

Measuring Gestational Age in Vital Statistics Data: Transitioning to the Obstetric Estimate

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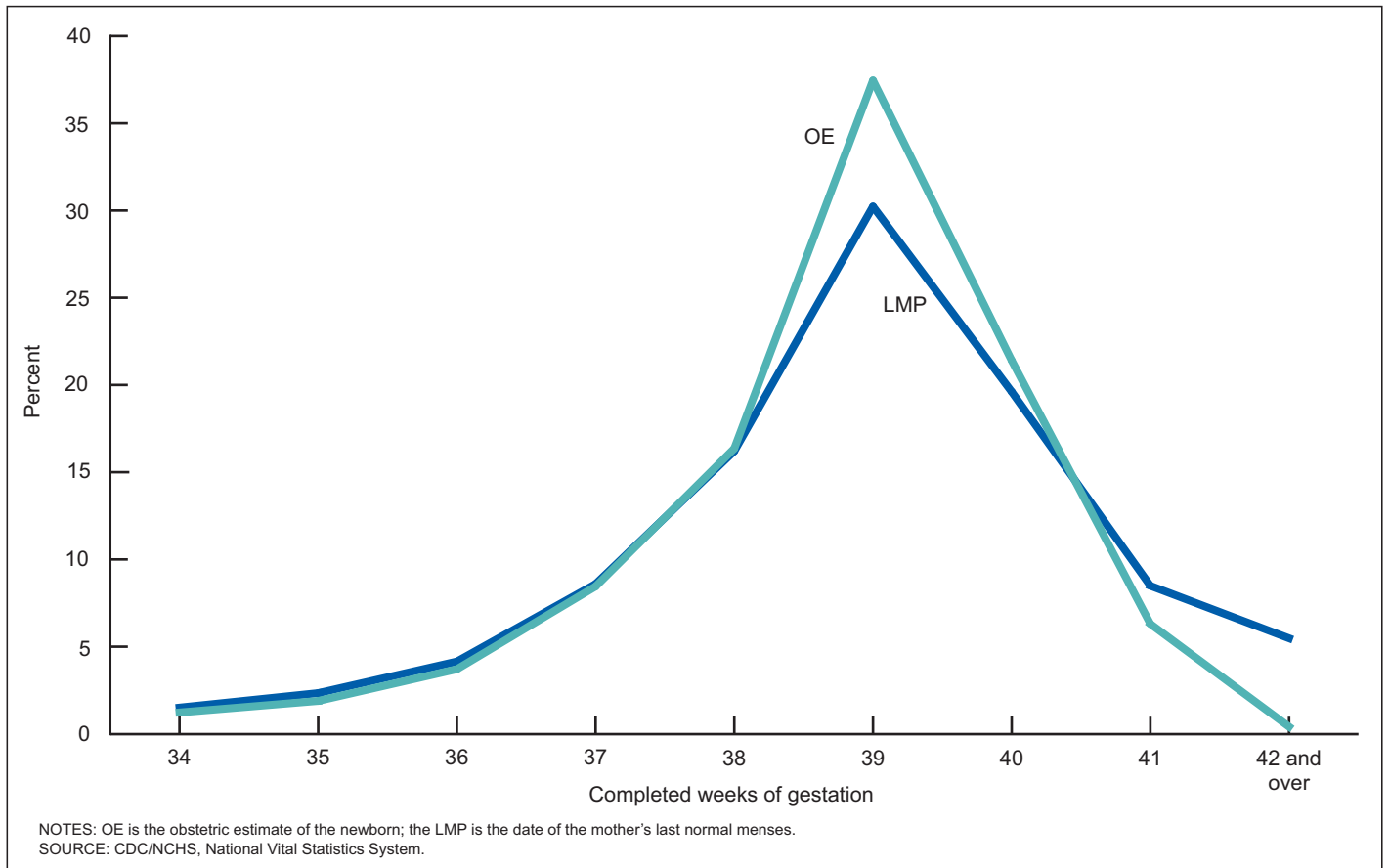


Figure 1. OE- and LMP-based measures of gestational age for selected weeks: United States, 2013

Abstract

Objectives—Beginning with the 2014 data year, the National Center for Health Statistics is transitioning to a new standard for estimating the gestational age of a newborn. The new measure, the obstetric estimate of gestation at delivery (OE), replaces the measure based on the date of the last normal menses (LMP). This transition is being made because of increasing evidence of the greater validity of the OE compared with the LMP-based measure. This report describes the relationship between the two measures. Agreement between the two measures is shown for 2013. Comparisons between the two measures for single gestational weeks and selected gestational age categories for 2013, and trends in the two measures for 2007–2013 by gestational category, focusing on preterm births, are shown for the United States and by race and Hispanic origin and state.

Methods—Data are derived from U.S. birth certificates for 2007–2013 for 100% of reported resident births.

Results—Estimates of pregnancy length were the same for the OE- and LMP-based measures for 62.1% of all births, and within 1 week for 83.4% in 2013. The mean OE-based gestational age for all 2013 births was 38.5 weeks, lower than the LMP-based average of 38.7. Births were less likely to be classified as preterm using the OE (9.62%) than with the LMP (11.39%). The 2013 OE preterm rate was lower than the LMP rate for 49 states and the District of Columbia. The OE-based percentage of full-term deliveries was higher than the LMP-based percentage; levels of late-term and postterm deliveries were lower. Preterm birth rates declined for both measures from 2007 through 2013 (8% compared with 10%). The OE-based 2013 preterm infant mortality rate was 19% higher than the LMP rate.

Keywords: LMP-based gestational age estimate • infant mortality

Introduction

Information on the gestational age of the newborn derived from vital statistics is used extensively for surveillance of preterm birth, to determine optimum gestational age for delivery, and to advance understanding of the etiologies of adverse perinatal outcome (1–7). The Centers for Disease Control and Prevention’s National Center for Health Statistics (NCHS) has measured vital statistics gestational age data based primarily on the difference between the date of the last normal menses (LMP) and the date of infant’s birth since national LMP data first became available in 1981. However, the quality of LMP-based data has long been of concern. Imperfect maternal recall, misinterpretation of bleeding early in pregnancy, irregular menstrual cycles, and data entry errors have been shown to result in the misclassification of gestational age, particularly at preterm (under 37 completed weeks) and postterm (42 weeks and over) (8–13).

An alternative measure of gestational age, the clinical estimate (CE), was added to the 1989 U.S. Standard Certificate of Live Birth. Detailed definitions and instructions for the new measure were not developed or released, however (14,15). Concerns with data quality and the lack of national reporting (California did not report the CE) precluded the estimate from being used as a national measure of gestational age. The CE was replaced with the similar item, the “obstetric estimate of gestation at delivery” (OE) with the 2003 birth certificate revision (16). More detailed definitions and instructions were developed and distributed for the OE, which in brief is defined as “the

best estimate of the infant’s gestation in completed weeks based on the birth attendant’s final estimate of gestation” (17). Despite differences in definitions and instructions, data for the CE and OE appear comparable and are combined in natality public-use files. National data for a combined OE-CE item did not become available until the 2007 data year, however.

Compared with LMP-based estimates, recent studies suggest higher consistency between OE-CE-based estimates and birthweight (18) and better agreement between the OE-CE-based estimates and estimates of gestational age based on an early ultrasound (considered the gold standard) (19). Agreement was also closer between the OE-CE estimates and gestational ages for births conceived using assisted reproductive technology, for which dates of conception were well documented (13). Studies also indicate high to moderate agreement between OE reporting on the birth certificate and information on best estimates of gestational age and estimated delivery dates on hospital medical records (20,21)

Increasing evidence of the greater validity of OE-based data compared with LMP-based data, and the national availability of OE data, have prompted NCHS to transition to the use of the OE as its standard, primary measure of gestational age beginning with the 2014 data year. This report presents a detailed comparison of the two gestational age measures to better understand the implications of this change. The exact agreement between the two measures by detailed gestational age for 2013 is presented. Comparisons are made between the mean OE- and LMP-based gestational ages and percent distributions, focusing on preterm births for the country overall, and by race and Hispanic origin and by state for 2007–2013. Differences in gestation-specific infant mortality rates by measure for 2013 are also described.

Methods

Data for the obstetric estimate measure are based primarily on the 2003 U.S. Standard Certificate of Live Birth item “Obstetric estimate of gestation.” Forty-one states and the District of Columbia (DC), representing 90% of births, reported this item for 2013 (22). The obstetric estimate of gestation is defined as “the best obstetric estimate of the infant’s gestation in completed weeks based on the birth attendant’s final estimate of gestation” (17).

Data for the remaining nine states (10% of records) are based on the 1989 revision of the U.S. Standard Certificate of Live Birth item “Clinical estimate of gestation.” The instructions to hospitals for the 1989 revision simply state that the birth attendant should provide a clinical estimate of gestation not based on the date of LMP and the date of birth (14). For changes in the revised reporting area over the 2007–2013 study period, see “User Guide to the 2013 Natality Public Use File” (22). Despite differences in terminology and instructions, studies (18) and NCHS’ own internal review of CE and OE data for the study period (available upon request; e-mail births@cdc.gov) suggest that estimates based on the obstetric estimate and the clinical estimate of gestation are comparable (18). Accordingly, data for these two measures are combined for this report and are subsequently referred to as the OE.

The OE is edited for an allowable range of 17 through 47 completed weeks of gestation. Less than 1% of all 2013 birth records (0.2%) were either outside of this range or were missing information

for the OE. Additional standard NCHS edits typically made to the LMP-based data [i.e., for inconsistency with birthweight and substitutions for missing data (see reference 23)] are not applied to the OE data presented in this report. These editing procedures had not been used for OE data in NCHS natality data files prior to 2014, and they were not applied for this report due to the complexity of these edits, resource constraints, and the need to ensure that findings can be replicated using NCHS natality public-use files. Another factor influencing the decision not to further edit these data is the minimal impact of such edits. A comparison of 2014 preliminary data edited for both the allowable range and birthweight-gestational age consistency checks with 2014 preliminary OE data edited only for the allowable range (as the 2007–2013 data shown in this report) indicates that the impact of the birthweight-gestational age consistency check and substitutions for missing data is negligible. For example, the 2014 preliminary OE-based preterm birth rate was 9.57% for both the minimally (range only) and fully edited (birthweight-gestational age consistency check) data. (Detailed data are available upon request.)

