	196	239	1 181 036	6710	7865	3474	6051	18 498 784	21 337	20 103	15 171	17 257
26	928	1038	241	304	1 482 426	7267	7533	4648	7536	23 033 181	24 451	24 383	16 927	20 090
27	1036	1182	252	321	1 652 446	7650	8361	4326	7187	24 972 929	23 920	23 435	16 396	19 254
28	1213	1435	317	416	2 339 290	8696	12 572	4844	7638	30 681 916	24 824	26 893	16 719	19 319
29	1440	1681	380	499	2 942 648	9283	12 966	5061	7400	37 403 942	25 602	27 153	17 294	20 264
30	1825	2149	500	630	3 947 701	9559	13 126	5076	8647	45 310 466	24 492	28 371	15 531	18 885
31	2327	2790	686	869	4 777 826	8831	14 113	4827	6942	53 542 528	22 668	26 257	14 764	16 183
32	3692	4388	1002	1294	8 913 266	10 843	21 307	5193	8213	84 208 715	22 492	27 863	14 348	16 219
33	5589	6601	1433	1879	11 930 853	10 215	17 749	5057	6987	110 992 860	19 694	24 620	12 969	12 998
34	11 522	13 266	2591	3420	21 299 296	10 061	16 400	5035	7217	194 494 088	16 748	22 057	10 633	11 060
35	19 111	21 401	3424	4612	28 238 707	9638	15 041	4918	7697	243 313 620	12 681	15 999	8863	7779
36	39 957	43 329	5620	7313	42 145 513	8458	13 991	4598	6299	422 476 365	10 547	13 358	7773	6452
37	96 127	100 075	8826	11 108	62 117 413	7483	12 412	4059	5563	839 902 058	8729	8416	6919	5459
38	239 322	242 549	12 771	15 336	80 467 926	6446	11 173	3674	4695	1 818 555 099	7595	5820	6398	4621
39	428 873	429 703	16 558	19 248	99 767 357	6055	9104	3648	4715	3 209 114 673	7480	4988	6419	4522
40	296 857	297 185	10 097	11 500	56 075 726	5574	8366	3384	4322	2 213 906 848	7454	4961	6280	4707
41	81 887	81 985	3014	3374	16 361 590	5441	8828	3243	4238	727 024 200	8870	6585	7393	5938
42	6169	6183	334	369	1 474 200	4414	4496	2881	3758	60 514 569	9797	6612	8040	6797
43	473	476	36	49	236 288	6564	11 098	3810	3536	4 002 822	8463	6889	6918	5185
44	147	148	4	4	20 563	5141	1896	5790	2719	1 123 259	7641	4521	6693	4356
45	48	48	1	1	4305	4305	†	4305	0	331 955	6916	3258	6650	3235
All	1 241 099	1 260 457	68 628	83 182	449 445 898	6899	11 464	3843	5172	10 190 475 353	8203	7708	6626	5023
BW group, g														
<500	353	397	69	80	483 424	7797	10 447	4702	5518	5 940 625	15 969	13 816	12 139	13 332
500-599	748	831	153	179	950 734	7148	8176	4347	5548	12 988 224	17 249	16 815	11 503	14 247
600-699	829	939	201	245	1 162 577	6568	6425	4424	6689	17 842 091	20 627	18 967	14 795	17 383
700-799	878	978	206	251	1 399 934	7692	8957	4745	6755	19 534 034	21 729	20 542	16 204	17 689
800-899	843	966	214	264	1 434 412	7969	8910	4518	7491	20 144 277	23 755	23 048	16 814	18 467
900-999	991	1116	236	300	1 555 464	7201	8187	4375	7400	25 991 492	24 825	29 014	16 362	18 783
1000-1099	955	1105	239	305	1 966 139	9980	18 583	5364	7835	23 094 801	23 711	24 604	16 032	18 788
1100-1199	1067	1262	313	397	2 551 342	9112	13 888	4848	7166	29 471 762	26 035	29 932	16 508	20 218
1200-1299	1076	1282	276	362	2 216 271	9471	13 173	4919	8153	28 055 775	24 741	27 611	16 101	17 264
1300-1399	1417	1663	358	450	2 905 695	9283	15 452	4730	7819	34 502 903	23 266	28 453	14 753	16 881
1400-1499	1386	1672	387	522	3 636 620	11 087	20 288	5977	7760	36 216 387	24 048	28 374	15 865	16 805
1500-1599	1800	2167	477	628	3 918 767	10 179	18 411	4528	7124	40 948 621	21 945	28 520	13 909	15 048
1600-1699	1839	2219	497	655	4 133 831	9681	14 224	5411	7541	40 778 454	20 554	22 648	13 326	14 403
1700-1799	2462	3007	645	841	5 657 454	10 901	17 177	5551	8699	52 468 353	19 965	24 242	12 983	13 773
1800-1899	3263	3903	771	1010	6 082 625	9655	17 176	4893	7076	59 253 113	17 438	21 307	11 528	10 609
1900-1999	3548	4287	843	1100	7 155 702	10 093	15 290	5128	7122	66 879 770	17 494	22 676	11 413	11 509
2000-2249	14 836	17 343	2946	3921	24 731 804	10 037	17 219	5093	7432	222 158 503	14 362	18 670	9667	8941
2250-2499	32 250	35 680	4296	5719	34 316 823	9300	15 303	4728	6771	360 917 576	10 999	13 650	7970	6719
2500-2749	67 400	70 948	6161	7922	44 351 955	8222	14 698	4330	5905	589 675 657	8896	10 081	6904	5415
2750-2999	150 074	152 824	9245	11 413	64 602 238	7329	12 516	3992	5388	1 180 447 513	7891	6858	6455	4849
3000-3249	239 748	241 354	11 497	13 651	71 918 793	6351	9709	3762	4893	1 805 036 354	7530	5457	6319	4658
3250-3499	266 796	267 527	11 206	13 038	65 101 241	5845	8742	3492	4524	2 005 367 102	7513	5577	6348	4630
3500-3749	216 315	216 594	8212	9432	47 395 405	5792	9430	3508	4369	1 651 581 939	7632	5378	6473	4751
3750-3999	130 749	130 853	5074	5798	27 628 973	5448	7445	3310	4436	1 028 146 296	7860	5228	6646	4870
≥4000	99 476	99 540	4106	4699	22 187 674	5413	6900	3433	4372	833 033 732	8371	5622	7080	5197

