



*Improving Maternal Mortality Statistics for Public Health:
Multi-Metric Models and Abortion Surveillance*

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Introduction

Maternal mortality statistics are public health measures which play a significant role in how nations protect women's health and innovate healthcare modalities to lessen the burden of disease and lower mortality rates. To maintain comparability between nations, the World Health Organization (WHO) developed international maternal mortality standards, defining maternal death as:

female deaths from any cause related to or aggravated by pregnancy or its management (excluding accidental or incidental causes) during pregnancy and childbirth or within 42 days of termination of pregnancy irrespective of the duration and site of the pregnancy.¹

Maternal death, as defined by WHO, does not exclude deaths resulting from complications of abortion, surgical or medication, or make distinction based on the location of the pregnancy, meaning death related to ectopic pregnancy or its treatment are also not excluded. Any pregnancy-related deaths occurring 42 days to one year after the end of pregnancy are defined as "late maternal deaths," which are allocated separate codes (O96 and O97) within the International Classification of Diseases, Tenth Revision (ICD-10). Under the ICD-11, late maternal deaths are combined with maternal deaths as "comprehensive maternal deaths."

Late maternal deaths are particularly significant when considering mortality from pregnancy-related mental health outcomes, especially when considering maternal suicide or overdose which most often occurs after 42 days but within one year of termination of pregnancy or childbirth.

The maternal mortality ratio (MMR), as defined by the WHO, is:

the number of maternal deaths during a given time period per 100[,]000 live births during the same time period.²

$$MMR = \left(\frac{\text{Number of Maternal Deaths}}{\text{Number of Live Births}} \right) \times 100,000$$

MMR is most commonly referenced in relation to maternal deaths (within 42 days following childbirth or termination of pregnancy) but can be applied to late maternal deaths or comprehensive maternal deaths, the latter being introduced under the ICD-11, effective January 2022. This

methodology uses “live births” since births are tracked nearly completely and are stable across internationally comparable nations.

The United States via the Centers for Disease Control and Prevention (CDC)’s National Vital Statistics System (NVSS), overseen by the National Center for Health Statistics, currently adheres to the WHO and ICD standard for estimating MMR, but this standard is inadequate for comparing women’s health outcomes. The NVSS assumes death certification detection of maternal deaths and accurate ICD coding, but this is not the best practice for identifying maternal deaths.³

Maternal mortality data is also available to the CDC from its National Center for Chronic Disease Prevention and Health Promotion’s Pregnancy Mortality Surveillance System (PMSS), providing a more thorough examination by capturing deaths up to one year after pregnancy. The PMSS is used to estimate a national “pregnancy-related mortality ratio.”⁴

Additionally, most states have created “maternal mortality and morbidity review committees.” These multidisciplinary committees review all available records (medical, legal, judicial, and informant interviews) on pregnancy-associated deaths within one year of the end of pregnancy to investigate and document all pregnancy-related deaths within their jurisdiction, with an emphasis on preventability and recommendations for preventing future maternal deaths and severe maternal morbidity.

Using the NVSS methodology, the United States ranked the highest among high-income countries with 22 deaths per 100,000 births in 2022.⁵ On the same live-birth standard, the United States has a maternal mortality rate of 17.9 deaths per 100,000 live births in 2024, with provisional data from 2025 to early 2026 suggesting improvement.^{6, 7} This international standard may still provide limited usefulness in comparing public health outcomes internationally but does not provide an accurate picture at the patient level, due to differences in sampling frames, populations at risk, and data collection methodology.

According to the WHO, MMR “depicts the risk of maternal death relative to the number of live births and essentially captures the risk of death from a maternal cause in a single pregnancy (proxied by a single live birth).”² However, the WHO’s methodology for estimating maternal mortality inflates mortality ratios by only relativizing risk to pregnancies resulting in live births, contrary to the variety of pregnancy outcomes women may face. As an international comparator, this methodology cannot control for nations that have higher or lower rates of maternal morbidity not associated with a live birth outcome, in different nations. Domestically, this comparator inflates subgroup comparisons, often among groups of low socioeconomic status or those overrepresented by induced abortion, for the same reason.⁸

To capture an accurate depiction of pregnancy-associated risks, MMR should be more accurately defined as the number of maternal deaths during a given time period per 100,000 pregnancies.

$$MMR = \left(\frac{\text{Number of Maternal Deaths}}{\text{Number of Pregnancies}} \right) \times 100,000$$

Defining MMR this way would ideally eliminate the reliance on the incomplete proxy of a single live birth and instead weighs any pregnancy outcome by the number of total pregnancies.