The LMP-based measure used in this report is the standard edited gestational age measure used by NCHS since the 1981 data year (COMBGEST field in the public-use birth data file). This measure is based primarily on the difference between the infant's date of birth and the date of the mother's last normal menses. The LMP measure is also edited for a range of 17 through 47 completed weeks. Where the date of the LMP is missing, weeks of gestation are imputed based on a previous record with the same month of LMP and birthweight within 500 grams. This imputation was performed for 2.7% of records for 2013. Where the LMP is missing or inconsistent with birthweight, the OE is used if valid and consistent with birthweight (0.4% of 2013 records) (22).

In sum, OE data in this report are edited only for range, whereas the LMP-based data are further edited for missing data and inconsistency with birthweight. The impact of this difference in editing procedures on the OE data and comparisons of the two measures appears negligible. The OE data for 2007–2013 will not be further updated to incorporate these edits and should be considered final estimates. Full editing procedures of the OE will be used beginning with the 2014 birth data files.

Race and Hispanic origin are reported independently on the birth certificate. This report shows “bridged” race categories consistent with those presented in previous NCHS vital statistics reports to facilitate consistency with LMP-based trends for these groups (1). The categories shown are non-Hispanic white, non-Hispanic black, American Indian or Alaska Native (AIAN), Asian or Pacific Islander (API), and Hispanic.

This report presents both absolute (expressed as percentage points) and relative differences in gestational age rates. Unless otherwise stated, all differences noted in the text are statistically significant. For information and discussion on random variation and significance testing see the “User Guide” (22).

The mean gestational age is the arithmetic average of the gestational age of the newborn in completed weeks. The difference between means was tested for statistical significance based on the calculated test statistic, z .

Infant mortality data are from the 2013 period linked birth/infant death file. In this file, information from the death certificate is linked with information from the birth certificate for each infant under age 1 year

who died during 2013. For 2013, 99.0% of all infant death records were successfully linked to the corresponding birth certificate (24).

Consistent with commonly used gestational age categories, “preterm” is defined as under 37 completed weeks of gestation, “late preterm” as 34–36 weeks, “early term” as 37–38 weeks, “full term” as 39–40 weeks, “late term” as 41 weeks, and “postterm” as 42 weeks and over.

Results

Percent agreement—the OE compared with the LMP-based measure of gestational age

- Weeks of gestation were the same for the OE- and LMP-based measures for 62.1% of all 2013 records for which gestational age was known (Table 1). The OE was within 1 week of the LMP for a total of 83.4% of records, and within 2 weeks for 91.4% of all 2013 records.
- When the imputed OE is excluded from the LMP-based measure (as noted in “Methods,” for the LMP-based measure, the OE is substituted where the LMP date is missing or inconsistent with birthweight), exact agreement between the measures was 59.9%; agreement within 1 week was 82.4%; and agreement within 2 weeks was 90.9%.
- When examined by gestational week (including imputed values for the LMP), exact agreement was lowest at the higher gestational ages—1% agreement and less at 43 weeks and over, and 8% at 42 weeks. Exact agreement between the measures was highest at 39 weeks (79%), followed by 40 weeks (67%), and 17–24 weeks (60.6%–68.7%). Patterns of agreement by single gestational week were similar where the imputed OE was excluded.

Mean gestational age—the OE compared with the LMP-based measure of gestational age

- The mean OE-based gestational age for all births for 2013 was 38.5 weeks, slightly lower than the LMP-based average of 38.7 weeks (Table A).
- Mean OE gestational ages for all race and Hispanic origin groups ranged from 38.1 to 38.6 weeks compared with an LMP-based average range of 38.2 to 38.8 weeks. Differences in means between measures were statistically significant for all groups; however, the largest difference between measures for all groups was 0.2 weeks.

Percent distributions—the OE compared with the LMP-based gestational age

- When the percent distributions of the OE and LMP were examined by single week of gestation for 2013, the smallest absolute differences were observed at under 39 weeks, and the largest at 39–44 weeks (Figure 1, Table 2).
- When examined by selected gestational age categories, births were somewhat less likely to be classified as preterm (under 37 completed weeks) using the OE than with the LMP (Tables B and 3).

Table A. Mean gestational age, by race and Hispanic origin of mother: United States, 2013

Race and Hispanic origin of mother	Obstetric estimate		LMP	
	Mean	Standard deviation	Mean	Standard deviation
Total	38.5	2.1	38.7	2.5
Non-Hispanic white	38.6	2.0	38.8	2.4
Non-Hispanic black	38.1	2.7	38.2	3.0
Hispanic	38.5	2.1	38.6	2.4
American Indian or Alaska Native	38.4	2.1	38.6	2.6
Asian or Pacific Islander	38.5	2.0	38.6	2.3

NOTE: LMP refers to the date of the mother's last normal menses.

Table B. Preterm birth rates, by race and Hispanic origin of mother: United States, 2013

Race and Hispanic origin of mother	Percent preterm ¹		Absolute difference	Relative difference
	Obstetric estimate	LMP		
Total	9.62	11.39	-1.8	-16
Non-Hispanic white	8.94	10.17	-1.2	-12
Non-Hispanic black	13.25	16.27	-3.0	-19
Hispanic	9.08	11.31	-2.2	-20
American Indian or Alaska Native	10.17	13.07	-2.9	-22
Asian or Pacific Islander	8.68	10.16	-1.5	-15

¹Preterm is under 37 completed weeks of gestation.

NOTES: The absolute difference is calculated as a-b. The relative difference is calculated as (a-b)/(b)*100. LMP refers to the date of the mother's last normal menses.

The 2013 OE-based national percentage of preterm birth was 9.62%, 1.8 percentage points (PP) lower than the LMP-based level of 11.39%. This difference translates to almost 70,000 fewer OE-estimated preterm births.

- Among preterm categories, differences between the OE and LMP of less than one-half PP were observed at under 28 weeks of gestation, 28–31, and 32–33 weeks, but the difference widened to 1.2 PP at 34–36 weeks or late preterm (6.83% compared with 7.99%).
- The two gestational age estimates show essentially the same percentages of births at 37–38 weeks, or early term (24.80% compared with 24.81%), for 2013.
- The OE-based percentage of full-term deliveries was higher than the LMP, especially at 39 weeks (37.46% compared with 30.23% for a more than seven PP difference), whereas levels of late-term (2.2 PP difference) and postterm deliveries were lower (0.41% compared with 5.49% for a difference of more than five PP); see [Table 2](#). The difference in the measures at 42 weeks and over results in nearly 200,000 fewer births based on the OE.
- Differences between the measures in percent distributions were largely consistent throughout the study period (e.g., lower OE-based levels of preterm and postterm births).

Trends in births by gestational age categories—the OE compared with the LMP-based measure of gestational age

- Preterm birth rates declined from 2007 through 2013 for both the OE- and the LMP-based measures; the decline in the OE preterm

rate was slightly smaller than the LMP rate (8% compared with 10%) ([Table 3](#), [Figures 2](#) and [3](#)).

- Declines were seen for both measures in early term births (16% for the OE and 13% for the LMP); the two measures showed similar relative increases at full term (both up 11%).
- Divergent trends were observed at 41 weeks—the OE indicated a 3% decline at late term, whereas the LMP showed a 2% rise. Both showed declines in postterm births (42 weeks and over), but the decline was greater using the OE.

Race and Hispanic origin—the OE compared with the LMP-based measure of gestational age

- Differences between the two measures observed for all births in gestational age distributions were also seen generally for each race and Hispanic origin group. That is, as with all births, the OE showed lower levels of preterm, and late- and postterm births, similar levels of early term births, and higher levels of full-term births compared with the LMP ([Table 3](#), [Figure 4](#)). As with all births, for each race and Hispanic origin group examined, the largest differences between the measures were seen at full and at post-term.
- Differences in preterm rates among groups were somewhat narrowed using the OE ([Table B](#)). The 2013 OE-based rates ranged from 8.68% (API) to 13.25% (non-Hispanic black), compared with the LMP-based range of 10.16% (API) to 16.27% (non-Hispanic black).
- The largest absolute differences among the groups in OE- and LMP-based preterm rates in 2013 were for births to non-Hispanic

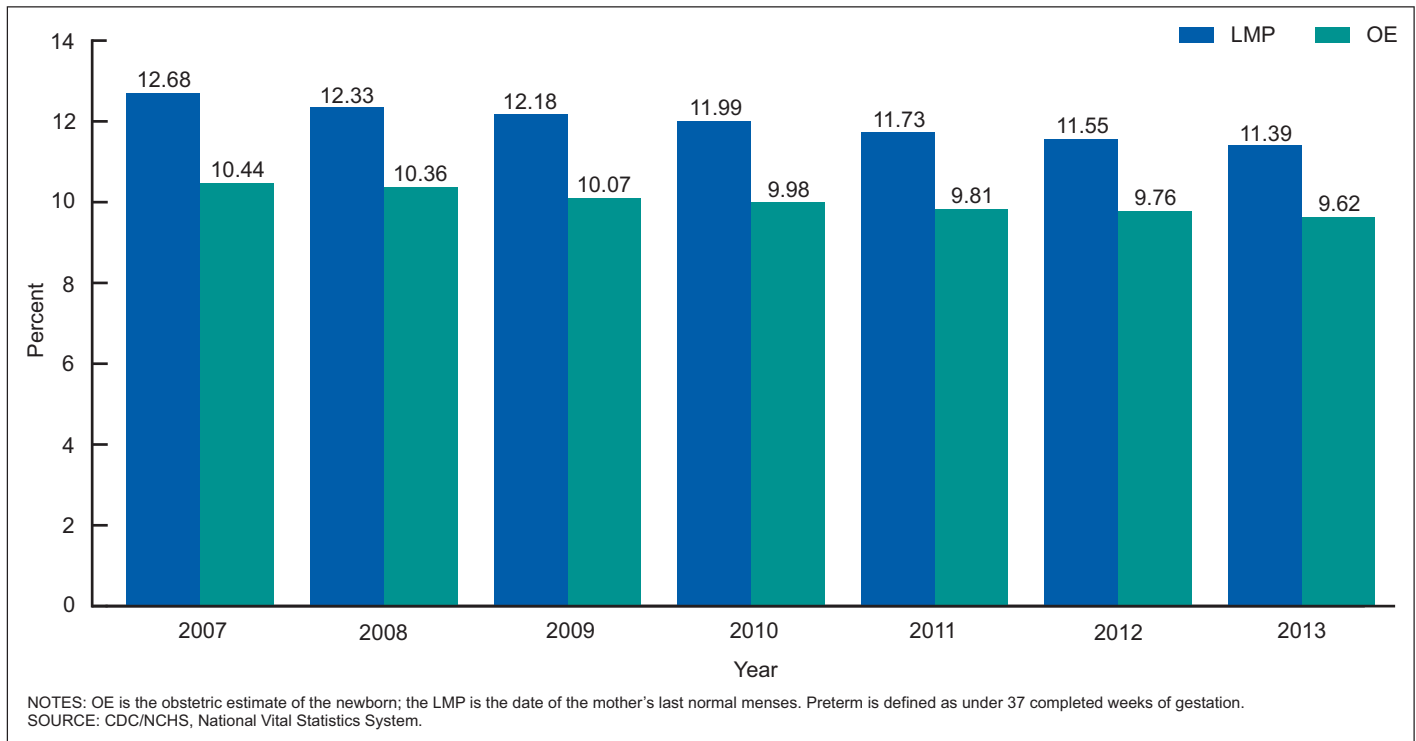


Figure 2. Preterm births, by OE- and LMP-based measures of gestational age: United States, 2007–2013

