RESEARCH LETTER

WOMEN'S HEALTH

Stillbirths in the United States

Stillbirth—the death of a fetus at or after 20 weeks' gestation—impacts nearly 21 000 families in the United States each year.[1,2] Although commonly perceived to be rare and unavoidable, stillbirth occurs in 5.74 per 1000 US births (10.34 per 1000 births among non-Hispanic Black individuals),[2] and nearly half of term stillbirths are thought to be preventable.[3] Little progress has been made in reducing stillbirth rates in the United States in recent decades.[1,4] In 2023, the US Department of Health and Human Services established a Stillbirth Working Group.[2]

Supplemental content

Most prior stillbirth research has relied on fetal death records, despite limited information on comorbidities,[2] or medical records, which have smaller sample sizes to examine rare outcomes.[5] This study characterizes stillbirth rates across clinical risk factors and geographic-based measures of access, income, and race in a large, national, commercially insured population.

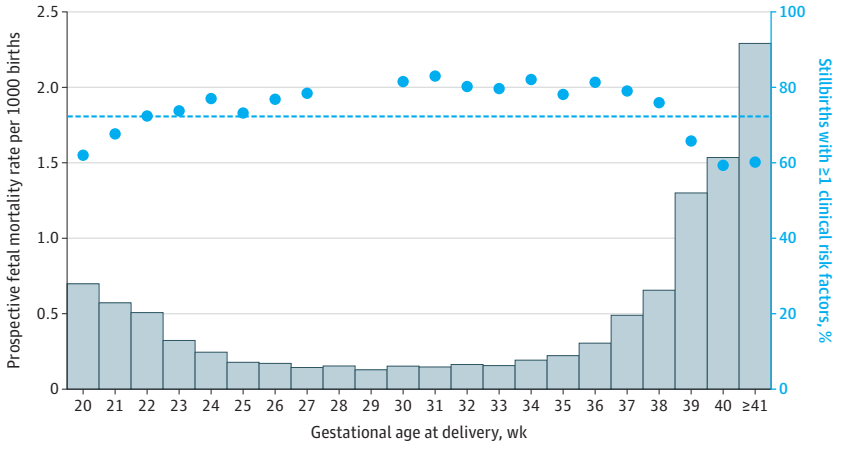
Methods | This cohort study included singleton births between January 1, 2016, and December 31, 2022, in Health Care Cost Institute commercial health insurance claims. We report unadjusted prospective fetal mortality rates—the number of stillbirths that occur at a gestational week divided by the number of live births and stillbirths that occur at or after that week. We report unadjusted stillbirth rates per 1000 births, both overall and in a subgroup of third-trimester births, by age, rurality, access to obstetric care, and area-level race and income quintiles and by common risk factors for stillbirth that influence antenatal surveillance.[6] We report the stillbirth rate for pregnancies with 1 or more clinical risk factors and the 12 most prevalent clinical risk factors in this sample: maternal factors (obesity, pregnancy-related hypertension, gestational diabetes, chronic hypertension, prepregnancy diabetes, substance use), fetal factors (decreased fetal movement, fetal growth restriction, fetal anomaly), and obstetric factors (history of stillbirth or adverse pregnancy outcomes, oligohydramnios, polyhydramnios). Area-level measures of race are derived from the American Community Survey. See the eAppendix and eTables 1 and 2 in Supplement 1 for further details.

The study was exempted from review and informed consent was waived by the Harvard University Institutional Review Board. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) reporting guideline was followed. Two-sided χ^2 tests were used; $P < .05$ was considered statistically significant.

Results | Among 2 792 669 live births, 18 893 stillbirths were identified (6.8 per 1000 births). Prospective fetal mortality was lowest at 29 weeks' gestation and highest at 41 or greater weeks' gestation (0.13 and 2.29 per 1000 ongoing pregnancies) and nearly doubled (from 0.66 to 1.30 per 1000 ongoing pregnancies) between 38 and 39 weeks' gestation (**Figure 1**). Overall, 72.3% of stillbirths had at least 1 clinical risk factor, ranging from 59.3% to 83.0% of stillbirths across gestational weeks (Figure 1).

Stillbirth rates were higher among pregnancies with vs without clinical risk factors (7.94 vs 4.88 per 1000 births; $P < .001$) (**Figure 2**), highest among pregnancies with oligohydramnios, fetal anomalies, or chronic hypertension, and lower in the subsample of third-trimester births. Stillbirth rates varied significantly with the proportion of low-income households ($P < .001$) and the proportion of Black vs White residents in a zip code ($P < .001$) (Figure 2) but not by rurality or levels of access to obstetric care.