*2009-2011 California linked data, matched good cost/LOS cases only, by gestational age and BW, costs adjusted to December, 2017.
†Indicates that there was only one observation, so the standard deviation is not defined.

Table XI. Maternal costs, includes fetal deaths*

	Maternal cases, n	Live births + fetal deaths, n	Maternal cases with 1 + prenatal hospitalizations, n	Total prenatal hospitalizations, n	Maternal prenatal hospitalization costs, $					Total maternal hospitalization costs (prenatal + delivery), $				
					Total	Mean	SD	Median	IQR	Total	Mean	SD	Median	IQR
Gestational age in completed weeks														
22	731	807	117	136	650 981	6445	6639	4105	5772	8 048 195	10 861	12 527	7237	7505
23	931	1023	158	186	968 237	7067	7860	4841	5281	12 692 675	13 474	14 621	9014	10 061
24	1033	1135	192	219	1 180 684	7199	8130	4845	6430	17 318 804	16 573	16 008	11 477	15 051
25	1028	1154	212	258	1 265 737	6662	8044	3314	5720	20 329 300	19 417	19 467	13 391	15 756
26	1123	1244	262	327	1 746 925	7799	8896	4888	7598	25 781 856	22 616	25 777	14 481	18 224
27	1215	1374	268	341	1 790 987	7753	8474	4621	7355	27 172 465	22 073	22 619	14 508	17 806
28	1419	1657	336	447	2 521 611	8817	12 546	4987	7570	32 914 763	22 637	25 666	14 963	17 876
29	1612	1862	397	518	3 031 536	9104	12 722	4882	7294	39 243 876	23 988	26 400	15 765	19 075
30	1983	2312	513	646	4 053 077	9514	12 985	5066	8599	46 989 960	23 343	27 587	14 720	18 185
31	2496	2961	699	885	4 855 403	8780	13 984	4827	6915	55 203 199	21 811	25 634	14 166	16 025
32	3913	4617	1030	1329	9 123 660	10 759	21 063	5165	8093	86 651 981	21 821	27 397	13 832	15 670
33	5 773	6795	1454	1904	12 147 818	10 217	17 669	5046	7002	113 402 304	19 455	24 948	12 759	12 872
34	11 736	13 488	2603	3438	21 388 565	10 046	16 361	5035	7217	197 041 114	16 652	21 949	10 566	10 934
35	19 334	21 636	3450	4650	28 485 094	9640	15 009	4944	7668	245 904 744	12 662	15 988	8845	7765
36	40 256	43 640	5655	7358	43 498 639	8670	18 187	4605	6311	426 855 049	10 575	14 032	7771	6454
37	96 440	100 398	8857	11 151	62 393 596	7488	12 405	4060	5565	843 153 305	8734	8424	6920	5459
38	239 640	242 876	12 784	15 355	80 600 999	6451	11 175	3674	4697	1 821 511 089	7597	5822	6398	4623
39	429 143	429 973	16 571	19 261	99 833 337	6055	9102	3648	4714	3 211 491 203	7481	4989	6419	4523
40	297 028	297 356	10 107	11 520	56 180 148	5 579	8387	3384	4323	2 215 603 156	7455	4965	6281	4707
41	81 936	82 034	3016	3376	16 366 010	5439	8825	3239	4238	727 551 558	8872	6587	7393	5940
42	6183	6197	335	370	1 475 634	4405	4492	2868	3770	60 621 573	9792	6609	8036	6800
43	473	476	36	49	236 288	6564	11 098	3810	3536	4 002 822	8463	6889	6918	5185
44	147	148	4	4	20 563	5141	1896	5790	2719	1 123 259	7641	4521	6693	4356