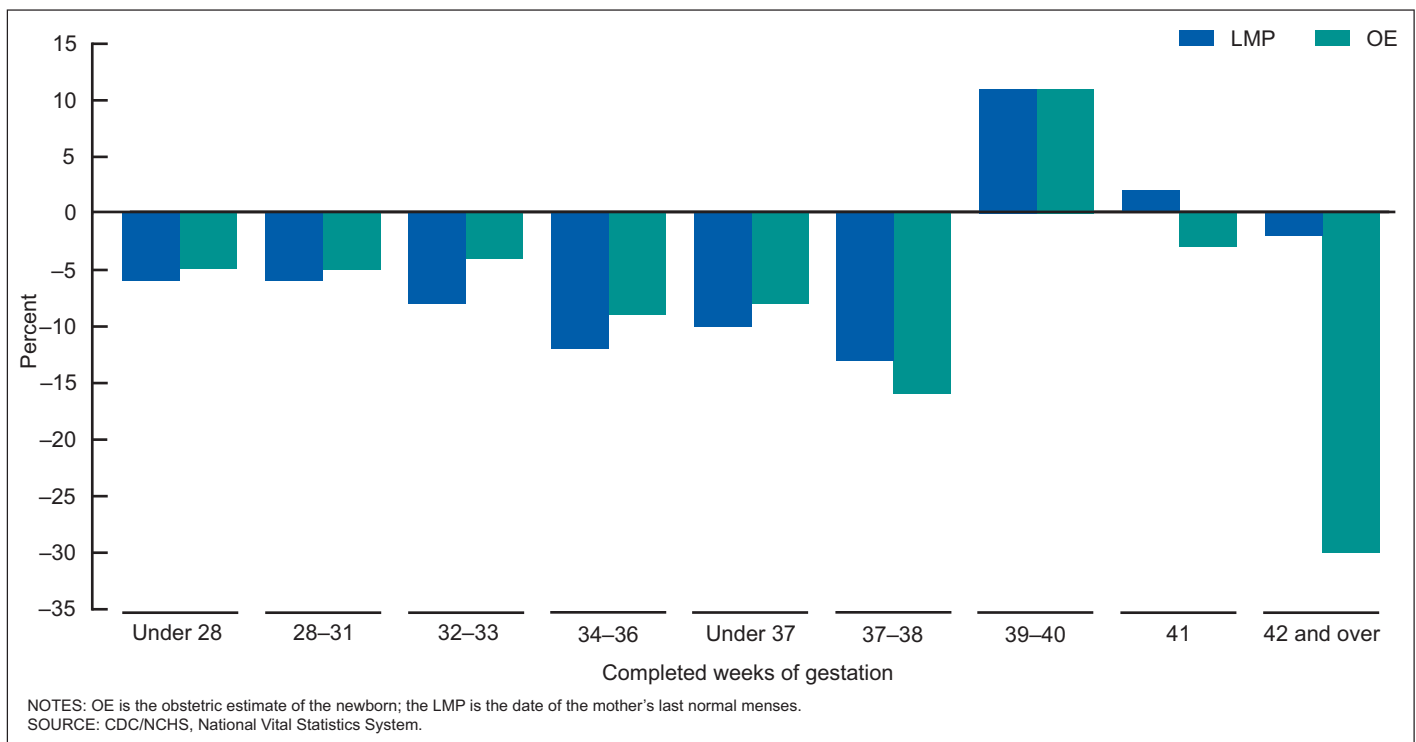


Figure 3. Percent change in OE- and LMP-based estimates of gestational age, by gestational age: United States, 2007 and 2013

- black (3.02 PP), AIAN (2.90 PP), and Hispanic (2.23 PP) women. The smallest difference (1.23 PP) was for births to non-Hispanic white women (Table B).
- According to the LMP, the 2013 preterm rate for API births (10.16% in 2013) was essentially the same as for non-Hispanic white births (10.17%). However, the 2013 API preterm rate based on the OE was lower than for non-Hispanic white births (8.68% and 8.94%).
- A small but statistically significant difference of 0.1 PP was observed for 2013 between the Hispanic and non-Hispanic white OE-based preterm rate (9.08% and 8.94%, respectively), compared with a 1.1 PP difference between the groups in LMP-based rates (11.31% and 10.17%).

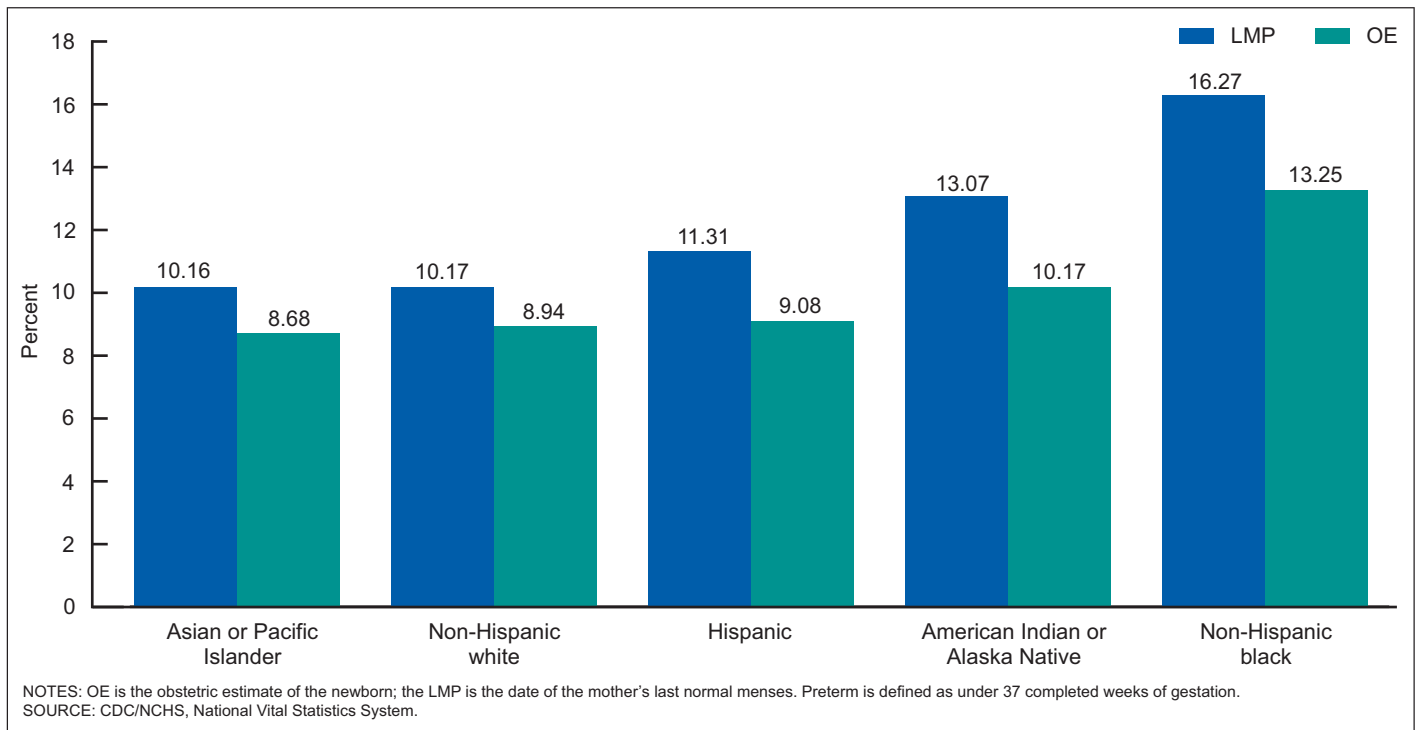


Figure 4. Preterm births by OE- and LMP-based gestational age, by race and Hispanic origin: United States, 2013

