

The Comparative Safety of Legal Induced Abortion and Childbirth in the United States

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OBJECTIVE: To assess the safety of abortion compared with childbirth.

METHODS: We estimated mortality rates associated with live births and legal induced abortions in the United States in 1998–2005. We used data from the Centers for Disease Control and Prevention's Pregnancy Mortality Surveillance System, birth certificates, and Guttmacher Institute surveys. In addition, we searched for population-based data comparing the morbidity of abortion and childbirth.

RESULTS: The pregnancy-associated mortality rate among women who delivered live neonates was 8.8 deaths per 100,000 live births. The mortality rate related to induced abortion was 0.6 deaths per 100,000 abortions. In the one recent comparative study of pregnancy morbidity in the United States, pregnancy-related complications were more common with childbirth than with abortion.

CONCLUSION: Legal induced abortion is markedly safer than childbirth. The risk of death associated with childbirth is approximately 14 times higher than that with abortion. Similarly, the overall morbidity associated with childbirth exceeds that with abortion.

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See related editorial on page 212.

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Decades of research have demonstrated that legal induced abortion is safe. Mortality and serious acute complications are extremely rare.^{1–4} Recently, allegations of later sequelae—breast cancer and mental illness—were refuted.^{5,6} However, laws in 22 states in the United States now require that before an abortion is performed, the patient must be given detailed, specific verbal or written information about potential risks. In some cases, this material is misleading or patently wrong.⁷

Health policy and medical practice should be based on the best available evidence. In the past 10 years, the introduction of new abortion methods may have affected the overall safety of the procedure. Notably, mifepristone was approved by the U.S. Food and Drug Administration for medical abortion in 2000; by 2008, approximately 17% of all nonhospital abortions were performed medically rather than surgically.⁸ In addition, changes in the risk profile of pregnant women—for example, as a result of growing obesity⁹ and an upward shift in the maternal age distribution¹⁰—as well as the rising cesarean delivery rate¹⁰ may have enhanced the risks of the alternative to abortion, childbirth. The objective of this review is to provide an updated assessment² of the safety of abortion relative to delivery.

MATERIALS AND METHODS

We estimated mortality rates associated with live births and legal induced abortions in the United States in 1998–2005 by combining published data from several national data sets. For mortality related to live birth, we divided the number of pregnancy-related deaths among women delivering live neonates as reported by the Centers for Disease Control and Prevention's (CDC) Pregnancy Mortality Surveillance System¹¹ by the number of live births as reported on birth certificates.¹⁰ The Pregnancy Mortality Surveillance System collects and reviews death certificates and other information from deceased women who were recorded as pregnant within a



specified time period before death in all 50 states and Washington, DC. To estimate abortion-related mortality, we divided the number of legal abortion-related deaths from the 50 states and Washington, DC, reported by the CDC¹² by the number of legal abortions estimated by the Guttmacher Institute from its annual surveys of all U.S. hospitals, clinics, and physician offices known or suspected to have provided abortion services.⁸ We did not calculate confidence intervals around mortality rates because these estimates are derived from the full population.

In addition, we searched PubMed for relevant studies for other population-based comparative data on mortality and morbidity of abortion and childbirth in the United States since 2000. We used the following search strategies: (maternal morbidity [MESH] OR maternal mortality [MESH]) AND pregnancy outcome AND United States [MESH] (73 results); pregnancy outcome AND (maternal morbidity [MESH] OR maternal mortality [MESH]) AND United States [tiab] (49 results); pregnancy outcome AND abortion, induced AND morbidity AND United States [MESH] (94 results). We limited our review to reports that included data on both pregnancy outcomes in a single population with contemporaneous, uniform ascertainment of outcomes.

Because women who choose abortion differ in underlying risk for adverse outcomes from women who opt to continue a pregnancy, we also compared the characteristics of each group. We obtained data about characteristics of U.S. women having abortions and live births in 2008 from the Guttmacher Institute 2008 Abortion Patient survey¹³ and from birth certificate data¹¹ (www.cdc.gov/nchs/data_access/vitalstats/VitalStats_Births.htm. Retrieved 28 May 2011).

RESULTS

Between 1998 and 2005, the pregnancy-associated mortality rate among women known to have delivered live neonates in the United States was 8.8 deaths per 100,000 live births (Table 1). Of all pregnancy-associated deaths of women with known pregnancy outcome, 71% occurred after live births¹¹; if 71% of women with unknown pregnancy outcome who died of pregnancy-associated causes are also assumed to have had live births, the mortality estimate increases to 10.4 deaths per 100,000 live births. The mortality rate related to legal induced abortion during that same interval was 0.6 deaths per 100,000 abortions. Thus, according to federal statistics, the risk of death associated with childbirth was approximately 14 times higher than that with abortion.

