Early Term Delivery and Health Care Utilization in the First Year of Life

Patricia M. Dietz, DrPH[1], Joanne H. Rizzo, MPA[2], Lucinda J. England, MD[1], William M. Callaghan, MD[1], Kimberly K. Vesco, MD[2], F. Carol Bruce, MPH[1], Joanna E. Bulkley, PhD[2], Andrea J. Sharma, PhD[1], and Mark C. Hornbrook, PhD[2]

Objective To assess health care utilization during the first year of life among early term-born infants.

Study design We assessed health care utilization of 22 420 singleton term infants (37-42 weeks gestational age [GA]) without major birth defects, fetal growth restriction, or exposure to diabetes or hypertension in utero, delivered between 1998 and 2007 and continuously enrolled at Kaiser Permanente Northwest for 12 months after delivery. GA, duration of delivery hospitalization, and postdelivery rehospitalizations and sick/emergency room visits in the first year of life were obtained from electronic medical records. Logistic regression models were used to estimate associations between GA and number of hospitalizations and length of stay. Generalized linear models were used to estimate the adjusted mean number of sick/emergency visits.

Results Overall, 20.9% of term infants were born early. Infants delivered vaginally at 37 weeks GA had a 2.2 greater odds (95% CI, 1.6-3.1) of staying 4 or more days compared with those born at 39-40 weeks GA. Similar association was found among infants delivered by cesarean delivery at 37 or 38 weeks GA. Infants born at 37 weeks GA had increased odds of being rehospitalized within 2 weeks of delivery (OR, 2.6; 95% CI, 1.9-3.6). The adjusted mean number of sick/emergency room visits was higher for infants born at 37 and 38 weeks GA than for those born at 39-40 weeks GA (8.1, 7.7, and 7.3, respectively; $P < .0001$).

Conclusions Early term-born infants had greater health care utilization during their entire first year of life than infants born at 39-40 weeks GA. *(J Pediatr 2012;161:234-9)*.

The average gestational age (GA) at delivery has decreased in the United States. In 2005, term infants (≥37 weeks GA) were born an average of 2 days earlier than term infants born in 1990.[1] Furthermore, the proportion of term infants in the United States delivered at 37-38 weeks GA (ie, early term) has increased by nearly 50% over the last 20 years.[2] During delivery hospitalization, early term infants exhibit higher rates of respiratory distress, jaundice, and neonatal death compared with infants born at 39 weeks GA or later.[3,4] In addition, early term infants are more likely to receive neonatal intensive care, have longer delivery hospital stays, and higher hospital expenses than those born at 39 weeks GA or later.[5] For late preterm infants (34-36 weeks GA), considerable evidence has accumulated showing a greater likelihood of readmission in the first month of life compared with term infants.[5,6] In fact, after the delivery hospitalization, health care costs during the first year of life are 3-fold higher for late preterm infants.[7] Whether or not early term infants have greater health care utilization than later term infants in the first year of life remains unknown.

To gain insight into the implications of early term birth on infant health, we evaluated health care utilization patterns and morbidity during the entire first year of life among early term infants. We hypothesized that being born at early term compared with at 39-40 weeks would be associated with higher health care utilization during infancy.

Methods

We analyzed data from Kaiser Permanente Northwest (KPNW), a large nonprofit prepaid, federally certified, Joint Commission–accredited, group practice health maintenance organization with approximately 475 000 members in western Oregon and Washington as of January 1, 2011. Members include individuals and families covered by commercial group and individual self-pay health plans, Washington State Basic Health Plan (subsidized; Washington only), Medicare Advantage, and Medicaid (Oregon and Washington).