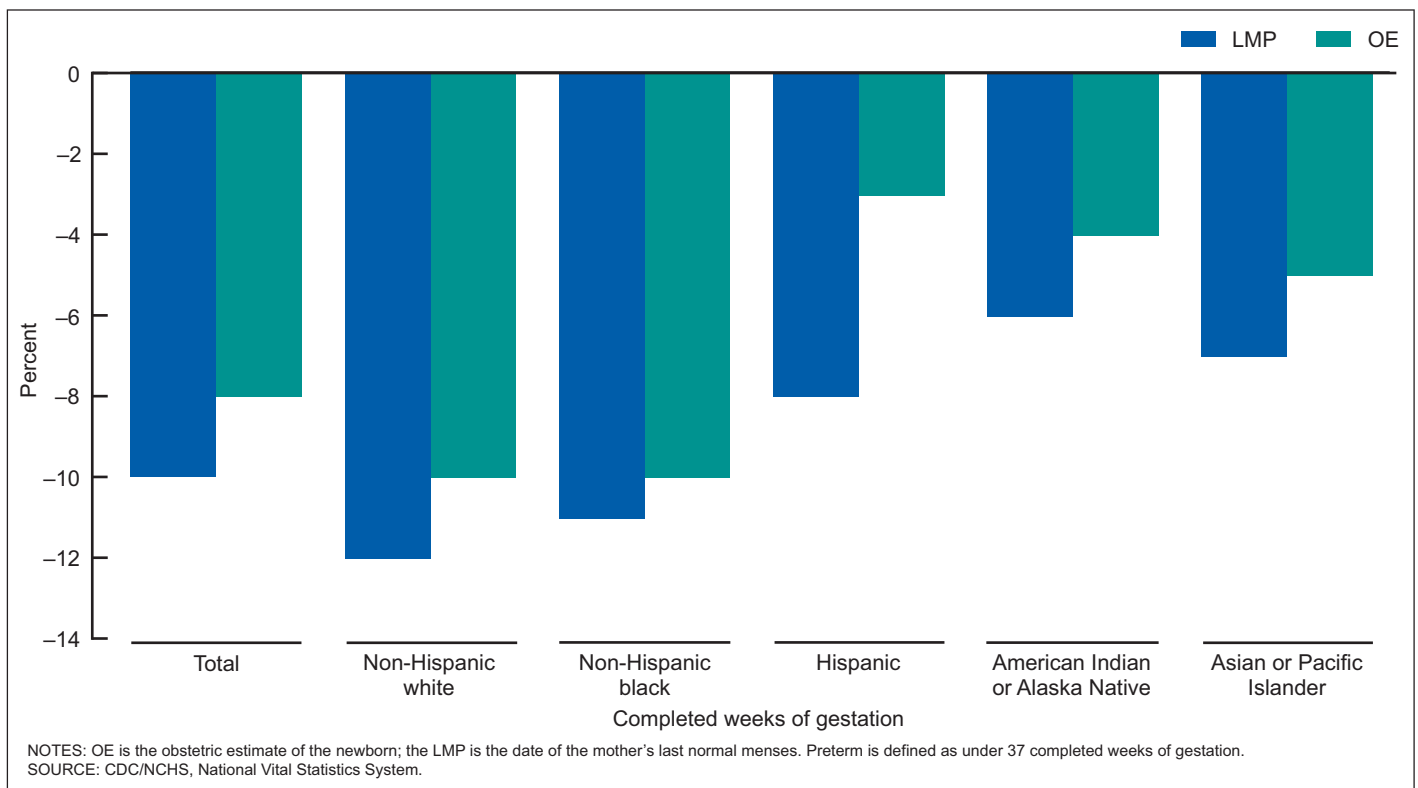


Figure 5. Percent change in OE- and LMP-based estimates of preterm birth rates, by race and Hispanic origin: United States, 2007 and 2013

- Both measures showed declines in preterm birth rates for all race and Hispanic origin groups from 2007 through 2013. However, as with all births, the OE-based decline was somewhat less pronounced than the LMP for all groups; see Table 3 and Figure 5.

State preterm birth rates—the OE compared with the LMP-based measure of gestational age

- The range in state OE-based preterm rates for 2013 was narrower (5.5 PP difference) than the LMP-based range (8.5 PP) (Table 4).

(The full OE gestational age distributions for each state are shown in [Table 5](#).)

- The 2013 OE-based preterm rate was lower than the LMP-based rate for 49 states and DC; the difference for Vermont was not statistically significant.
- Both measures show Vermont with the lowest rate of preterm deliveries among the 50 states and DC in 2013 (OE = 7.6%; LMP = 8.1%), and Mississippi with the highest level (OE = 13.1%; LMP = 16.6%).
- Trends in state preterm rates for 2007–2013 were similar for the two gestational age measures, but fewer significant declines by state were observed in OE preterm rates ([Figure 6](#)).
- OE-based preterm rates declined for 39 states and DC. Rates were lower, but not significantly so in 10 of the remaining states; the preterm rate increased in 1 state.
- Declines in LMP-based preterm rates were observed for 46 states and DC; no state reported increases in LMP-measured preterm births.

Infant mortality rates—the OE compared with the LMP-based measure of gestational age

- The OE-based infant mortality rate (IMR) among preterm births was 19% higher than the LMP-based IMR (41.51 deaths per 1,000 births compared with 34.77). OE-based IMRs were higher for each preterm and early term category under 28 weeks, 28–31, 32–33, 34–36, and 37–38 weeks, with the greatest difference (30%) at 32–33 weeks ([Table 6](#), [Figure 7](#)).
- In contrast to differences in preterm infant mortality rates, OE-based rates at term (full and late) were lower than LMP-based IMRs—the OE rate at 40 weeks was 14% lower than the LMP, and the OE rate at 41 weeks was 16% lower.

- Similar to preterm IMRs, the OE-based IMR was higher than that of the LMP-based IMR at 42 weeks and over (3.29 and 2.39, respectively).

Discussion

Similarities and differences between the two gestational age measures

This report documents similarities and differences between OE- and LMP-based estimates of gestational age. For more than 6 of every 10 records, estimates of pregnancy length were exactly the same; for about 3 of every 4 records, the estimates were within 1 week. Although differences between the mean number of weeks for the two measures were statistically significant, the average gestational ages differed by only 0.1–0.2 weeks overall, and for each of the race and Hispanic origin groups studied. The two measures showed consistent trends in U.S. preterm birth rates from 2007 through 2013. Preterm trends were also generally consistent between the OE and LMP by race and Hispanic origin, and often by state, confirming that U.S. preterm deliveries generally have been on the decline over the study period.

Key differences between measures in commonly tracked and studied gestational categories were observed, however. The OE exhibits lower levels of preterm births (nearly 70,000 fewer 2013 births) and postterm births (about 200,000 fewer births) than the LMP, and higher levels of births at full term, particularly at 39 weeks. Higher preterm and postterm risk of infant mortality was also evident using the OE compared with the LMP. Differences between the two measures in preterm and postterm birth rates may be related to LMP misclassification of term births as preterm and postterm. This misclassification has

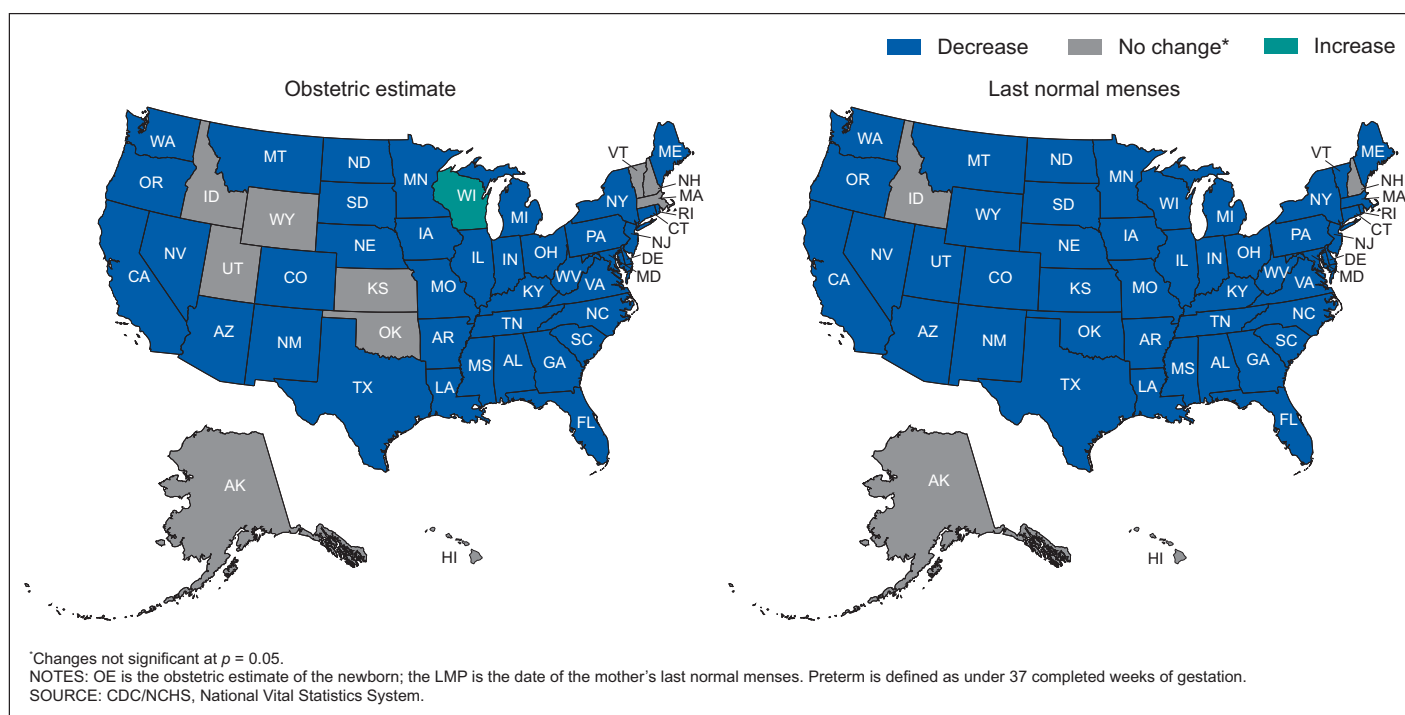


Figure 6. Percent change in OE- and LMP-based preterm births: United States, 2007–2013

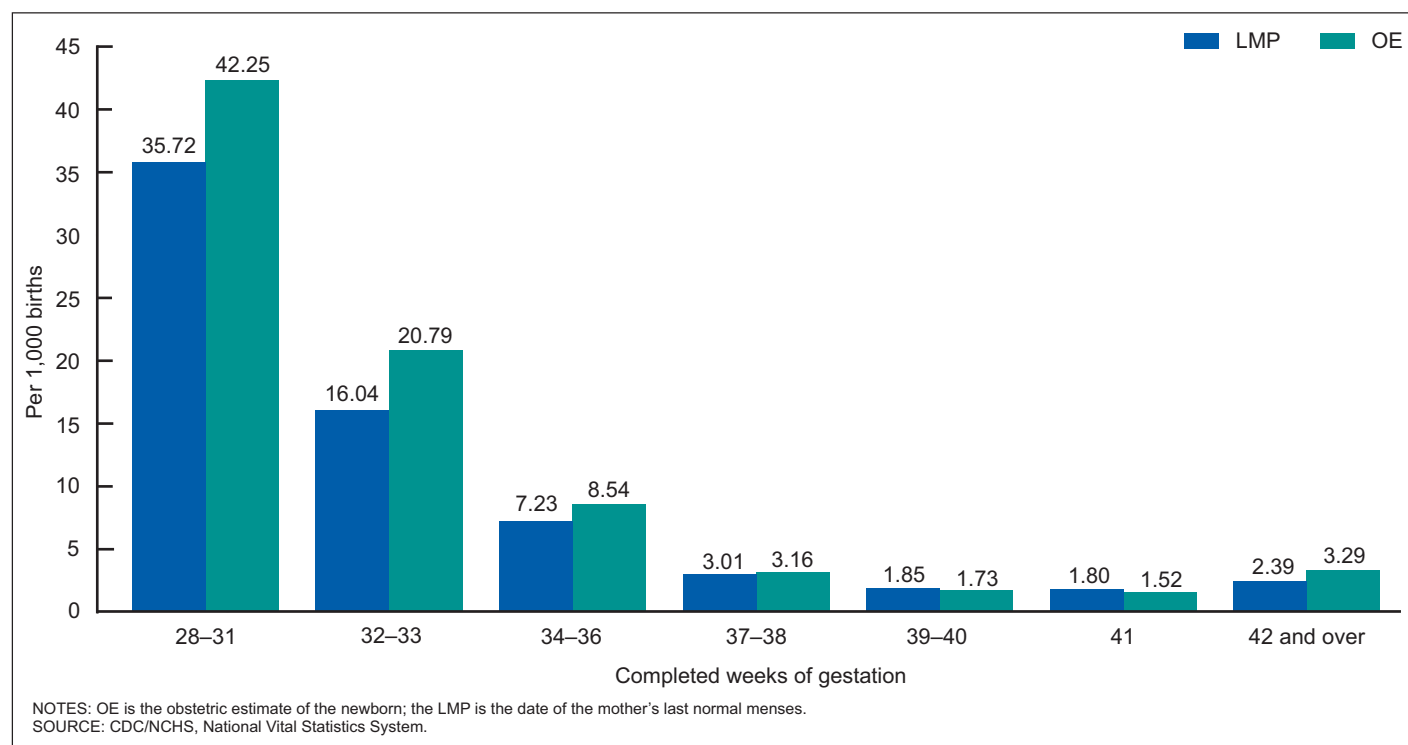


Figure 7. Infant mortality rates, by OE- and LMP-based gestational age: United States, 2013