Most nations reporting MMR to WHO capture pregnancy-related maternal deaths in correlation with registered, live births. Exceptions include the Scandinavian countries, in particular Finland, which capture every interaction with the health system for everyone in the country through their registry system. This is the most comprehensive type of data.

The United States, however, captures robust maternal death data across all pregnancy outcomes using the “pregnancy checkbox” on death certificates.¹⁰ Using the pregnancy checkbox has been demonstrated to produce false positives, possibly inflating the total maternal death count, where quality control and verification is primarily housed with state vital statistics offices.⁹ Since the numerator for the United States already includes maternal deaths across all pregnancy outcomes, the denominator should include the total number of pregnancies across the same breadth of outcomes.

Live births are well documented via birth certificates in the United States, but as with the WHO methodology, there will be an inevitable, undercounted number of early pregnancy losses, including unrecognized miscarriages and ectopic pregnancies, or induced abortion, for which there is no mandatory federal reporting required from abortion providers. Federal vital statistics reporting requirements overlook many pregnancy outcomes. This does not mean that the United States should abandon efforts to implement the updated, domestic model for MMR. Instead, reporting requirements need to become more robust.

Determining the total “number of pregnancies” can be improved if the United States enacted mandatory, deidentified reporting requirements for all pregnancy outcome and fetal loss categories included within the CDC maternal mortality reporting systems: live birth, stillbirth, miscarriage, induced abortion, ectopic pregnancy, and molar pregnancy.⁸ Many states already require fetal loss reports after a certain gestational age, most commonly after 20 weeks.

The CDC’s National Survey of Family Growth (NSFG) does collect self-reported data on fetal losses, including miscarriages, stillbirths, and ectopic pregnancies, but the self-reported nature of the data, by definition, produces an incomplete estimate of early pregnancy loss outcomes. Currently, the CDC relies on NSFG reports to estimate total early pregnancy loss, but this is insufficient for calculating an accurate MMR.

One model-based approach to estimating the number of miscarriages (occurring at five or more weeks gestation) estimates total miscarriages to be 20 percent of the annual number of live births plus 10 percent of induced abortions.^{11, 12} This model is common in literature but fails to account for incomplete abortion reporting.

Supplementing a corrected MMR using a “total pregnancies” methodology with outcome-specific mortality ratios where deaths from each pregnancy outcome are measured against the total incidence of the same outcome is necessary for risk surveillance, accurate public health policy, and the provision of adequate informed consent.

Childbirth and Abortion

Abortion-rights advocates have claimed over the years that “abortion is safer than childbirth,” basing their claims on the comparison of MMR (using the WHO methodology) as an estimate of childbirth mortality and the abortion mortality rate (AMR), as defined by the CDC, calculated as:

$$AMR = \left(\frac{\text{Known Legal Induced Abortion Related Deaths}}{\text{Number of Legal Abortions}} \right) \times 100,000$$

Looking solely at how AMR is defined, this comparison is problematic.¹³

Abortion reporting is entirely voluntary and directed through state agencies to the CDC.¹⁴ Elements included in state-mandated abortion reporting requirements vary widely across all 50 states, where the CDC does not have statutory authority to mandate federal reporting requirements. Each state voluntarily submits abortion reporting summaries to the CDC annually, but states only know what is reported to them. As of the most recent abortion surveillance report, California, New Hampshire, New Jersey, and Maryland do not submit any data to the CDC.¹⁵

With the rise of medication abortion and the Food and Drug Administration’s 2023 elimination of mifepristone’s in-person dispensing requirement, proportionally fewer abortions are likely being reported. In 2025, an estimated 28% of all abortions were performed using the FDA-approved mifepristone-misoprostol regimen via telehealth.¹⁶ Even in states that otherwise require reporting, these telehealth abortions are not often tracked, especially if pills are shipped from out of state. Enforcing the Comstock Act’s mail-order abortion restriction would reduce the number of abortions lost to telehealth.