45	49	49	1	1	4305	4305	†	4305	0	340 036	6940	3228	6685	3219
All	1 245 622	1 265 212	69 057	83 729	453 819 834	6923	11 902	3849	5182	10 240 948 288	8213	7785	6628	5028
BW group, g														
<500	1102	1227	163	191	1 159 701	7630	8629	5066	661	14 201 897	12 15	13 22	8109	9510
500-599	1057	1173	205	245	1 348 877	7578	8737	4806	5884	16 628 802	15 585	16 146	10 524	12 667
600-699	1065	1189	231	279	1 400 442	6831	7599	4594	6499	21 046 489	18 995	21 146	12 877	16 246
700-799	1078	1188	228	279	1 574 371	7718	8803	4820	6832	22 500 601	20 344	24 074	13 801	16 456
800-899	985	1116	226	285	1 567 582	8207	9469	4575	7511	21 925 794	22 080	22 513	15 084	17 490
900-999	1155	1293	243	308	1 576 595	7102	8102	4332	7171	27 606 298	22 684	27 561	14 441	17 106
1000-1099	1061	1220	247	315	2 020 494	9856	18 260	5364	7703	24 436 488	22 543	24 136	15 003	17 779
1100-1199	1186	1390	319	403	2 571 111	9021	13 788	4844	6974	30 835 669	24 531	29 302	15 169	19 354
1200-1299	1156	1366	281	367	2 245 164	9433	13 084	4919	8153	28 881 378	23 751	27 080	15 427	16 659
1300-1399	1542	1793	366	458	2 944 628	9231	15 321	4730	7847	35 751 731	22 206	27 711	13 940	16 544
1400-1499	1503	1794	399	535	3 707 514	10 904	19 974	5929	7615	37 414 104	22 996	27 683	14 947	16 339
1500-1599	1900	2270	486	639	3 984 699	10 113	18 228	4535	7130	41 906 821	21 305	27 954	13 498	14 688
1600-1699	1917	2300	505	665	4 308 374	9904	14 641	5380	7717	41 670 020	20 179	22 427	12 973	14 065
1700-1799	2556	3102	654	852	5 754 371	10 898	17 121	5548	8710	53 567 818	19 672	23 986	12 715	13 545
1800-1899	3372	4014	780	1025	6 150 100	9625	17 068	4915	7074	60 467 513	17 242	21 167	11 354	10 560
1900-1999	3640	4383	848	1106	7 185 261	10 063	15 244	5120	7122	67 781 186	17 300	22 510	11 271	11 438
2000-2249	15 099	17 612	2971	3965	25 056 771	10 071	17 220	5097	7459	225 019 915	14 300	18 593	9618	8921
2250-2499	32 494	35 938	4309	5734	34 363 653	9287	15 285	4728	6750	363 305 832	10 987	13 614	7964	6713
2500-2749	67 631	71 182	6179	7944	44 685 552	8257	14 932	4331	5919	591 983 111	8899	10 112	6906	5420
2750-2999	150 331	153 082	9259	11 435	65 527 554	7422	15 128	3997	5391	1 183 746 193	7899	7192	6457	4851
3000-3249	239 984	241 591	11 511	13 666	71 978 320	6349	9704	3761	4892	1 807 183 062	7532	5458	6320	4659
3250-3499	266 946	267 677	11 226	13 066	65 333 476	5855	8754	3493	4530	2 007 008 205	7515	5581	6349	4631
3500-3749	216 421	216 700	8223	9445	47 452 246	5791	9426	3507	4371	1 652 773 720	7634	5381	6474	4752
3750-3999	130 820	130 925	5081	5809	27 651 791	5446	7442	3310	4436	1 028 869 522	7861	5229	6647	4871
≥4000	99 621	99 687	4117	4713	22 271 189	5419	6901	3438	4386	834 436 118	8373	5624	7082	5199