important public health implications, including the overestimation of LMP-based preterm birth rates and underestimation of the risk of death for newborns delivered preterm and postterm. Similar findings have been suggested elsewhere (13,25).

The larger differences between OE and LMP estimates for non-Hispanic black, AIAN, and Hispanic births may be related to the higher levels of missing and invalid LMP data and accordant gestational age misclassification for these groups (15). A recent study found that the LMP overestimated preterm births among non-Hispanic black and Hispanic women and reported less reliable LMP dates among younger, less-educated women and those who entered prenatal care after the first trimester of pregnancy (11, 12). Despite the narrowing of differences among race and Hispanic origin groups using the OE, this study shows non-Hispanic black women remained about 50% more likely than non-Hispanic white and API women to give birth before 37 completed weeks.

Among Hispanic women, the difference between the OE-based Hispanic preterm birth rate and those of other race and Hispanic origin groups may be more consistent with other birth outcome measures such as low birthweight (LBW) compared with the LMP-based rate. For example, whereas the 2013 LMP-based Hispanic preterm rate is 11% higher than for non-Hispanic white births, the Hispanic OE preterm rate is 2% higher, consistent with the difference between the Hispanic LBW rate (LBW is well reported and closely associated with preterm birth) and the non-Hispanic white LBW rate (also 2%) (1).

This report's findings of lower OE estimates of preterm birth are consistent with most recent research comparing LMP-based data with estimated date of delivery (EDD) and ultrasound estimates. Lower and similar preterm estimates have also been observed in LMP-ultrasound comparisons (11,12,26); however, these inconsistent findings may be

attributable to differences in sample characteristics and study methods (12). The finding of lower postterm estimates is consistent with other research (10–13,26).

Assessing and improving data quality

While research demonstrates that the OE is an improved measure of gestational age compared with the LMP, the OE has limitations. The national recommended definition for this item has been publicized since 2003, but the derivation of the OE remains uncertain. Studies comparing the OE with results from early ultrasound may be less informative because the OE is not recommended to be based solely on ultrasound; it is to be "the best obstetric estimate . . . determined by all perinatal factors and assessments such as ultrasound . . ." (17). A recent unpublished study based on interviews with 25 hospital staff responsible for collecting or entering OE information for the birth certificate found incorrect rounding procedures (i.e., rounding to the nearest whole number instead of rounding down to completed weeks) (27). Another recent study comparing birth certificate OE data with information from hospital medical records (EDD or best obstetric estimates) for two states found exact agreement between the OE and hospital records to be high in one state but only moderate in another (20). Another study found that sensitivity between preterm rates based on the OE and those calculated from the EDD (considered the best obstetric estimate) was excellent in one jurisdiction but moderate in another (21).

Efforts are underway to improve OE reporting across the country. In collaboration with the National Association for Public Health Statistics and Information Systems (NAPHSIS), which represents the vital

statistics jurisdictions, and clinical experts, NCHS is refining and updating its “Guide to Completing the Facility Worksheets for the Certificate of Live Birth and Report of Fetal Death (2003 revision)” (“Facility Guidebook”). This update will ensure consistency with the American College of Obstetricians and Gynecologists Revitalize Obstetric Data Definitions for establishing estimated due date (28). NCHS and NAPHSIS are also collaborating to develop web-based training for relevant hospital staff for use in all vital statistics jurisdictions. Among other features, the training will link with the Facility Guidebook, include information on the relevance and uses of gestational age data, and offer continuing education credits for both clinicians and nonclinicians.

Despite switching to use of the OE estimate in lieu of the LMP as the primary measure of gestational age in vital statistics data, NCHS will continue to collect and publish LMP-based data as in the past to allow for the analysis of national trends prior to 2007 (LMP data are available since 1981), and as an alternative to the OE. The OE estimates presented in this report for 2007–2013 will serve as standard OE estimates. The national transition to the OE should improve monitoring of trends in gestational age, identification of disparities in preterm birth among population groups, estimation of mortality risk by gestational age, and understanding of why pregnancies end too soon.

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Table 1. Exact agreement between the OE- and LMP-based gestational ages, by single week of gestation: United States, 2013

Gestational age	Exact agreement			
	Including imputed values ¹		Excluding imputed values ¹	
	Number	Percent	Number	Percent
Total				
Exact agreement	2,435,775	62.1	2,221,455	59.9
Agreement within 1 week	3,272,669	83.4	3,058,364	82.4
Agreement within 2 weeks	3,587,849	91.4	3,373,529	90.9
Exact agreement by week				
17	208	60.6	135	50.0
18	325	62.7	205	51.5
19	468	64.8	323	56.0
20	806	68.7	593	61.7
21	1,072	63.8	798	56.8
22	1,329	64.7	985	57.6
23	1,722	61.7	1,316	55.2
24	2,441	63.2	1,877	56.9
25	2,553	58.3	1,955	51.7
26	2,886	57.6	2,271	51.7
27	3,336	56.6	2,632	50.7
28	3,881	51.2	3,099	45.6
29	4,340	45.4	3,556	40.5
30	5,845	45.0	4,830	40.3
31	7,446	44.4	6,269	40.2
32	10,972	47.1	9,294	43.0
33	16,195	46.7	13,953	43.0
34	29,011	49.0	25,106	45.4
35	44,312	48.3	38,853	45.0
36	86,986	53.5	77,215	50.5
37	202,038	59.9	182,335	57.4
38	390,992	61.5	356,096	59.2
39	936,987	79.0	862,669	77.6
40	515,714	67.0	474,131	65.1
41	154,683	46.4	142,673	44.4
42	8,389	8.0	7,515	7.2
43	541	1.0	494	0.9
44	184	0.6	172	0.6
45	64	0.4	62	0.4
46	30	0.4	26	0.3
47	19	0.4	17	0.3

¹Imputed values are those for which the obstetric estimate-based measure is substituted for the LMP-based measure when the LMP date is missing or inconsistent with birthweight.

NOTES: OE is the obstetric estimate of the newborn; LMP refers to the date of the mother's last normal menses.

Table 2. Percent distributions of the OE- and LMP-based estimates of gestational age: United States, 2013

Weeks of gestation	OE		LMP		Absolute difference	Relative difference
	Number	Percent	Number	Percent	Percentage points	Percent
Total	3,932,181	100.00	3,932,181	100.00
Under 37	377,655	9.62	447,361	11.39	-1.8	-16
Under 28	27,550	0.70	28,492	0.73	0.0	-4
17	290	0.01	353	0.01	0.0	0
18	483	0.01	522	0.01	0.0	0
19	758	0.02	730	0.02	0.0	0
20	1,313	0.03	1,181	0.03	0.0	0
21	1,590	0.04	1,681	0.04	0.0	0
22	2,129	0.05	2,056	0.05	0.0	0
23	2,691	0.07	2,794	0.07	0.0	0
24	3,927	0.10	3,870	0.10	0.0	0
25	4,172	0.11	4,380	0.11	0.0	0
26	4,775	0.12	5,015	0.13	0.0	-8
27	5,422	0.14	5,910	0.15	0.0	-7
28-31	36,096	0.92	46,972	1.20	-0.3	-23
28	6,399	0.16	7,595	0.19	0.0	-16
29	7,234	0.18	9,573	0.24	-0.1	-25
30	9,926	0.25	13,008	0.33	-0.1	-24
31	12,537	0.32	16,796	0.43	-0.1	-26
32-33	45,789	1.17	58,039	1.48	-0.3	-21
32	18,847	0.48	23,327	0.59	-0.1	-19
33	26,942	0.69	34,712	0.88	-0.2	-22
34-36	268,220	6.83	313,858	7.99	-1.2	-15
34	48,467	1.23	59,231	1.51	-0.3	-19
35	74,112	1.89	91,919	2.34	-0.5	-19
36	145,641	3.71	162,708	4.14	-0.4	-10
37-38	973,569	24.81	974,162	24.80	0.0	0
37	331,667	8.45	337,498	8.59	-0.1	-2
38	641,902	16.36	636,664	16.21	0.1	1
39-40	2,309,888	58.85	1,957,937	49.84	9.0	18
39	1,470,101	37.46	1,187,678	30.23	7.2	24
40	839,787	21.40	770,259	19.61	1.8	9
41	247,476	6.31	333,531	8.49	-2.2	-26
42 and over	16,126	0.41	215,510	5.49	-5.1	-93
42	14,844	0.38	105,082	2.67	-2.3	-86
43	840	0.02	53,625	1.37	-1.3	-99
44	266	0.01	28,477	0.72	-0.7	-99
45	92	0.00	14,870	0.38	-0.4	-100
46	37	0.00	8,203	0.21	-0.2	-100
47	47	0.00	5,253	0.13	-0.1	-100
Unknown	7,467	...	3,680

... Category not applicable.

0.0 or 0 Quantity more than 0 but less than 0.05.

NOTES: OE is the obstetric estimate of the newborn; LMP refers to the date of the mother's last normal menses.