Following the Supreme Court’s decision in *Dobbs v. Jackson Women’s Health Organization*, what is defined as a “legal” abortion has also become less clear. Where *Dobbs* returned the authority to legislate abortion to the people and their elected representatives, abortion law has become a patchwork from state to state. What is “legal” in one state may be illegal in another, especially when abortion drugs are mailed across state lines. Where does the statutory reporting responsibility, if any, lie?

Even assuming that AMR is not definitionally flawed, any comparison between the safety and maternal mortality of childbirth and abortion cannot accurately stand. Even comparing outcome-specific mortality ratios fails, such as:

$$\text{Childbirth Mortality Ratio} = \left(\frac{\text{Childbirth Related Deaths}}{\text{Number of Live Births}} \right) \times 100,000$$

$$AMR = \left(\frac{\text{Induced Abortion Related Deaths}}{\text{Number of Induced Abortions}} \right) \times 100,000$$

AMR, as currently defined, does not control for abortion type (surgical or medication) or gestational age or trimester. “Childbirth mortality ratio” similarly does not control for birth type (vaginal or Cesarean) or gestational age (premature or term). Neither AMR nor childbirth mortality rate control

for mother's age, demographic, or any number of comorbidities and environmental factors. No amount of redefinition can overcome the outcome-specific controls that interact differently with each outcome's relative risk.

The “childbirth mortality ratio,” where “childbirth related deaths” includes all maternal deaths where the mother did not survive childbirth or died within a certain time period after successfully delivering a live baby, does hold value as an outcome-specific mortality ratio. The CDC does not currently report a “childbirth mortality ratio.”

Live births are relatively well documented. However, until a national abortion reporting law authorizes the CDC to mandate the collection of data related to induced abortion related deaths, the data set necessary to estimate AMR will only represent a biased selection of related complications.

Policy Recommendations

1. Implement Multi-Metric U.S. Maternal Mortality Model

No statutory authority mandates that the United States CDC to adhere to the WHO's ICD definition of maternal mortality. Maintaining this model as the sole authority and metric for maternal mortality limits the accuracy and completeness of public health reporting and the development of interventions to reduce maternal mortality, undermining the informed consent process, since women are not given accurate information regarding the risks associated with different pregnancy outcomes. The WHO standard should be used only as an international comparator and falls short for public health use in the United States.

The CDC should adopt a multi-metric model for the United States, incorporating MMR models that accurately represent the risk of maternal death across all pregnancy outcomes. This model should measure maternal mortality per total pregnancy for maternal deaths, late maternal deaths, and comprehensive maternal deaths. The CDC should also include outcome-specific mortality ratios, including a childbirth mortality ratio, to improve informed consent and identify comparative risks, noting that AMR can only be accurately measured when abortion reporting is federally mandated.

2. Expand Voluntary Abortion Reporting Elements Requested by the CDC

Until Congress grants the CDC authority to mandate anonymized abortion reporting, the agency should expand the elements included in their annual requests for voluntary reporting to the 50 states. At minimum, abortion reporting should include:

- Identification of the physician who performed the abortion, the facility where the abortion was performed, and the referring physician, agency, or service, if any;
 - A notation indicating whether the performing physician referred the woman to a licensed professional for pre-abortion or post-abortion counseling services;
- The county and state in which the woman resides;
- The woman's age and race;

- The number of the woman’s previous pregnancies, number of live births, and number of previous abortions;
- The probable gestational age of the unborn child;
- The type of procedure performed or prescribed, and the serial or lot number and expiration date for each abortion-inducing drug prescribed or administered;
 - If a medication abortion, whether the medication abortion was completed at the providing facility, at an alternate known location, or unknown location;
- The date of the abortion;
- The reason for the abortion (fetal anomaly, rape, incest, health of the mother, life of the mother, other reasons); and
- Preexisting medical condition(s) of the woman which would complicate the pregnancy, if any;
 - This is not limited to physical conditions, but to include mental health diagnoses relevant to potential perinatal or postpartum depression, anxiety, or suicidal ideation and behavior, especially for late maternal deaths.