CPT-4	*Current Procedural Terminology, Fourth Edition*
GA	Gestational age
ICD-9-CM	*International Classification of Diseases, Ninth Revision, Clinical Modification*
KPNW	Kaiser Permanente Northwest
LOS	Length of stay

From the [1]Division of Reproductive Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, GA; and [2]Center for Health Research, Kaiser Permanente Northwest, Portland, OR

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The data for this study came from various KPNW individual-level clinical and administrative data systems, including electronic medical records, enrollment, hospital discharge, outpatient encounters, emergency department visits, outside claims and referrals, imaging, laboratory, and pharmacy. We adapted a computerized algorithm that links indicators and dates of pregnancies and pregnancy outcomes to create pregnancy "episodes."[8] Validation of this algorithm with experienced medical records technicians showed 100% agreement for live birth outcomes between episodes identified by the algorithm and those identified through medical record reviews. After pregnancy episodes were identified, mother and infant records were readily linked, because the mother's health insurance identification number is typically entered into the infant's medical and administrative records at birth. KPNW infant records were then matched to live birth certificate records, providing additional information on race/ethnicity, other demographic variables, and infant birth weight. A probabilistic method was used to link birth certificate records with KPNW records using a scored matching system based on mother's name (maiden and married), date of birth, and address, as well as infant's name, date of birth, and facility of delivery/birth. For this study, 86.1% of live births were matched to a live birth certificate. This study was approved by the Centers for Disease Control and Prevention and the KPNW Institutional Review Boards.

We identified a total of 46 807 singleton term (37-42 weeks GA) infants born between January 1, 1998, and December 31, 2007, who were matched to a mother's record. Infants who died in the first year of life (n = 70), or were not enrolled in KPNW for their entire first year of life (n = 13 198) were not eligible for the study. Infants with a major birth defect (structural or genetic; n = 3126) or whose mother had a diagnosed drug or alcohol dependency disorder (n = 642) were also excluded, because of the potential effects of these conditions on pregnancy outcomes and health care utilization. In an effort to minimize the contribution of antenatal complications to infant health care utilization, we also excluded 5795 infants who were born small for GA or whose mother was diagnosed with hypertension or any type of diabetes during pregnancy. Finally, among infants who were eligible (n = 23 976), we excluded 1122 who were missing information on GA, 338 with no data on the delivery hospitalization, and 96 without a birth weight. We analyzed a total of 22 420 deliveries by 18 861 mothers.

Infant GA in completed weeks was based on the physician's best estimate recorded in the prenatal electronic medical record. We examined 6 indicators of health care utilization for the infants during their first year of life: length of stay (LOS) for the delivery hospitalization, percentage of infants rehospitalized within 2 weeks of delivery, percentage of infants rehospitalized 3-52 weeks after delivery, LOS for those rehospitalizations, and mean number of nonroutine outpatient visits (sick and emergency room visits combined). *International Classification of Diseases, Ninth Revision, Clinical Modification* (ICD-9-CM) and *Current Procedural Terminology, Fourth Edition* (CPT-4) diagnosis and procedure codes were used to define health care utilization and diagnoses. Well-child care visits were defined as visits with ICD-9-CM code V20.2 or CPT-4 procedure code 99381 or 99391; all outpatient visits not identified as well visits were classified as sick visits. Sick and emergency room visits were combined into a single measure, because the number of emergency room visits was small and the reasons for the 2 types of visits were similar. Total LOS was defined as the number of days from admission to discharge. Morbidities based on ICD-9-CM and CPT-4 diagnosis and procedure codes in the health care episodes were grouped into related conditions (eg, all respiratory infections, jaundice, birth trauma). We examined the most common diagnoses during hospitalizations and sick/emergency room visits. Codes were available for 99% (22 277 of 22 420) of delivery hospitalizations, 99% (371 of 373) of rehospitalizations within 2 weeks of delivery, 94% (905 of 964) of rehospitalizations within 3-52 weeks, and 91% (127 786 of 140 233) of sick/emergency room visits (**Appendix**; available at www.jpeds.com).