*2009-2011 California linked data, matched good cost/LOS cases only, by gestational age and BW, costs adjusted to December, 2017.
†Indicates that there was only one observation, so the standard deviation is not defined.

Table XII. Maternal costs by cesarean delivery status, does not include fetal deaths*

Gestational age groups and delivery methods		Maternal cases, n	Live births, n	Total maternal hospitalization costs (prenatal + delivery), $				
				Total	Mean	SD	Median	IQR
Gestational age group, weeks								
≤24	Vaginal	904	972	10 977 285	11 997	11 950	8074	9783
	Cesarean	797	911	16 285 085	20 180	17 747	14 899	16 257
25-27	Vaginal	858	878	14 871 903	17 273	19 194	10 423	15 819
	Cesarean	1961	2304	51 658 606	25 920	23 770	18 809	19 676
28-31	Vaginal	2041	2147	37 136 368	18 010	21 101	11 159	15 477
	Cesarean	4764	5908	129 802 484	26 780	28 966	17 720	18 960
32-36	Vaginal	42 402	43 803	422 864 617	9946	12 846	6816	6171
	Cesarean	37 469	45 182	632 628 243	16 770	21 277	11 198	9612
37-38	Vaginal	214 419	215 779	1 416 586 608	6602	5354	5373	3911
	Cesarean	121 030	126 845	1 241 870 550	10 254	8041	8462	5213
39-41	Vaginal	558 933	559 420	3 631 650 864	6494	4332	5491	3865
	Cesarean	248 684	249 453	2 518 394 857	10 123	5988	8619	5401
>41	Vaginal	4518	4522	35 629 442	7879	5228	6546	5046
	Cesarean	2319	2333	30 343 163	13 062	7565	11 170	7983
<28	Vaginal	1762	1850	25 849 188	14 555	16 093	9017	12 014
	Cesarean	2758	3215	67 943 691	24 266	22 351	17 723	18 273
<32	Vaginal	3803	3997	62 985 556	16 411	19 025	10 062	13 543
	Cesarean	7522	9123	197 746 175	25 859	26 760	17 720	18 691
<37	Vaginal	46 205	47 800	485 850 173	10 482	13 583	6968	6597
	Cesarean	44 991	54 305	830 374 417	18 302	22 554	11 972	11 160
All	Vaginal	824 075	827 521	5 569 717 087	6754	5616	5524	3998
	Cesarean	417 024	432 936	4 620 982 987	11 066	10 106	8817	5833
Gestational age in completed weeks								
22	Vaginal	265	296	2 819 854	10 405	8841	7563	7830
	Cesarean	52	55	878 589	16 270	15 779	9648	6907
23	Vaginal	351	381	4 326 517	12 187	12 911	8043	9640
	Cesarean	235	268	4 473 113	18 954	18 224	12 993	14 635
24	Vaginal	288	295	3 830 914	13 256	13 077	8576	12 384
	Cesarean	510	588	10 933 383	21 148	17 661	17 316	16 366
25	Vaginal	272	280	4 085 699	14 911	14 737	10 014	14 108
	Cesarean	583	682	14 438 700	24 308	21 501	17 860	18 897