Table 3. Births based on the OE- and LMP-based estimates of gestational age by selected gestational age categories, by race and Hispanic origin: United States, 2007–2013

Year	Births	Preterm					Early term	Full term	Late term	Postterm	Not stated
		Total under 37 weeks	27 weeks and under	28–31 weeks	32–33 weeks	34–36 weeks	37–38 weeks	39–40 weeks	41 weeks	42 weeks and over	
		Obstetric estimate									Number
		Number	Percent								
All races and Hispanic origins											
Obstetric estimate											
2013.	3,932,181	9.62	0.70	0.92	1.17	6.83	24.81	58.85	6.31	0.41	7,467
2012.	3,952,841	9.76	0.71	0.92	1.17	6.96	25.47	58.30	6.06	0.40	8,380
2011.	3,953,590	9.81	0.70	0.93	1.18	6.99	26.09	57.51	6.16	0.43	9,290
2010.	3,999,386	9.98	0.71	0.94	1.18	7.15	27.29	56.08	6.19	0.46	10,538
2009.	4,130,665	10.07	0.71	0.94	1.18	7.24	28.24	54.98	6.23	0.48	11,748
2008.	4,247,694	10.36	0.71	0.95	1.22	7.47	29.69	53.26	6.17	0.52	14,194
2007.	4,316,233	10.44	0.74	0.97	1.22	7.51	29.46	53.02	6.50	0.58	20,286
LMP-based estimate											
2013.	3,932,181	11.39	0.73	1.20	1.48	7.99	24.80	49.84	8.49	5.49	3,680
2012.	3,952,841	11.55	0.73	1.19	1.49	8.13	24.96	49.33	8.55	5.62	4,080
2011.	3,953,590	11.73	0.73	1.20	1.52	8.28	25.86	48.48	8.36	5.57	4,846
2010.	3,999,386	11.99	0.74	1.22	1.53	8.49	26.88	47.41	8.24	5.48	5,279
2009.	4,130,665	12.18	0.74	1.23	1.55	8.66	27.59	46.51	8.19	5.54	5,285
2008.	4,247,694	12.33	0.74	1.24	1.57	8.77	27.85	45.71	8.44	5.68	5,809
2007.	4,316,233	12.68	0.77	1.27	1.60	9.04	28.60	44.79	8.30	5.62	6,846
Non-Hispanic white											
Obstetric estimate											
2013.	2,129,196	8.94	0.51	0.80	1.10	6.54	23.10	60.44	7.04	0.48	3,892
2012.	2,134,044	9.13	0.52	0.80	1.09	6.72	24.00	59.74	6.67	0.46	4,070
2011.	2,146,566	9.21	0.51	0.82	1.11	6.77	24.74	58.90	6.67	0.47	4,974
2010.	2,162,406	9.41	0.53	0.83	1.11	6.94	26.02	57.44	6.64	0.49	5,011
2009.	2,212,552	9.50	0.52	0.83	1.09	7.05	27.14	56.24	6.62	0.49	5,911
2008.	2,267,817	9.81	0.53	0.85	1.14	7.30	28.96	54.26	6.46	0.51	6,142
2007.	2,310,333	9.90	0.55	0.84	1.14	7.37	29.11	53.69	6.74	0.56	7,564
LMP-based estimate											
2013.	2,129,196	10.17	0.52	1.03	1.32	7.31	23.19	51.53	9.30	5.80	1,569
2012.	2,134,044	10.29	0.54	1.01	1.30	7.44	23.59	51.04	9.28	5.80	1,602
2011.	2,146,566	10.50	0.52	1.02	1.34	7.62	24.64	50.17	8.95	5.73	2,380
2010.	2,162,406	10.77	0.54	1.04	1.35	7.84	25.77	49.04	8.77	5.65	1,892
2009.	2,212,552	10.92	0.54	1.04	1.34	8.00	26.73	48.02	8.66	5.67	2,350
2008.	2,267,817	11.14	0.54	1.06	1.38	8.16	27.29	47.03	8.82	5.71	2,325
2007.	2,310,333	11.50	0.56	1.08	1.40	8.46	28.39	45.91	8.58	5.61	2,557

Table 3. Births based on the OE- and LMP-based estimates of gestational age by selected gestational age categories, by race and Hispanic origin: United States, 2007–2013—Con.

Year	Births	Preterm					Early term	Full term	Late term	Postterm	Not stated
		Total under 37 weeks	27 weeks and under	28–31 weeks	32–33 weeks	34–36 weeks	37–38 weeks	39–40 weeks	41 weeks	42 weeks and over	
Number		Percent									Number
Non-Hispanic black											
Obstetric estimate											
2013.	583,834	13.25	1.59	1.56	1.65	8.45	27.26	53.93	5.21	0.34	1,245
2012.	583,489	13.48	1.61	1.58	1.69	8.60	27.68	53.38	5.13	0.32	1,685
2011.	582,345	13.54	1.61	1.59	1.67	8.67	28.19	52.67	5.25	0.35	1,531
2010.	589,808	13.81	1.59	1.61	1.74	8.86	29.12	51.32	5.38	0.37	1,680
2009.	609,584	14.05	1.65	1.63	1.76	9.01	29.71	50.36	5.47	0.41	1,657
2008.	623,029	14.38	1.63	1.63	1.84	9.28	30.78	48.87	5.49	0.48	1,929
2007.	627,191	14.71	1.74	1.74	1.84	9.40	30.33	48.72	5.72	0.52	2,280
LMP-based estimate											
2013.	583,834	16.27	1.65	2.06	2.19	10.36	27.36	44.55	6.76	5.07	639
2012.	583,489	16.53	1.68	2.03	2.23	10.59	27.29	44.03	7.00	5.15	902
2011.	582,345	16.77	1.70	2.06	2.28	10.74	28.03	43.29	6.81	5.10	828
2010.	589,808	17.12	1.69	2.10	2.34	10.99	28.83	42.30	6.82	4.94	961
2009.	609,584	17.47	1.74	2.12	2.35	11.24	29.20	41.51	6.82	5.01	867
2008.	623,029	17.54	1.72	2.12	2.43	11.27	29.15	40.91	7.11	5.28	1,000
2007.	627,191	18.29	1.86	2.23	2.46	11.75	29.52	39.98	7.02	5.19	1,058
Hispanic											
Obstetric estimate											
2013.	901,033	9.08	0.62	0.82	1.07	6.57	26.43	58.66	5.51	0.32	1,200
2012.	907,677	9.09	0.63	0.82	1.06	6.58	26.71	58.41	5.45	0.35	1,474
2011.	918,129	9.02	0.61	0.81	1.06	6.54	27.34	57.54	5.71	0.39	1,603
2010.	945,180	9.09	0.61	0.80	1.04	6.64	28.65	55.92	5.86	0.47	2,639
2009.	999,548	9.12	0.60	0.82	1.06	6.65	29.41	54.87	6.06	0.54	2,757
2008.	1,041,239	9.38	0.61	0.82	1.07	6.88	30.31	53.55	6.18	0.59	4,449
2007.	1,062,779	9.35	0.62	0.84	1.06	6.83	29.44	53.85	6.65	0.71	8,312
LMP-based estimate											
2013.	907,033	11.31	0.64	1.09	1.45	8.13	26.34	49.15	7.88	5.32	629
2012.	907,677	11.58	0.64	1.13	1.49	8.31	26.16	48.47	8.04	5.75	775
2011.	918,129	11.65	0.63	1.13	1.49	8.40	26.98	47.58	8.09	5.69	780
2010.	945,180	11.79	0.64	1.14	1.49	8.53	27.96	46.56	8.03	5.65	1,636
2009.	999,548	11.97	0.63	1.14	1.55	8.64	28.29	45.81	8.12	5.80	1,187
2008.	1,041,239	12.10	0.64	1.15	1.53	8.77	28.09	45.25	8.51	6.05	1,503
2007.	1,062,779	12.29	0.65	1.17	1.58	8.89	28.36	44.72	8.57	6.06	2,167

Table 3. Births based on the OE- and LMP-based estimates of gestational age by selected gestational age categories, by race and Hispanic origin: United States, 2007–2013—Con.

Year	Births	Preterm					Early term	Full term	Late term	Postterm	Not stated
		Total under 37 weeks	27 weeks and under	28–31 weeks	32–33 weeks	34–36 weeks	37–38 weeks	39–40 weeks	41 weeks	42 weeks and over	
		Obstetric estimate									Number
		Number	Percent								Number
American Indian or Alaska Native											
2013.	45,991	10.17	0.62	0.94	1.21	7.41	27.27	55.81	6.34	0.41	122
2012.	46,093	10.39	0.70	0.90	1.24	7.56	27.43	55.63	6.12	0.43	124
2011.	46,419	10.24	0.64	0.93	1.17	7.50	27.27	55.49	6.52	0.49	144
2010.	46,760	10.57	0.62	0.93	1.22	7.80	27.67	54.53	6.69	0.54	125
2009.	48,665	10.04	0.63	0.88	1.18	7.34	28.55	54.07	6.72	0.62	145
2008.	49,537	10.38	0.68	0.90	1.14	7.67	28.94	53.15	6.84	0.69	163
2007.	49,443	10.58	0.65	0.85	1.33	7.75	28.39	52.96	7.27	0.80	210
LMP-based estimate											
2013.	45,991	13.07	0.66	1.44	1.73	9.24	25.88	45.55	8.58	6.92	75
2012.	46,093	13.25	0.76	1.37	1.86	9.25	25.59	45.60	8.40	7.16	67
2011.	46,419	13.50	0.68	1.43	1.75	9.64	25.35	45.42	8.61	7.11	79
2010.	46,760	13.60	0.71	1.48	1.79	9.62	26.57	44.37	8.50	6.96	68
2009.	48,665	13.45	0.72	1.41	1.88	9.44	27.04	44.19	8.52	6.80	70
2008.	49,537	13.60	0.73	1.42	1.74	9.70	26.88	43.59	8.97	6.97	81
2007.	49,443	13.92	0.69	1.44	1.85	9.94	27.70	42.71	8.60	7.06	87
Asian or Pacific Islander											
2013.	265,673	8.68	0.52	0.79	0.98	6.38	27.33	58.29	5.44	0.26	360
2012.	272,802	8.75	0.51	0.76	1.01	6.46	27.93	57.85	5.22	0.26	367
2011.	253,915	8.84	0.51	0.79	1.02	6.51	28.20	57.32	5.34	0.30	426
2010.	246,886	9.01	0.51	0.78	1.04	6.67	28.89	56.56	5.22	0.31	554
2009.	251,089	9.02	0.51	0.75	1.00	6.76	29.63	55.92	5.10	0.33	681
2008.	253,185	9.15	0.51	0.77	1.01	6.86	31.36	54.11	5.05	0.34	869
2007.	254,488	9.13	0.49	0.81	1.02	6.82	30.87	54.19	5.39	0.43	1,331
LMP-based estimate											
2013.	265,673	10.16	0.54	0.98	1.22	7.42	26.75	51.01	7.76	4.32	177
2012.	272,802	10.15	0.52	0.93	1.24	7.46	26.72	50.72	7.85	4.56	166
2011.	253,915	10.40	0.52	0.98	1.29	7.62	27.34	49.84	7.82	4.60	231
2010.	246,886	10.69	0.53	1.01	1.31	7.84	28.07	49.16	7.65	4.43	277
2009.	251,089	10.85	0.53	0.95	1.32	8.06	28.54	48.57	7.57	4.47	297
2008.	253,185	10.71	0.52	0.99	1.28	7.92	28.91	47.91	7.82	4.64	367
2007.	254,488	10.93	0.50	1.00	1.33	8.09	29.50	47.22	7.68	4.67	486

NOTES: OE is the obstetric estimate of the newborn; LMP refers to the date of the mother's last normal menses.