We evaluated several maternal demographic variables as possible confounders, which we derived from birth certificate and KPNW electronic medical record sources. The birth certificate was the primary source of data on maternal educational attainment, marital status, and race/ethnicity, and the electronic medical record was the primary source of data on parity. We also assessed diagnoses of maternal mental health conditions (depression, anxiety, phobias, and other), infant birth weight, and tobacco exposure as possible confounders. Prenatal maternal smoking was ascertained from the mother's prenatal encounter records and/or from the infant's birth certificate. Infant tobacco exposure after delivery was ascertained from maternal and infant health care encounter data (ie, maternal smoking status). Infant birth weight for GA was grouped as 10th-90th percentile (appropriate for GA) and >90th percentile (large for GA).

Confounders were defined as covariates that changed the association between GA groups (37 weeks, 38 weeks, 39-40 weeks, 41-42 weeks) and the health care utilization measures by >10%. Logistic regression with generalized estimating equations (to account for correlations among siblings and repeated visits or hospitalizations) was used to assess the association between GA group and rehospitalizations and LOS. The mean number of sick/emergency room visits was adjusted for confounding variables, and differences were tested for statistical significance using generalized estimating equations. Statistical analyses were run in SAS version 9.2 (SAS Institute, Cary, North Carolina).

Results

We began by examining differences between eligible infants who were included (n = 22 420) and excluded (n = 7351) from the sample. Mothers of excluded infants were more likely to be nulliparous (49.1% vs 39.5%) and to have had <12 years of education (28.1% vs 22.9%). Mothers of included and excluded infants had similar distributions of age, race/ethnicity, and Medicaid status. The majority of

infants included in the study sample were born at 39-40 weeks GA (62.4%), with fewer born at 37-38 weeks GA (20.9%) and at 41-42 weeks GA (16.7%). During the study period, the proportion of infants born at 37-38 weeks GA increased from 16.7% in 1998 to 24.4% in 2005, then decreased to 21.6% in 2007.

Maternal and Pregnancy Characteristics

Although the distribution of all maternal and pregnancy characteristics differed by GA, only a few of the differences were meaningful. Compared with mothers of infants born at 39-40 weeks GA, mothers of infants born at 37 or 38 weeks GA were more likely to be Asian, to have undergone cesarean delivery, and to have had a diagnosed mental health condition (Table I). These findings remained unchanged when the sample was limited to only the first pregnancy episode per woman.

Delivery Hospitalization

Among infants delivered vaginally, those born at 37 weeks GA had a 2.2 greater OR (95% CI, 1.6-3.1) of staying 4 or more days compared with those born at 39-40 weeks GA; no variables confounded this association. Infants born vaginally at 38 weeks did not have an increased LOS. However, infants delivered by cesarean delivery at 37 or 38 weeks GA had a longer LOS at delivery hospitalization compared with those born at 39-40 weeks GA. Compared with all infants born at 39-40 weeks GA, a greater percentage of infants delivered vaginally or by cesarean delivery at 37 weeks GA experienced jaundice, respiratory conditions, and tachypnea (Table II).

Rehospitalizations within 2 Weeks after Delivery

Within 2 weeks of delivery, 373 rehospitalizations occurred among 371 infants; 3.7% of infants born at 37 weeks GA, 2.4% of those born at 38 weeks GA, 1.4% of those born at 39-40 weeks GA, and 1.0% of those born at 41-42 weeks GA were rehospitalized at least once. Compared with infants born at 39-40 weeks GA, those born at 37 weeks GA had a 2.6 greater OR (95% CI, 1.9-3.6) and those born at 38 weeks GA had a 1.7 greater OR (95% CI, 1.3-2.2) of being rehospitalized at least once within 2 weeks of delivery. No variables confounded this association. Of the infants who were rehospitalized, jaundice was more likely to be diagnosed in infants born