26	Vaginal	282	286	5 098 301	18 015	18 755	11 408	15 640
	Cesarean	646	752	17 934 881	27 215	25 962	19 585	21 523
27	Vaginal	304	312	5 687 903	18 710	22 693	9917	17 701
	Cesarean	732	870	19 285 026	26 061	23 415	18 607	19 395
28	Vaginal	318	333	5 785 377	18 079	22 622	11 126	15 701
	Cesarean	895	1102	24 896 539	27 180	27 862	17 973	19 622
29	Vaginal	424	444	8 813 981	20 450	25 506	11 501	16 738
	Cesarean	1016	1237	28 589 961	27 757	27 540	19 267	20 762
30	Vaginal	565	593	9 897 202	17 394	20 038	10 760	15 009
	Cesarean	1260	1556	35 413 264	27 645	30 858	17 963	19 605
31	Vaginal	734	777	12 639 808	17 035	18 115	11 101	13 995
	Cesarean	1593	2013	40 902 720	25 249	28 880	16 548	16 657
32	Vaginal	1257	1327	21 103 677	16 670	19 013	10 161	14 447
	Cesarean	2435	3061	63 105 037	25 466	31 022	16 230	16 936
33	Vaginal	2197	2331	34 512 965	15 539	18 907	10 023	11 080
	Cesarean	3392	4270	76 479 895	22 395	27 377	14 919	13 838
34	Vaginal	5564	5818	75 220 228	13 454	19 251	8246	8918
	Cesarean	5958	7448	119 273 860	19 806	23 975	12 754	12 039
35	Vaginal	10 148	10 514	98 767 283	9715	11 336	6978	6089
	Cesarean	8963	10 887	144 546 336	16 023	19 458	10 960	8980
36	Vaginal	23 236	23 813	193 260 464	8305	9563	6214	5072
	Cesarean	16 721	19 516	229 223 114	13 654	16 804	9948	7286
37	Vaginal	61 651	62 340	443 839 000	7194	6739	5650	4331
	Cesarean	34 476	37 735	396 063 058	11 473	10 222	9118	6074
38	Vaginal	152 768	153 439	972 747 608	6364	4659	5278	3757
	Cesarean	86 554	89 110	845 807 491	9769	6924	8235	4875
39	Vaginal	272 410	272 673	1 715 455 407	6295	4172	5326	3697
	Cesarean	156 463	157 030	1 493 659 266	9544	5583	8190	4838
40	Vaginal	227 380	227 546	1 471 321 446	6467	4018	5503	3842
	Cesarean	69 477	69 639	742 585 403	10 682	6222	9151	5804
41	Vaginal	59 143	59 201	444 874 011	7516	5820	6338	4794
	Cesarean	22 744	22 784	282 150 188	12 392	7132	10 652	7330
42	Vaginal	4082	4086	32 831 543	8035	5364	6694	5264
	Cesarean	2087	2097	27 683 026	13 239	7419	11 384	8136
43	Vaginal	302	302	1 951 385	6462	3442	5730	3610
	Cesarean	171	174	2 051 436	11 997	9546	9438	6661
44	Vaginal	97	97	617 879	6370	3432	5764	2716
	Cesarean	50	51	505 381	10 108	5331	8552	5186
45	Vaginal	37	37	228 634	6179	2810	5657	3136
	Cesarean	11	11	103 320	9393	3565	8708	4217

*2009-2011 California linked data, matched good cost/LOS cases only, by gestational age, costs adjusted to December, 2017.