Table 4. OE- and LMP-based preterm birth rates, by state: United States and each state, 2007–2013

Area	Measure	2013	2012	2011	2010	2009	2008	2007	Percent change 2007–2013
United States	OE	9.6	9.8	9.8	10.0	10.1	10.4	10.4	-8
	LMP	11.4	11.5	11.7	12.0	12.2	12.3	12.7	-10
Alabama	OE	11.8	11.9	11.9	12.5	12.5	12.9	13.0	-9
	LMP	15.1	14.6	14.9	15.6	15.6	15.7	16.6	-9
Alaska	OE	8.5	7.6	8.9	8.3	9.0	8.7	8.8	-3
	LMP	10.0	9.2	10.4	9.7	11.0	10.3	10.4	-4
Arizona	OE	9.1	9.2	9.3	9.7	10.1	10.2	10.3	-12
	LMP	11.6	11.6	12.1	12.2	12.7	12.9	12.7	-9
Arkansas	OE	10.2	10.4	10.8	10.8	11.1	11.7	11.7	-13
	LMP	12.7	13.3	13.2	12.7	13.1	13.5	13.9	-9
California	OE	8.4	8.4	8.5	8.6	8.8	9.1	9.1	-8
	LMP	8.8	9.6	9.8	9.9	10.3	10.5	10.9	-19
Colorado	OE	8.6	8.9	8.8	9.1	9.3	9.6	9.8	-12
	LMP	10.3	10.4	10.3	10.8	11.3	11.4	12.2	-16
Connecticut	OE	9.3	9.7	9.8	9.9	10.0	10.1	10.1	-8
	LMP	9.8	9.7	10.1	10.3	10.2	10.4	10.5	-7
Delaware	OE	9.4	9.5	9.3	10.1	10.0	10.1	11.2	-16
	LMP	12.4	12.3	11.2	12.8	12.5	12.9	14.3	-13
District of Columbia	OE	10.4	9.9	11.0	10.4	11.0	12.2	12.1	-14
	LMP	13.3	12.8	13.7	13.6	14.2	15.5	15.6	-15
Florida	OE	10.0	10.2	10.3	10.5	10.6	11.2	10.9	-8
	LMP	13.6	13.7	13.0	13.3	13.5	13.8	13.8	-1
Georgia	OE	10.7	10.9	11.0	11.3	11.3	11.7	11.6	-8
	LMP	12.7	12.7	13.2	13.8	13.8	13.4	13.9	-9
Hawaii	OE	10.2	9.9	9.9	10.5	11.1	10.6	10.6	-4
	LMP	12.6	12.2	12.3	12.2	12.6	12.8	12.4	2
Idaho	OE	9.0	8.5	8.1	8.9	9.0	9.4	9.3	-3
	LMP	10.5	10.3	10.2	10.3	10.1	9.8	10.5	0
Illinois	OE	10.0	10.0	10.1	10.3	10.0	10.4	10.6	-6
	LMP	11.7	12.0	12.1	12.2	12.4	12.7	13.0	-10
Indiana	OE	9.6	9.6	10.0	10.1	10.2	10.6	10.9	-12
	LMP	11.0	10.9	11.6	11.7	11.9	12.4	12.9	-15
Iowa	OE	9.0	9.5	9.2	9.6	9.4	9.8	9.7	-7
	LMP	11.1	11.5	11.1	11.6	11.3	11.5	11.6	-4
Kansas	OE	8.9	9.0	9.1	8.8	9.2	9.3	9.2	-3
	LMP	10.8	11.0	11.2	10.6	11.2	11.2	11.6	-7
Kentucky	OE	11.0	11.0	11.3	11.7	11.6	11.8	12.7	-13
	LMP	12.6	12.7	13.4	13.7	13.6	14.0	15.2	-17
Louisiana	OE	12.5	12.5	12.4	12.3	12.4	12.6	13.0	-4
	LMP	15.1	15.3	15.6	15.1	14.7	15.4	16.6	-9
Maine	OE	8.1	7.8	8.3	8.2	8.3	8.7	9.2	-12
	LMP	9.3	9.3	9.6	9.7	9.9	10.3	10.6	-12
Maryland	OE	9.8	10.3	10.2	10.4	10.4	11.0	11.0	-11
	LMP	11.9	12.2	12.5	12.7	12.7	13.0	13.4	-11
Massachusetts	OE	8.8	8.7	8.6	8.6	8.8	8.8	9.0	-2
	LMP	10.0	10.1	10.5	10.7	10.9	10.8	11.2	-11
Michigan	OE	9.7	10.1	10.0	10.2	10.1	10.5	10.4	-7
	LMP	11.6	11.8	12.0	12.2	12.4	12.7	12.5	-7
Minnesota	OE	8.3	8.6	8.5	8.8	8.7	8.8	9.0	-8
	LMP	9.8	10.2	9.9	10.2	10.1	10.0	10.4	-6
Mississippi	OE	13.1	13.8	13.5	13.8	13.9	13.7	14.2	-8
	LMP	16.6	17.1	16.9	17.6	18.0	18.0	18.3	-9

Table 4. OE- and LMP-based preterm birth rates, by state: United States and each state, 2007–2013—Con.

Area	Measure	2013	2012	2011	2010	2009	2008	2007	Percent change 2007–2013
Missouri	OE	9.6	9.9	9.6	10.0	9.9	10.3	10.0	-4
	LMP	11.3	11.7	11.6	12.1	12.2	12.3	12.5	-10
Montana	OE	9.0	9.4	8.8	10.1	9.0	9.9	9.9	-9
	LMP	10.5	11.2	10.8	12.0	10.9	11.5	11.9	-12
Nebraska.	OE	8.7	9.3	9.1	9.8	9.7	9.6	9.5	-8
	LMP	10.6	11.1	10.6	11.4	11.5	11.8	11.9	-11
Nevada.	OE	9.8	10.4	10.5	10.9	10.8	11.2	11.5	-15
	LMP	12.6	13.0	13.2	13.9	13.8	13.5	14.3	-12
New Hampshire.	OE	8.2	8.6	8.5	8.4	8.7	8.5	8.1	1
	LMP	9.0	9.4	9.5	9.4	9.9	9.6	9.4	-4
New Jersey	OE	9.7	9.7	9.9	9.7	10.0	10.5	10.6	-8
	LMP	11.5	11.2	11.7	11.6	12.0	12.5	12.7	-9
New Mexico	OE	9.3	9.5	9.7	9.1	9.3	9.8	10.3	-10
	LMP	11.6	11.5	11.8	11.9	12.3	12.3	12.8	-9
New York	OE	8.9	9.1	9.2	9.4	9.5	9.6	9.7	-8
	LMP	10.7	10.7	10.9	11.5	12.2	12.0	12.3	-13
North Carolina.	OE	9.9	10.1	10.2	10.4	10.6	10.7	11.1	-11
	LMP	12.0	12.0	12.6	12.7	13.0	12.9	13.3	-10
North Dakota	OE	8.5	9.1	8.5	9.7	9.2	9.8	9.6	-11
	LMP	9.9	9.9	9.9	10.9	10.6	11.1	11.6	-15
Ohio	OE	10.3	10.5	10.2	10.3	10.4	10.7	11.0	-6
	LMP	12.1	12.1	12.1	12.2	12.3	12.6	13.2	-8
Oklahoma	OE	10.6	10.9	10.8	11.2	10.9	11.0	10.6	0
	LMP	12.8	13.0	13.2	13.9	13.8	13.4	13.5	-5
Oregon	OE	7.6	7.5	7.4	7.9	7.8	7.9	8.0	-5
	LMP	9.3	9.1	9.1	9.9	9.8	10.1	10.3	-10
Pennsylvania	OE	9.3	9.5	9.6	9.9	10.1	10.3	10.3	-10
	LMP	10.7	10.8	11.1	11.4	11.5	11.6	11.8	-9
Rhode Island	OE	8.7	9.7	9.0	9.6	10.0	10.0	10.8	-19
	LMP	10.2	11.0	10.4	10.8	11.4	11.2	12.0	-15
South Carolina	OE	11.1	11.3	11.5	11.5	11.7	11.8	12.2	-9
	LMP	13.7	13.7	14.1	14.2	14.5	14.3	15.5	-12
South Dakota	OE	8.1	7.8	7.9	8.6	7.9	8.6	9.5	-15
	LMP	10.8	10.7	11.2	11.4	10.9	11.9	12.6	-14
Tennessee	OE	11.1	11.2	11.1	11.4	11.3	11.5	11.8	-6
	LMP	12.6	12.5	12.8	12.9	13.0	13.5	14.2	-11
Texas	OE	10.4	10.5	10.7	10.9	11.1	11.2	11.3	-8
	LMP	12.3	12.4	12.8	13.1	13.1	13.3	13.6	-10
Utah	OE	9.2	9.1	9.4	9.5	9.8	9.7	9.5	-3
	LMP	10.2	10.2	10.9	10.9	11.3	11.0	10.9	-6
Vermont	OE	7.6	7.6	7.6	7.2	8.2	8.4	8.2	-7
	LMP	8.1	8.7	8.8	8.4	9.3	9.5	9.1	-11
Virginia	OE	9.4	9.5	9.5	10.1	10.2	10.5	10.7	-12
	LMP	11.0	11.3	11.2	11.6	11.4	11.3	12.1	-9
Washington	OE	8.1	8.3	8.2	8.5	8.5	8.9	8.9	-9
	LMP	9.7	9.9	9.8	10.2	10.3	10.7	10.6	-8
West Virginia	OE	10.5	10.7	11.2	10.6	10.8	11.9	11.9	-12
	LMP	12.5	12.4	12.8	12.1	12.9	13.7	13.9	-10
Wisconsin	OE	9.0	9.4	9.3	8.2	8.2	8.5	8.3	8
	LMP	10.4	10.5	10.4	10.8	10.9	11.1	11.1	-6
Wyoming	OE	10.4	9.0	9.9	10.5	9.9	10.2	11.1	-6
	LMP	11.6	10.8	10.2	11.0	11.2	11.2	12.7	-9

NOTES: OE is the obstetric estimate of the newborn; LMP refers to the date of the mother's last normal menses.