Table I. Characteristics of mother–infant pairs of singleton term births by GA

Characteristic	37 weeks (n = 1382)	38 weeks (n = 3301)	39-40 weeks (n = 13 996)	41-42 weeks (n = 3741)	*P* value
Infant birth weight >90th percentile, %	9.9	11.5	14.4	17.2	<.0001
Maternal age, years, %					
<18	3.0	2.4	2.9	3.7	.0001
18-24	26.0	24.6	27.3	28.7	
25-29	33.0	32.4	32.3	31.5	
30-34	24.0	27.8	25.9	24.5	
35-39	11.9	10.8	9.9	10.2	
≥40	2.0	2.0	1.6	1.4	
Race/ethnicity, %*					
White	71.8	71.3	75.1	81.0	<.0001
Black	3.5	4.0	3.8	3.9	
Hispanic	9.5	9.9	9.0	6.1	
Asian	13.1	12.6	10.3	7.2	
Other/unknown	1.9	2.1	1.8	1.8	
Education, years, %†					
<12	25.0	23.3	23.4	20.1	.002
12	25.2	26.3	26.3	28.1	
>12	49.8	50.3	50.3	51.8	
Medicaid or Washington Basic Health Plan, %	9.8	10.7	11.4	13.1	.001
Parity‡					
0	38.3	35.1	37.3	51.6	<.0001
1	33.9	38.3	36.5	28.2	
2	17.0	17.0	16.3	10.7	
≥3	10.8	9.6	9.9	9.4	
Cesarean delivery, %	24.1	23.8	19.8	22.0	<.0001
Tobacco use, %					
During and after pregnancy	11.4	9.3	9.9	11.6	<.0001
During pregnancy only	2.2	1.8	2.1	2.7	
After pregnancy only	9.9	8.4	8.2	7.9	
No tobacco	65.8	68.5	66.2	62.1	
Tobacco use unknown	10.7	12.0	13.5	15.7	
Mental health diagnoses, %§					
During and after pregnancy	6.3	6.4	4.7	3.4	<.0001
During pregnancy only	4.0	3.2	2.7	3.0	
After pregnancy only	10.1	9.7	8.8	8.2	
No mental health diagnoses	79.5	80.7	83.8	85.3	

There were a total of 22 420 deliveries to 18 861 mothers.
*Missing race/ethnicity, n = 170.
†Missing education, n = 3513.
‡Missing parity, n = 1044.
§See the Appendix for definitions.

Table II. Delivery hospitalization by GA among term singleton infants

Characteristic	Infant GA				*P* value
	37 weeks (n = 1382)	38 weeks (n = 3301)	39-40 weeks (n = 13 996)	41-42 weeks (n = 3741)	
LOS, vaginal delivery, %					
≤1 day	30.7	35.2	36.2	34.1	<.0001
2 days	58.9	57.3	56.8	57.5	
3 days	6.6	5.6	5.3	6.4	
≥4 days	3.8	1.9	1.8	2.0	
Unadjusted OR of LOS ≥4 days (95% CI)	2.2 (1.6-3.1)	1.1 (0.8-1.5)	Reference	1.1 (0.8-1.5)	
Complications in infants born vaginally, %*					
Jaundice	9.3	8.8	7.0	6.5	.0002
Respiratory conditions	5.2	3.4	3.2	3.8	.0062
Birth trauma	2.8	2.0	2.4	2.6	.4117
Tachypnea	2.6	1.5	1.6	2.1	.0254
Fever	1.6	1.8	1.6	1.6	.9513
LOS, cesarean delivery, %					
1-3 days	66.4	70.5	75.3	71.0	.0004
4 days	27.0	23.9	21.2	24.0	
≥5 days	6.6	5.6	3.4	5.0	
Unadjusted OR of LOS ≥5 days (95% CI)	2.0 (1.2-3.2)	1.7 (1.2-2.4)	Reference	1.5 (1.0-2.1)	
Complications in infants born via cesarean, %*					
Jaundice	21.4	14.6	12.3	11.7	<.0001
Respiratory conditions	7.5	4.4	4.7	5.3	.1105
Birth trauma	3.3	2.3	2.7	3.4	.5382
Tachypnea	5.7	3.1	3.7	2.9	.1036
Fever	2.4	2.0	1.4	1.5	.3748

*See the Appendix for definitions. The sample included 22 277 of 22 420 hospitalizations.

at 37 weeks GA (84.6%) and 38 weeks GA (70.0%) than those born at 39-40 weeks GA (36.8%) or 41-42 weeks GA (23.7%) ($P < .0001$) (Table III). Upper respiratory and non–upper respiratory infections were more common for infants born at 39-40 and 41-42 weeks GA compared with those born at 37 or 38 weeks GA.