Table XIV. Mean maternal and newborn hospital and professional costs*

	Maternal count, n	Total maternal hospital costs, mean $	Total maternal MD costs, mean $	Live births, n	Total newborn hospital costs, mean $	Total newborn MD costs, mean $
Gestational age in completed weeks based on OB estimate of gestational age from BC						
22	731	7467	3395	351	58 748	13 784
23	931	9361	4113	649	181 247	43 280
24	1033	11 882	4691	883	305 830	72 176
25	1028	13 908	5509	962	332 811	79 837
26	1123	16 168	6448	1038	292 539	68 720
27	1215	15 761	6313	1182	244 532	55 459
28	1419	16 129	6508	1435	203 292	45 820
29	1612	17 142	6846	1681	158 925	35 993
30	1983	16 776	6567	2149	125 150	27 390
31	2496	15 600	6211	2790	96 513	20 739
32	3913	15 684	6137	4388	72 253	15 229
33	5773	13 955	5500	6601	49 540	9880
34	11 736	11 849	4803	13 266	29 139	5768
35	19 334	9033	3630	21 401	14 911	2883
36	40 256	7470	3105	43 329	7120	1370
37	96 440	6084	2649	100 075	3955	783
38	239 640	5207	2390	242 549	2447	476
39	429 143	5095	2386	429 703	2116	396
40	297 028	5031	2424	297 185	2004	380
41	81 936	6011	2861	81 985	2436	469
42	6183	6675	3117	6183	2883	572
43	473	5969	2494	476	3854	658
44	147	5309	2332	148	5153	1203
45	49	4899	2041	48	2359	336
BW group, g						
<500	1102	8464	3695	397	134 405	34 863
500-599	1057	11 028	4556	831	206 411	50 078
600-699	1065	13 554	5441	939	294 631	69 027
700-799	1078	14 561	5783	978	317 414	74 946
800-899	985	15 910	6170	966	297 750	70 940
900-999	1155	16 126	6557	1116	227 682	51 326
1000-1099	1061	16 271	6272	1105	184 311	41 441
1100-1199	1186	17 603	6928	1262	163 181	35 909
1200-1299	1156	17 080	6671	1282	140 672	31 032
1300-1399	1542	15 881	6325	1663	111 823	24 278
1400-1499	1503	16 520	6476	1672	96 929	20 774
1500-1599	1900	15 288	6017	2167	82 277	17 409
1600-1699	1917	14 525	5654	2219	68 256	14 372
1700-1799	2556	14 156	5516	3007	55 625	11 377
1800-1899	3372	12 303	4939	3903	44 636	9211
1900-1999	3640	12 376	4924	4287	37 870	7520
2000-2249	15 099	10 185	4114	17 343	22 546	4439
2250-2499	32 494	7746	3241	35 680	10 728	2077
2500-2749	67 631	6186	2713	70 948	4858	946
2750-2999	150 331	5428	2471	152 824	2896	550
3000-3249	239 984	5135	2396	241 354	2296	435
3250-3499	266 946	5105	2410	267 527	2081	397
3500-3749	216 421	5181	2453	216 594	2022	383
3750-3999	130 820	5339	2522	130 853	2096	404
≥4000	99 621	5742	2631	99 540	2825	558

*2009-2011 CA linked data, matched good cost/LOS cases only, by OB estimate of gestational age and BW, costs adjusted to December, 2017.