Table 1. Pregnancy-Related Mortality in Women With Live Births or Legal Induced Abortions in the United States, 1998–2005

	Deaths*	Pregnancies [†]	Deaths per 100,000 Pregnancies
Live birth		32,347,794	
Known live birth	2,856		8.8
Known live births+71% of pregnancies with unknown outcome	3,352		10.4
Legal abortion	64	10,185,100	0.6

* Number of deaths related to live births from Berg et al¹¹; number of deaths related to abortion from Pazol et al.¹²

[†] Number of live births from Martin et al¹⁰; number of abortions from Jones et al.⁸

Only one recent study provided comparative data on morbidity associated with various pregnancy outcomes in the United States.¹⁴ Epidemiologists at the CDC examined all International Classification of Diseases, 9th Revision, Clinical Modification diagnoses reported during or within 8 weeks after all 24,481 pregnancies among members of the Kaiser Permanente Northwest Health Maintenance Organization between 1998 and 2001. Of these pregnancies, 16,824 ended in live birth, 4,192 in induced abortion, and the rest in spontaneous abortions, stillbirths, or other outcomes. Common maternal morbidities were defined as conditions either unique to pregnancy or potentially exacerbated by pregnancy that occurred in at least 5% of all pregnancies.

Every complication was more common among women having live births than among those having abortions (Fig. 1). The relative risks of morbidity with live birth compared with abortion were 1.3 for mental health conditions, 1.8 for urinary tract infection, 4.4 for postpartum hemorrhage, 5.2 for obstetric infections, 24 for hypertensive disorders of pregnancy, 25 for antepartum hemorrhage, and 26 for anemia.

In 2008, the median age of women having abortions was younger than that of women having live births, but the proportion of women age 40 years or older was comparable (Table 2). Nearly half of women in each group had no education beyond high school. Patients undergoing abortion were twice as likely to be unmarried or non-Hispanic African American women. Nulliparity was equally common in the two groups.



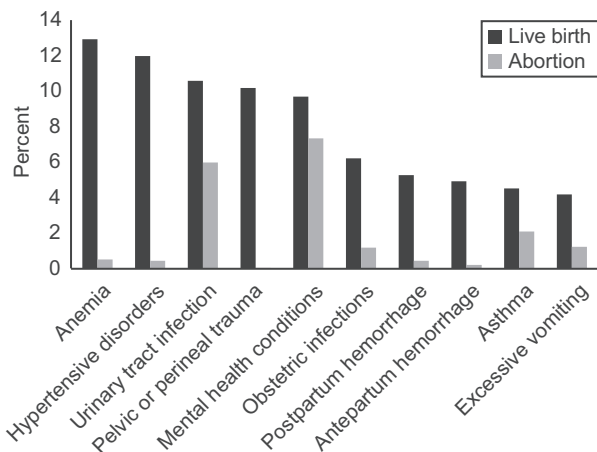


Fig. 1. Common maternal morbidities associated with live birth and abortion, 1998–2001. Common maternal morbidities defined as conditions either unique to pregnancy or potentially exacerbated by pregnancy that occurred in at least 5% of all pregnancies. Data from Bruce FC, Berg CJ, Hornbrook MC, Whitlock EP, Callaghan WM, Bachman DJ, et al. Maternal morbidity rates in a managed care population. *Obstet Gynecol* 2008;111:1089–95.

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DISCUSSION

Legal abortion in the United States remains much safer than childbirth. The difference in risk of death is approximately 14-fold. Abortion also is associated with substantially less pregnancy-related morbidity. These results are consistent with prior analyses of national data.² Indeed, the relative safety of abortion has increased substantially since the first decade after nationwide legalization, when child birth-related mortality was approximately seven times the mortality related to abortion.¹⁵ Although we could not find data that allowed comparable calculations of mortality or morbidity associated with surgical and medical abortion, Danco Laboratories, the distributor of mifepristone in the United States, has identified only 11 pregnancy-related deaths among the estimated 1.6 million women who have used the drug in the United States since 2000, which is a mortality rate of 0.7 per 100,000 users (Abigail Long, Danco Laboratories, LLC, personal communication). Clearly, the growing use of medical regimens has not increased relative abortion risk overall.