Rehospitalization within 3-52 Weeks after Delivery

A total of 868 infants (3.9%) were rehospitalized 964 times between 3 and 52 weeks after delivery (Table IV): 91.2% of the rehospitalized infants had 1 rehospitalization during the time period, 7.0% had 2 rehospitalizations, and 1.8% had 3 or more (data not shown). Infant GA was not associated with rehospitalization between 3 and 52 weeks after delivery or with any specific morbidity. Infants born at 37 weeks GA had greater odds of LOS ≥4 days, but the 95% CI included 1. However, infants born at 38 weeks GA who were rehospitalized had a 1.9 greater OR (95% CI, 1.2-3.1) of LOS ≥4 days compared with rehospitalized infants born at 39-40 weeks GA. No variables confounded this association.

Sick/Emergency Room Visits

After adjusting for Medicaid status and mental health diagnosis, the mean number of sick/emergency room visits was higher for infants born at 37 weeks and 38 weeks GA than for those born at 39-40 weeks GA (8.1, 7.7, and 7.3, respectively; $P < .0001$) (Table V).

Table III. Nondelivery hospitalization within 2 weeks of delivery by GA among term singleton infants

Characteristic	Infant GA				*P* value
	37 weeks (n = 1382)	38 weeks (n = 3301)	39-40 weeks (n = 13 996)	41-42 weeks (n = 3741)	
Rehospitalization at 0-2 weeks after delivery, % (n)	3.7 (51)	2.4 (79)	1.4 (202)	1.0 (39)	<.0001
Unadjusted OR of rehospitalization (95% CI)	2.6 (1.9-3.6)	1.7 (1.3-2.2)	Reference	0.7 (0.5-1.0)	
LOS, %					
≤1 day	60.8	53.2	41.1	51.3	.0432
2 days	25.5	31.6	33.7	17.9	
≥3 days	13.7	15.2	25.2	30.8	
Unadjusted OR of LOS ≥3 days (95% CI)	0.5 (0.2-1.1)	0.5 (0.3-1.1)	Reference	1.3 (0.6-2.8)	
Complications during rehospitalization, %*					
Jaundice	84.6	70.0	36.8	23.7	.0001
Upper and non–upper respiratory infections	9.6	8.7	24.4	31.6	.0014
Dehydration	19.2	16.2	17.9	15.8	.9610
Feeding problems	25.0	28.7	23.9	28.9	.8105
Respiratory conditions	7.7	6.2	12.9	13.2	.3318

*See the Appendix for definitions. The sample included 371 of 373 rehospitalizations.

Table IV. Nondelivery hospitalization within 3-52 weeks of delivery by GA among term singleton infants

Characteristic	Infant GA				*P* value
	37 weeks (n = 1382)	38 weeks (n = 3301)	39-40 weeks (n = 13 996)	41-42 weeks (n = 3741)	
Rehospitalization 3-52 weeks after delivery % (n)	4.6 (63)	3.9 (128)	3.9 (545)	3.5 (132)	.3986
LOS, %					
≤1 day	38.1	34.4	45.3	32.6	.0177
2-3 days	41.3	42.2	41.1	48.5	
≥4 days	20.6	23.4	13.6	18.9	
Unadjusted OR of LOS ≥4 days (95% CI)	1.6 (0.8-3.2)	1.9 (1.2-3.1)	Reference	1.5 (0.9-2.4)	
Complications during rehospitalization, % (n)*					
Upper respiratory infections	45.3	40.4	35.6	35.7	.3590
Non–upper respiratory infections	29.7	22.0	27.3	25.2	.5504
Respiratory conditions	15.6	17.7	14.9	14.0	.8236
Dehydration	14.1	17.0	14.7	18.2	.7096
Otitis	4.7	12.1	15.4	12.6	.0981

*See the **Appendix** for definitions. The sample included 905 of 964 rehospitalizations within 3-52 weeks of delivery.