Table 5. Percent and number of births based on the obstetric estimate, by selected gestational age categories: United States and each state, 2013

Area	Births	Obstetric estimate									Not stated
		Preterm					Early term	Full term	Late term	Postterm	
		Total under 37 weeks	Under 28 weeks	28–31 weeks	32–33 weeks	34–36 weeks	37–38 weeks	39–40 weeks	41 weeks	42 weeks and over	
Number	Percent									Number	
United States	3,932,181	9.62	0.70	0.92	1.17	6.83	24.81	58.85	6.31	0.41	7,467
Alabama	58,167	11.77	1.04	1.20	1.40	8.13	25.65	59.32	3.13	0.14	27
Alaska	11,446	8.54	0.48	0.78	0.97	6.32	25.17	55.99	9.49	0.81	113
Arizona	85,600	9.09	0.57	0.75	1.10	6.67	25.36	59.65	5.60	0.31	43
Arkansas	37,832	10.16	0.79	1.00	1.22	7.15	25.01	59.87	4.62	0.35	179
California	494,705	8.42	0.57	0.74	1.02	6.08	24.43	59.38	7.25	0.52	805
Colorado	65,007	8.57	0.53	0.89	1.01	6.15	22.95	59.03	8.76	0.69	36
Connecticut	36,085	9.31	0.69	0.91	1.16	6.54	22.29	59.96	8.13	0.31	16
Delaware	10,831	9.45	0.80	0.97	1.09	6.58	22.68	59.06	8.51	0.30	13
District of Columbia	9,288	10.39	1.23	1.29	1.42	6.45	22.06	57.00	10.00	0.55	68
Florida	215,407	10.04	0.77	0.97	1.23	7.06	26.35	59.02	4.39	0.20	239
Georgia	128,748	10.66	0.92	1.13	1.22	7.39	26.09	58.42	4.57	0.25	584
Hawaii	18,987	10.17	0.70	0.87	1.07	7.54	26.50	55.50	7.33	0.51	28
Idaho	22,383	9.04	0.60	0.75	1.20	6.49	23.22	60.26	7.02	0.46	54
Illinois	156,931	9.96	0.75	0.96	1.22	7.03	24.73	59.78	5.32	0.21	181
Indiana	83,102	9.62	0.72	0.90	1.12	6.88	24.76	58.96	5.88	0.79	52
Iowa	39,094	8.99	0.55	0.88	1.04	6.51	22.29	61.80	6.59	0.33	24
Kansas	38,839	8.88	0.66	0.86	1.14	6.21	23.02	62.43	5.33	0.34	15
Kentucky	55,686	11.05	0.70	1.06	1.21	8.07	28.20	56.47	4.03	0.25	33
Louisiana	63,201	12.54	0.98	1.31	1.45	8.79	28.91	55.66	2.73	0.16	40
Maine	12,776	8.10	0.56	0.75	0.93	5.85	20.73	57.61	12.28	1.29	17
Maryland	71,953	9.83	0.88	0.97	1.24	6.74	24.65	58.25	6.96	0.31	195
Massachusetts	71,788	8.84	0.60	0.86	1.04	6.33	21.04	58.93	10.63	0.57	333
Michigan	113,489	9.75	0.83	1.03	1.17	6.72	22.94	59.11	7.80	0.41	99
Minnesota	69,159	8.30	0.59	0.76	1.03	5.91	21.47	59.73	9.75	0.75	101
Mississippi	38,634	13.14	1.01	1.34	1.49	9.30	32.87	51.94	1.89	0.16	44
Missouri	75,296	9.61	0.67	0.88	1.18	6.88	24.20	60.70	5.09	0.40	394
Montana	12,377	8.99	0.45	0.74	1.00	6.81	22.96	60.18	7.25	0.62	21
Nebraska	26,095	8.73	0.51	0.96	1.02	6.23	23.22	62.41	5.22	0.41	32
Nevada	35,030	9.84	0.62	0.85	1.21	7.16	25.70	59.82	4.29	0.34	93
New Hampshire	12,396	8.25	0.53	0.70	1.16	5.85	19.08	59.13	12.76	0.78	27
New Jersey	102,575	9.70	0.70	0.95	1.29	6.75	23.85	59.49	6.66	0.31	48
New Mexico	26,354	9.29	0.56	0.88	1.25	6.60	27.28	56.91	6.16	0.36	99
New York	236,980	8.90	0.65	0.85	1.12	6.27	22.91	59.22	8.50	0.48	422
North Carolina	119,002	9.92	0.94	1.05	1.24	6.70	23.67	57.79	8.28	0.34	106
North Dakota	10,599	8.52	0.58	0.87	0.91	6.16	22.25	62.19	6.66	0.38	6
Ohio	138,936	10.31	0.86	0.97	1.29	7.19	24.47	59.56	5.31	0.36	581
Oklahoma	53,369	10.56	0.65	0.92	1.32	7.66	27.84	58.09	3.27	0.24	85
Oregon	45,155	7.60	0.49	0.66	0.91	5.54	20.63	60.01	10.63	1.12	44
Pennsylvania	140,921	9.35	0.73	0.98	1.22	6.42	21.77	60.14	8.32	0.42	1,146
Rhode Island	10,809	8.70	0.70	0.77	0.93	6.30	22.75	59.29	9.05	0.21	39
South Carolina	56,795	11.14	0.83	1.26	1.40	7.66	25.39	59.27	4.02	0.18	28
South Dakota	12,248	8.13	0.43	0.76	0.78	6.15	22.87	59.67	8.24	1.10	27
Tennessee	79,992	11.08	0.75	1.09	1.30	7.94	26.17	58.59	3.93	0.23	301
Texas	387,340	10.42	0.70	0.93	1.22	7.57	28.39	56.92	3.89	0.39	148
Utah	50,957	9.16	0.46	0.76	0.94	7.00	27.48	58.05	5.05	0.26	4
Vermont	5,975	7.64	0.32	0.60	1.00	5.71	19.31	58.03	13.92	1.11	4
Virginia	102,147	9.40	0.76	0.93	1.18	6.53	24.30	59.08	6.77	0.45	64
Washington	86,577	8.14	0.49	0.76	1.02	5.86	22.24	58.93	9.93	0.76	256
West Virginia	20,825	10.53	0.63	0.85	1.27	7.78	26.77	57.47	4.98	0.26	22
Wisconsin	66,649	8.97	0.61	0.83	1.11	6.42	24.46	59.11	7.02	0.44	130
Wyoming	7,644	10.36	0.48	1.05	1.19	7.64	25.45	57.82	5.69	0.68	1

Table 6. Infant mortality rates based on the OE and LMP measures of gestation: United States, 2013 linked file

Weeks of gestation	OE		LMP		Absolute difference	Relative difference
	Number	Infant deaths per 1,000 births	Number	Infant deaths per 1,000 births	Percentage points	Percent
Total	23,447	5.90	23,446	5.91	0.0	0
Under 37	15,675	41.51	15,553	34.77	6.7	19
Under 28	10,908	395.93	10,676	374.70	21.2	6
17	256	882.76	293	830.03	52.7	6
18	423	875.78	438	839.08	36.7	4
19	667	879.95	645	883.56	-3.6	0
20	1,129	859.86	1,010	855.21	4.7	1
21	1,427	897.48	1,431	851.28	46.2	5
22	1,870	878.35	1,599	777.72	100.6	13
23	1,618	601.26	1,593	570.15	31.1	5
24	1,426	363.13	1,321	341.34	21.8	6
25	920	220.52	997	227.63	-7.1	-3
26	674	141.15	734	146.36	-5.2	-4
27	498	91.85	615	104.06	-12.2	-12
28-31	1,525	42.25	1,678	35.72	6.5	18
28	402	62.82	416	54.77	8.1	15
29	339	46.86	404	42.20	4.7	11
30	391	39.39	416	31.98	7.4	23
31	393	31.35	442	26.32	5.0	19
32-33	952	20.79	931	16.04	4.8	30
32	437	23.19	410	17.58	5.6	32
33	515	19.12	521	15.01	4.1	27
34-36	2,290	8.54	2,268	7.23	1.3	18
34	654	13.49	649	10.96	2.5	23
35	677	9.13	714	7.77	1.4	18
36	959	6.58	905	5.56	1.0	18
37-38	3,078	3.16	2,934	3.01	0.1	5
37	1,407	4.24	1,322	3.92	0.3	8
38	1,671	2.60	1,612	2.53	0.1	3
39-40	3,990	1.73	3,617	1.85	-0.1	-6
39	2,721	1.85	2,267	1.91	-0.1	-3
40	1,269	1.51	1,350	1.75	-0.2	-14
41	376	1.52	601	1.80	-0.3	-16
42 and over	53	3.29	514	2.39	0.9	38
42	43	2.90	216	2.06	0.8	41
43	5	*	135	2.52	*	*
44	3	*	69	2.42	*	*
45	1	*	43	2.89	*	*
46	1	*	34	4.14	*	*
47	-	*	17	*	*	*
Unknown	275	...	227

0.0 or 0 Quantity more than 0 but less than 0.05.

* Figure does not meet standards of reliability or precision.

- Quantity zero.

... Category not applicable.

NOTES: OE is the obstetric estimate of the newborn; LMP refers to the date of the mother's last normal menses.

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National Vital Statistics Reports, Vol. 64 No. 5 June 1, 2015

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Acknowledgments

The authors gratefully acknowledge the contributions of Brady E. Hamilton and Marian F. MacDorman to this report.

Suggested citation

Martin JA, Osterman MJK, Kirmeyer SE, Gregory ECW. Measuring gestational age in vital statistics data: Transitioning to the obstetric estimate. National vital statistics reports; vol 64 no 5. Hyattsville, MD: National Center for Health Statistics. 2015.

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DHHS Publication No. 2015-1120 • CS256506