At no time will reports contain the name of the woman, her common identifiers (such as social security number, motor vehicle operator’s license number, passport number), or other information or identifiers that would make it possible to identify, in any manner or under any circumstances, a woman who has obtained an abortion and subsequently suffered an abortion-related complication.¹⁷

Expanding the abortion reporting elements requested brings greater transparency and accuracy to both the updated MMR metric and individual AMR estimations, serving an important public health goal. As noted in the most recent CDC abortion surveillance report, “routine abortion surveillance can be used to assess changes in clinical practice patterns over time. Information in this report on the number of abortions performed through different methods (e.g., medication or surgical) and at different gestational ages provides the denominator data that are necessary for analyses of the relative safety of abortion practices.”¹⁵

¹ World Health Organization, *Maternal Deaths*, Glob. Health Observatory Indicator Metadata Registry, <https://www.who.int/data/gho/indicator-metadata-registry/imr-details/4622> (last visited Aug. 15, 2026).

² World Health Organization, *Maternal Mortality Ratio (per 100 000 Live Births)*, Glob. Health Observatory Indicator Metadata Registry, <https://www.who.int/data/gho/indicator-metadata-registry/imr-details/26> (last visited Aug. 15, 2026).

³ Ingrid Skop, *Handbook of Maternal Mortality: Addressing the U.S. Maternal Mortality Crisis, Looking Beyond Ideology*, Charlotte Lozier Inst. (Jan. 6, 2023), <https://lozierinstitute.org/handbook-of-maternal-mortality-addressing-the-u-s-maternal-mortality-crisis-looking-beyond-ideology/>.

⁴ Emily E. Petersen et al., *Vital Signs: Pregnancy-Related Deaths, United States, 2011–2015, and Strategies for Prevention, 13 States, 2013–2017*, 68 Morbidity & Mortality Wkly. Rep. 423 (2019), <https://www.cdc.gov/mmwr/volumes/68/wr/mm6818e1.htm>.

⁵ Munira Z. Gunja et al., *Insights into the U.S. Maternal Mortality Crisis: An International Comparison* (Commonwealth Fund, June 2024), <https://doi.org/10.26099/cthn-st75>.

- ⁶ Donna L. Hoyert, *Maternal Mortality Rates in the United States, 2024*, NCHS Health E-Stats (Mar. 2026), <https://www.cdc.gov/nchs/data/hestat/hestat113.htm> [<https://dx.doi.org/10.15620/cdc/174651>].
- ⁷ Nat'l Ctr. for Health Stats., *Provisional Maternal Mortality Rates*, Ctrs. for Disease Control & Prevention, <https://www.cdc.gov/nchs/nvss/vsrr/provisional-maternal-deaths-rates.htm> (last visited Aug. 15, 2026).
- ⁸ James Studnicki, David C. Reardon, Donna J. Harrison, John W. Fisher & Ingrid Skop, *Improving the Metrics and Data Reporting for Maternal Mortality: A Challenge to Public Health Surveillance and Effective Prevention*, 11 Online J. Pub. Health Informatics e17 (2019), <https://pmc.ncbi.nlm.nih.gov/articles/PMC6788905/>.
- ⁹ Lyman Stone, *The U.S. Maternal Mortality Crisis Is a Statistical Illusion*, Foreign Pol'y (Jan. 31, 2024), <https://foreignpolicy.com/2024/01/31/united-states-maternal-mortality-crisis-statistics-health/>.
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- ¹¹ John Bongaarts & Robert G. Potter, *Fertility, Biology, and Behavior: An Analysis of the Proximate Determinants* (1983).
- ¹² Gilda Sedgh, Susheela Singh & Rubina Hussain, *Intended and Unintended Pregnancies Worldwide in 2012 and Recent Trends*, 45 Stud. Fam. Plan. 301 (2014), <https://pmc.ncbi.nlm.nih.gov/articles/PMC4727534/>.
- ¹³ Clarke D. Forsythe & Bradley N. Kehr, *A Road Map Through the Supreme Court's Back Alley*, 57 Vill. L. Rev. 45 (2012), <https://digitalcommons.law.villanova.edu/vlr/vol57/iss1/2>.
- ¹⁴ Ctrs. for Disease Control & Prevention, *CDC's Abortion Surveillance System FAQs* (Nov. 27, 2024), <https://www.cdc.gov/reproductive-health/data-statistics/abortion-surveillance-system.html>.
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- ¹⁷ Ams. United for Life, *Abortion Reporting Act: Model Legislation & Policy Guide* (2023), <https://aul.org/wp-content/uploads/2022/11/Abortion-Reporting-Act-2023.pdf>.