Discussion

We found that infants born at 37 weeks GA had a longer LOS at the delivery hospitalization compared with infants born at 39-40 weeks GA, consistent with previously reported findings.[4] After the delivery hospitalization, infants born at 37 or 38 weeks GA exhibited increases in 3 measures of health care utilization: rehospitalizations within 2 weeks of delivery, LOS for rehospitalization at 3-52 weeks after delivery (38 weeks GA only), and number of sick/emergency room visits. The magnitude of the increase in sick/emergency room visits was small, approximately 1 visit on average; however, the number of rehospitalizations within 2 weeks of delivery was twice that of infants born at 39-40 weeks GA. In addition, >23% of infants born at 38 weeks GA had a LOS of ≥4 days for hospitalizations occurring 3-52 weeks after delivery, compared with 13% of infants born at 39-40 weeks GA. Infants born at 41-42 weeks GA were similar to those born at 39-40 weeks GA for all measures of health care utilization.

Jaundice was the most common reason for rehospitalization within the first 2 weeks of delivery for all infants, consistent with previous studies.[5,9] Although only a slightly higher percentage of infants born at 38 weeks GA had jaundice at birth, their readmission rate for jaundice was twice that of other infants, a finding consistent with the expected delay in achieving a peak indirect bilirubin level in infants born at earlier GAs.[9] The KPNW region has a "mother–baby program" that is structured to evaluate mothers and newborns in the outpatient or home setting at 1-2 days after the delivery discharge with the specific goal of identifying any concerns, such as jaundice or poor feeding, in the immediate postpartum period. Continued close monitoring by parents and medical staff of infants born early term and of those born at risk for hyperbilirubinemia may reduce rehospitalizations for this condition.

Our finding of significantly greater health care utilization during the first year of life in early term infants is particularly troubling given that the proportion of early term infants in the US has increased by nearly 50% over the last 20 years.[2] In 2008, a total of 1 181 269 infants were born at 37-38 weeks GA, representing 27.8% of all infants born in the United States.[2] At KPNW, the percentage of early term births increased from 16.7% in 1998 to 24.4% in 2005, then decreased to 21.6% in 2007 in our study population. The

Table V. Sick/emergency room visits during first 12 months by GA among term singleton infants

Characteristic	Infant GA				*P* value
	37 weeks (n = 1382)	38 weeks (n = 3301)	39-40 weeks (n = 13 996)	41-42 weeks (n = 3741)	
Number of visits, mean ± SE	7.0 ± 0.2	6.7 ± 0.1	6.1 ± 0.1	6.1 ± 0.1	
Adjusted number of visits, mean ± SE*	8.1 ± 0.2	7.7 ± 0.1	7.3 ± 0.1	7.3 ± 0.1	<.0001
<5 visits, %	40.8	43.4	47.8	47.9	<.0001
5 visits, %	8.5	8.8	8.8	8.4	
6-12 visits, %	37.0	34.5	32.6	33.4	
≥13 visits, %	13.7	13.3	10.7	10.2	
Adjusted OR of ≥13 visits (95% CI)*	1.3 (1.1-1.5)	1.2 (1.1-1.4)	Reference	0.9 (0.8-1.1)	
Complications at visits, %†					
Upper respiratory infections	25.0	25.5	25.4	24.7	.1146
Otitis	17.7	20.3	20.4	19.3	<.0001
Non–upper respiratory infections	12.1	12.5	12.4	12.7	.5733
Respiratory conditions	7.0	7.5	7.0	7.0	.1569
Feeding problems	4.8	4.5	3.9	3.7	<.0001