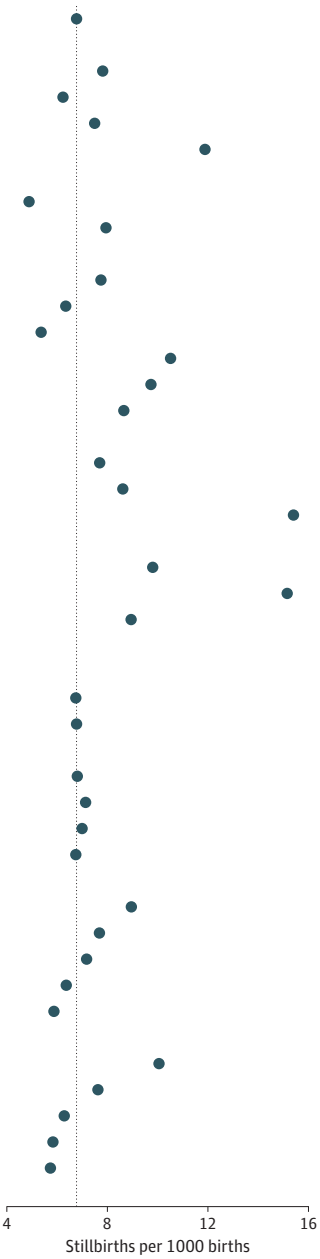
Figure 1. Stillbirths by Gestational Age at Delivery and Clinical Risk Factors



This figure was generated from the full sample of births (n = 2 792 669). The histogram depicts the prospective fetal mortality rate by gestational age at delivery. The blue circles depict the percentage of stillbirths at a given gestational week that had 1 or more clinical risk factors for stillbirth. Values were suppressed at 28 weeks and 29 weeks due to small sample size and Health Care Cost Institute data privacy rules. The dashed blue line marks the study sample rate of stillbirths with 1 or more clinical risk factors (72.3%; see eAppendix in Supplement 1 for details).

Figure 2. Stillbirth Rates by Risk Factor and Gestational Age

Subgroup	Overall births		Third-trimester births	
	No. (%)	Stillbirth rate per 1000 births	No. (%)	Stillbirth rate per 1000 births
Overall	2 792 669 (100)	6.77	2 771 014 (100)	3.96
Age, y				
18-24	335 274 (12)	7.81	NA	NA
25-34	1 731 539 (62)	6.23	NA	NA
35-44	714 657 (25.6)	7.49	NA	NA
45-54	11 199 (0.4)	11.88	NA	NA
No. of clinical risk factors				
0	1 071 683 (38.4)	4.88	1 065 747 (38.5)	2.68
≥1	1 720 986 (61.6)	7.94	1 705 267 (61.5)	4.76
Maternal risk factors				
Obesity	518 304 (18.6)	7.74	512 800 (18.5)	4.32
Pregnancy-related hypertension	487 961 (17.5)	6.34	483 200 (17.4)	4.45
Gestational diabetes	304 321 (10.9)	5.36	302 880 (10.9)	4.50
Chronic hypertension	175 692 (6.3)	10.51	172 506 (6.2)	5.51
Prepregnancy diabetes	98 417 (3.5)	9.73	97 200 (3.5)	6.06
Substance use	66 366 (2.4)	8.65	65 670 (2.4)	5.42
Fetal risk factors				
Decreased fetal movement	339 758 (12.2)	7.69	338 532 (12.2)	6.34
Fetal growth restriction	329 633 (11.8)	8.61	325 951 (11.8)	5.42
Fetal anomaly	218 769 (7.8)	15.4	215 507 (7.8)	7.71
Obstetric risk factors				
History of stillbirth or adverse outcomes	302 950 (10.8)	9.80	299 143 (10.8)	5.89
Oligohydramnios	111 948 (4)	15.15	109 200 (3.9)	6.14
Polyhydramnios	101 625 (3.6)	8.94	101 221 (3.7)	7.80
Social risk factors				
Location				
Rural	311 841 (11.2)	6.74	309 602 (11.2)	4.08
Urban	2 480 828 (88.8)	6.77	2 461 412 (88.8)	3.95
Access to obstetric care				
Desert	86 680 (3.1)	6.80	86 033 (3.1)	4.38
Low	129 481 (4.6)	7.13	128 412 (4.6)	4.25
Moderate	69 681 (2.5)	6.99	69 163 (2.5)	3.93
Full	2 506 827 (89.8)	6.74	2 487 406 (89.8)	3.93
Income quintile				
1 (Lower income)	155 123 (5.6)	8.95	153 310 (5.5)	4.97
2	465 952 (16.7)	7.68	461 604 (16.7)	4.35
3	616 189 (22.1)	7.17	610 985 (22)	4.10
4	768 942 (27.5)	6.36	763 345 (27.5)	3.68
5 (Higher income)	786 463 (28.2)	5.87	781 770 (28.2)	3.70
Race quintile				
1 (Lowest proportion of White)	277 859 (9.9)	10.05	274 003 (9.9)	5.19
2	633 756 (22.7)	7.62	628 048 (22.7)	4.42
3	776 287 (27.8)	6.28	770 786 (27.8)	3.81
4	689 060 (24.7)	5.83	684 889 (24.7)	3.54
5 (Highest proportion of White)	415 707 (14.9)	5.73	413 288 (14.9)	3.44