Table XV. Total pregnancy costs (maternal + newborn)*

	Live births, n	Total costs (maternal + newborn), $				
		Total	Mean	SD	Median	IQR
Gestational age in completed weeks						
22	351	28 270 704	80 543	238 350	10 128	12 898
23	649	151 210 671	232 990	316 976	43 511	441 914
24	883	342 453 921	387 830	354 636	353 556	504 124
25	962	411 824 474	428 092	310 320	387 711	330 098
26	1038	395 339 464	380 867	266 779	330 467	253 300
27	1182	375 136 762	317 375	231 074	266 695	206 008
28	1435	381 863 108	266 107	192 807	216 351	176 597
29	1681	363 328 476	216 138	148 320	177 472	130 816
30	2149	370 625 057	172 464	146 545	136 881	99 641
31	2790	378 787 426	135 766	116 382	106 492	82 230
32	4388	465 565 715	106 100	98 854	81 481	64 939
33	6601	500 238 703	75 782	77 840	56 434	46 964
34	13 266	653 782 062	49 283	66 335	36 287	37 556
35	21 401	620 431 558	28 991	51 019	16 193	24 732
36	43 329	783 044 396	18 072	39 874	9936	11 307
37	100 075	1 305 534 317	13 046	29 523	8285	7084
38	242 549	2 509 261 741	10 345	19 775	7654	5638
39	429 703	4 254 893 585	9902	15 653	7715	5526
40	297 185	2 904 457 464	9773	12 957	7559	5813
41	81 985	959 076 569	11 698	15 966	8907	7374
42	6183	81 492 457	13 180	16 332	9640	8515
43	476	5 885 793	12 365	14 953	8556	7024
44	148	2 063 966	13 946	32 959	8345	5909
45	48	461 306	9611	8627	7937	3977
All	1 260 457	18 245 029 694	14 475	41 306	8050	6581
BW group, g						
<500	397	71 776 226	180 797	337 756	17 909	145 007
500-599	831	220 747 000	265 640	341 601	81 115	451 815
600-699	939	351 327 906	374 151	337 276	347 349	492 734
700-799	978	397 890 972	406 841	307 160	364 003	336 124
800-899	966	373 912 800	387 073	281 942	335 030	277 589
900-999	1116	333 066 156	298 446	222 638	248 839	204 913
1000-1099	1105	271 926 548	246 087	186 113	205 357	179 340
1100-1199	1262	275 913 566	218 632	167 668	174 707	149 311
1200-1299	1282	246 188 847	192 035	145 441	154 249	135 230
1300-1399	1663	257 218 328	154 671	137 757	124 255	110 778
1400-1499	1672	230 108 926	137 625	116 592	107 186	97 424
1500-1599	2167	254 345 914	117 372	110 864	90 431	82 518
1600-1699	2219	220 236 716	99 250	90 608	76 403	72 662
1700-1799	3007	251 002 784	83 473	78 488	63 911	59 784
1800-1899	3903	266 708 444	68 334	82 948	48 666	54 046
1900-1999	4287	254 401 864	59 343	70 628	42 210	47 824
2000-2249	17 343	679 768 621	39 196	58 506	23 711	36 530
2250-2499	35 680	803 355 521	22 516	45 739	10 902	16 189
2500-2749	70 948	1 011 619 403	14 259	30 325	8471	7684
2750-2999	152 824	1 696 699 996	11 102	21 411	7755	6077
3000-3249	241 354	2 448 615 286	10 145	19 301	7571	5688
3250-3499	267 527	2 653 852 767	9920	17 313	7618	5661
3500-3749	216 594	2 160 972 107	9977	13 754	7767	5808
3750-3999	130 853	1 348 446 455	10 305	12 747	7992	5988
≥4000	99 540	1 164 926 540	11 703	18 553	8681	6804

*2009-2011 California linked data, matched good cost/LOS cases only, by gestational age and BW (live births only), costs adjusted to December, 2017.

Table XVI. Different measures of inflation

	Inflation index				
	December, 1999	December, 2010	December, 2017	Change 2010 to 2017	Change 1999 to 2017
Overall CPI for all urban consumers	168.3	219.2	246.5	27.3	78.2
Medical component of CPI or MCPI	254.2	391.9	509.0	117.1	254.8
PPI	128.0	189.9	196.4	6.5	68.4
Hospital services PPI	69.1	103	118.5	15.5	49.4
PPI for general and surgical hospitals—Medicare patients	—	160.6	168.4	7.8	—
PPI for general and surgical hospitals—Medicaid patients	—	137.0	140.1	3.1	—
PPI for general and surgical hospitals—all other patients	—	202.1	253.1	51.0	—

CPI, consumer price index; *MCPI*, medical component of the consumer price index.