*Adjusted for Medicaid status and mental health diagnosis.
†See the **Appendix** for definitions. The sample included 127 786 of 140 233 sick/emergency room visits.

proportions of this increase in early term delivery related to increases in medically indicated interventions, spontaneous delivery, or changes in obstetrical practices around induction of labor and timing or scheduling of cesarean delivery are unknown. Regardless, however, induction of labor or cesarean delivery before 39 weeks GA with medical indications should be minimized. The American College of Obstetrics and Gynecology provides guidance for determining when a pregnancy can be considered term, as well as a list of potential indications and contraindications to induction of labor.[10] Published data suggest that process improvement programs within a health care system can be successful in reducing unnecessary early-term deliveries.[11] The proportion of infants delivered at 37-38 weeks GA at KPNW is lower than that reported by national vital statistics, as is the increase in the percentage of these births during the study period,[2] possibly related to internal efforts to reduce deliveries at this GA.

Our analysis has several limitations, related primarily to generalizability and the use of administrative data. Our findings are not necessarily generalizable to all US infants, given that our study population included pregnant women and infants enrolled in a managed care health plan located in the Pacific Northwest United States and had a higher percentage of white women than the general US population. In addition, KPNW's health care practices might differ from those of other providers. Practices related to the timing of delivery of term infants and LOS for delivery hospitalizations likely vary among clinicians and medical institutions. Our use of administrative data precluded us from assessing breastfeeding as a potential confounder, because this is not recorded in an extractable and analyzable form. In addition, miscoded administrative data could lead to misclassification of clinical conditions. However, given that administrative data systems of managed health care plans are designed to monitor resource utilization, we consider substantial errors in coding or underreporting unlikely.[8] ■

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Appendix. Definitions of grouped conditions

Morbidity	ICD-9-CM codes
Gestational diabetes	Defined by positive laboratory results or ICD-9-CM 648.8 and use of insulin or glyburide. Positive laboratory test results included fasting blood glucose ≥126 mg/dL (alone or as part of a 3-hour 100-g oral glucose tolerance test) or 1-hour glucose challenge test ≥200 mg/dL or at least 2 abnormal values in the 3-hour 100-g oral glucose tolerance test (fasting, >105 mg/dL; 1 hour, >190 mg/dL; 2 hour, >165 mg/dL; 3 hour, >145 mg/dL).
Pregestational diabetes	250.0-250.9, 648.0, or indicated on the birth certificate
Hypertension	401-405, 642, 760.0, or indicated on the birth certificate (Oregon only)
Mental health condition	295.0-295.9, 296.0-296.9, 297.0-297.9, 298.0-298.9, 300.0-300.9, 309.0, 309.1, 311.X, 648.4, E950-958
Jaundice	774, 782.4
Birth trauma	761.7, 767, 772.6, 920
Tachypnea	770.6
Fever	778.4, 780.6
Respiratory conditions	460, 478.1, 478.9, 490, 493.9, 769, 770 (excluding 770.6), 786
Otitis	381, 382
Dehydration	276.5, 775.5
Upper respiratory infections	461.9, 462, 464, 465, 466, 486
Non–upper respiratory infections	027.2, 038.0, 038.42, 038.9, 041.02, 041.19, 047.9, 054.5, 057.8, 057.9, 074.0, 074.3, 079, 112.0, 112.2, 112.3, 112.9, 320.2, 322.0, 372.0, 372.3, 376.01, 380.10, 480.1, 480.9, 482.32, 484.8, 590.8, 590.10, 599.0, 681.02, 681.1, 681.7, 681.8, 682.2, 682.9, 684.0, 686.8, 686.9, 730.28, 771
Feeding problems	315.9, 779.3, 783.1-783.4