Rates of stillbirth are presented as number per 1000 live births and stillbirths. The forest plot shows values for the full study sample. The vertical line represents the overall stillbirth rate in the full study sample (6.77 per 1000 births). Third-trimester births are defined as occurring at 28 or greater weeks' gestation. For all comparisons by χ^2 test, $P < .01$ except for location and access to obstetric care, which were $P = .87$ and $P = .36$ in the overall group and $P = .26$ and $P = .07$ in the third-trimester delivery group, respectively. For clinical risk factors, the χ^2 test compared those with the risk factor vs those without it. Number of clinical risk factors refers to having 1 or more risk factors that influence medical decision as listed in the American College of Obstetricians and Gynecologists committee opinion on indications for outpatient antenatal fetal surveillance (eAppendix in Supplement 1).

History of stillbirth or adverse outcomes was measured using O09.29, "Supervision of pregnancy with other poor reproductive or obstetric history." Access to obstetric care was measured at county level per the March of Dimes. "Desert" refers to areas without any hospitals, birth centers, or obstetric clinicians; low access refers to areas with less than 2 hospitals or birth centers, less than 60 obstetric clinicians per 10 000 births, and 10% or more of women aged 19 to 54 years without health insurance; moderate access refers to areas with less than 2 hospitals or birth centers, less than 60 obstetric clinicians per 10 000 births, and less than 10% of women aged 19 to 54 years without health insurance; full access refers to all other counties. NA indicates not available; values were suppressed due to small sample size and Health Care Cost Institute data privacy rules.

Discussion | In this contemporary report of stillbirth incidence and risk factors among commercially insured US pregnancies, the stillbirth rate was higher than the 2021 Centers for Disease Control and Prevention stillbirth rate.[1] Clinical risk factors were common and associated with higher stillbirth risk, although not highly discriminative. Moreover, no clinical risk factors were identified in 27.7% of all stillbirths and in 40.5% of stillbirths at 40 or greater weeks' gestation. This suggests a need to improve risk stratification and screening beyond current paradigms for all patients, especially for later-gestational-age deliveries. The area-level variation by income and race could be driven by social factors, health system factors, or clinical risk factors and warrants further exploration.

Limitations include the use of diagnosis codes to identify clinical risk factors and the inclusion of pregnancies only among commercially insured individuals, in which stillbirth rates and risk factors may differ from pregnancies among Medicaid-covered individuals.

These findings provide contemporary insights into clinical and structural factors influencing stillbirth risk, informing the design of future efforts to reduce stillbirth rates in the United States.

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Author Contributions: Ms Sullivan had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. Drs Clapp and Cohen contributed jointly.

Concept and design: Sullivan, Armstrong, Clapp, Cohen.
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Conflict of Interest Disclosures: Dr Fox reported being board president of the Health Care Cost Institute, which provided the data (having no direct authority or oversight of the data and services provided to researchers who use these data; that work is the exclusive purview of the Health Care Cost Institute staff). Dr Armstrong reported being an employee of CVS Health Corporation and owning stock in the company. Dr Clapp reported being a scientific advisory board member and holding private equity in Delfina Care, receiving payments from the American College of Obstetricians and Gynecologists for editorial services, and receiving grant funding from the Agency for Healthcare Research and Quality and the National Institutes of Health National Heart, Lung, and Blood Institute. No other disclosures were reported.

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