The disparity between abortion and childbirth safety is not surprising. Pregnancies ending in abortion are substantially shorter than those ending in childbirth and thus entail less time for pregnancy-related problems to occur. Many dangerous pregnancy-related complications such as pregnancy-induced hyper-

Table 2. Characteristics of Women Having Live Births and Abortions in the United States, 2008

	Live Births*	Abortions†
Age (y)		
Younger than 15	5,764 (0.1)	4,850 (0.4)
15–19	434,758 (10.2)	208,520 (17.2)
20–24	1,052,184 (24.8)	404,920 (33.4)
25–29	1,195,774 (28.2)	295,810 (24.4)
30–34	956,716 (22.5)	163,670 (13.5)
35–39	488,875 (11.5)	99,410 (8.2)
40 or older	113,623 (2.7)	35,160 (2.9)
Total	4,247,694 (100)	1,212,340 (100)
Ethnicity or race		
Hispanic	1,041,239 (24.7)	301,880 (24.9)
Non-Hispanic white	2,267,817 (53.8)	437,660 (36.1)
Non-Hispanic African American	623,029 (14.8)	358,860 (29.6)
Non-Hispanic other	282,783 (6.7)	113,960 (9.4)
Total	4,214,868 (100)	1,212,360 (100)
Marital status		
Married	2,521,128 (59.4)	179,430 (14.8)
Unmarried	1,726,566 (40.6)	1,032,930 (85.2)
Total	4,247,694 (100)	1,212,360 (100)
Education among women aged 20 y and older		
Less than high school	435,462 (18.1)	122,870 (12.3)
High school or GED	630,970 (26.2)	282,710 (28.3)
Some college	685,206 (28.4)	394,590 (39.5)
College graduate	659,044 (27.3)	198,800 (19.9)
Total	2,410,682 (100)	998,970 (100)
Number of prior births		
0	1,703,921 (40.4)	474,030 (39.1)
1	1,330,540 (31.5)	321,270 (26.5)
2 or more	1,186,657 (28.1)	418,260 (34.5)
Total	4,221,118 (100)	1,213,560 (100)

GED, high school equivalency certification.

Data are n (%).

* Data on live births from Martin¹⁰ and the National Center for Health Statistics. Numbers with unknown status are excluded from the table.

† Data on abortion from Jones et al.¹³

tension and placental abnormalities manifest themselves in late pregnancy; early abortion avoids these hazards. Moreover, in the United States in 2008, one third of births occurred by cesarean delivery, an abdominal operation with substantial morbidity.^{10,16}

These results may underestimate the relative safety of choosing abortion over continuing a pregnancy for two reasons. First, our comparison was limited to live



births; we omitted other pregnancy outcomes: spontaneous abortion, stillbirths, ectopic pregnancies, and gestational trophoblastic disease. The number of pregnancies ending in these outcomes was not available. Stillbirths and ectopic pregnancies are associated with higher risks of death than is live birth.² We likely therefore underestimated the mortality associated with opting for pregnancy continuation.

Second, patients undergoing abortion appear to be at higher underlying risk than women who opt for delivery. Women who had abortions were more likely to be African American or unmarried, demographic characteristics strongly associated with increased mortality.^{11,17} In addition, because comorbidities are sometimes the motivation for abortion, the underlying medical risk of patients undergoing abortion may be higher than that of other pregnant women. Women in good health may be more likely to choose to continue their pregnancies than those who are ill (selection bias termed the “healthy mother” effect¹⁸). Thus, mortality among patients undergoing abortion may overestimate the mortality risk of the procedure itself.

This study has both strengths and weaknesses. Strengths include the use of the most recent CDC statistics on pregnancy-related mortality for the entire country. Similarly, the cohort study of morbidity had uniform, contemporaneous ascertainment of outcomes in a large health maintenance organization. We systematically reviewed the past decade of PubMed publications for relevant data. Weaknesses include the likely underreporting of deaths, possibly differential by pregnancy outcome (abortion or childbirth).¹⁹ The analytic rules used by the original researchers to handle incomplete or inconsistent data on women’s characteristics may have led to errors. Our assessment of women’s underlying risk was necessarily incomplete. Moreover, both abortion and childbirth can cause mortality and morbidity long after the end of the pregnancy; these cases are not included in our analysis. However, these weaknesses are unlikely to account for the large differences in mortality and morbidity found in this analysis.

Pregnant women considering their options deserve accurate information about comparative risks. Currently, some state laws and policies violate this standard. In Texas, for example, the mandatory 23-page pamphlet, “A Woman’s Right-to-Know,” lists 12 potential complications of medical abortion with mifepristone and misoprostol, 12 of suction curettage, and 11 of dilation and evacuation. In contrast, the pamphlet names only six potential complications of

vaginal delivery and eight of cesarean delivery.²⁰ To laypersons who have little understanding of medical risk²¹ but can count complications, these tallies may imply that abortion has more complications than does childbirth. Similarly, the mortality statistics are presented as fractions with one in the numerator and with large denominators (eg, 8,475). Empiric evidence^{22,23} has demonstrated that women with less formal education than a college degree have trouble comparing risks expressed in this manner. Mortality risk should be expressed as number of deaths per 100,000, which is an easier format to understand.^{22,23}

Laws that compel exposure of women to such biased material thwart informed choice and contravene the ethical principle of autonomy.²⁴ Moreover, they put clinicians in the untenable position of having to be complicit in misleading their patients. Since the early 1970s, the public health evidence has been clear and incontrovertible: induced abortion is safer than childbirth.

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