Maternal and Neonatal Health and Abortion: 40-Year Trends in Great Britain and Ireland

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ABSTRACT

National data on maternal and neonatal health sequelae over more than 40 years of legal elective abortion in jurisdictions of Great Britain are compared with data from the abortion-averse jurisdictions of Northern Ireland and the Republic of Ireland. Both Irish jurisdictions show more favorable data than the British. The Republic of Ireland has a maternal mortality rate over the last decade of 3/100,000 compared with about 6/100,000 in England and Wales; a stillbirth rate in 2010 of 3.8/1,000 live births compared 5.1/1,000 live births in Great Britain; and a preterm (< 37 weeks) birth rate in 2010 of 42.7/1,000 live births compared with 48/1,000 in England and Wales and 72/1,000 in Scotland. Legal elective abortion is associated with higher rates of maternal mortality rates, stillbirth rates, and preterm birth. Cerebral palsy rates in Northern Ireland, at a prevalence rate for birth years 1981-2007 of 2.3 per 1,000 live births (95% CI, 2.2-2.5), are low.

Introduction

One of the eight Millennium Development Goals[1] stated by the United Nations includes improving maternal health. As such, all UN member states have been working to implement policies directed toward improving maternal health during pregnancy and the postpartum period.

Although maternal mortality rates have fallen by half during the last decade,[2] the UN believes that more efforts are needed to achieve the Millennium Development Goal by 2015.[3] In light of this effort, improving maternal health and decreasing morbidity and mortality from induced abortions remain important goals for all UN state members.[4]

Information about maternal mortality, stillbirth, and preterm birth is critical before proposing evidence-based public health guidelines or advocating policies for women's health worldwide, as well as for accurately evaluating the effects of such legal interventions. The study of statistics involving induced abortion has been challenging in countries where it is restricted; therefore, researchers employ various epidemiologic methodologies to yield estimations around empirically plausible figures. Given their inherent estimative nature, constant challenge and adjustment of the methodologies are mandatory steps to ensure valid, accurate, and reliable abortion estimates.

Abortion statistics, when published officially by governments, often tend to be inaccurate due to underreporting or unsubstantiated estimates due to incomplete data collection.[5-7] Because the data are so incomplete, the World Health Organization (WHO) has used seven different methods to estimate maternal death.[8,9] Harrison, one of the WHO researchers, acknowledged: "We make huge adjustments to make the numbers turn out right. More than 50 percent of some numbers are 'adjusted.'"[7] In a 2012 paper, Koch et al. added further evidence of the problem of overestimation when they substantiated, through careful database analysis of Mexico, the gross overestimates of "illegal abortion"-related deaths in Mexico.[10] They found that maternal death related to illegal abortions was rare in Mexico, and that legalization of abortion in the Mexico City jurisdiction did not decrease maternal death rates.[10]

The UK, through the National Health Service (NHS), provides comprehensive abortion statistics that are collected and published in detail for England, Wales, Scotland, and Northern Ireland. These statistics contain complete counts of all induced abortions for every year since 1968, when abortion was legalized in the UK (except for Northern Ireland, where it remains illegal except in restricted circumstances). Similarly, no abortions are reported in the Republic of Ireland, where abortion remains illegal. By drawing on available data regarding maternal mortality, stillbirth, and preterm birth rates, we can make comparisons over the time epoch of maternal and neonatal health in the various countries of the UK (England, Wales, Scotland, and Northern Ireland) and the Republic of Ireland. This comparison of similar socio-demographic areas within the UK (Great Britain vs. Northern Ireland) provides an ideal means to evaluate the issue of elective abortion with its effects on maternal and neonatal health especially as the UK jurisdictions have a standard National Health Service and standard procedures for compiling health statistics. The Republic of Ireland has also developed from a British model, retaining similarities with Great Britain.

Methods and Materials

National abortion data were obtained for England and Wales from abortion statistics published annually by Office for National Statistics (ONS) from 1968 to 2001, and by the Department of Health, London, since 2002. For Scotland, data were obtained from ISD (NHS Information and Statistics Division) of the National Health Service in Scotland.

The available national statistical data for the Republic of Ireland and Northern Ireland were analyzed at intervals since 1968 in each of the constituent areas for: total numbers of abortions performed, total abortion rates, rates of low birth weight, nulliparous and parous abortion rates, stillbirth rates, preterm birth rates, and maternal mortality rates.

Though the 1967 Abortion Act in Great Britain was applicable to neither of the two Irish jurisdictions, legally induced abortions became available to Irish residents who travelled to Great Britain

Table 1. Numbers of Legally Induced Abortions Obtained in and out of Country by Irish Resident Women[11-14]

	Republic of Ireland			Northern Ireland		
Year	E & W	Netherlands	Scotland	E & W	N. Ireland	Scotland
1971	666	-	-	558	-	-
1981	3585	-	1	1432	-	2
1991	4168	-	3	1775	-	3
2001	6655	-	2	1574	75	3
2009	4411	134	1	1125	71	2
2010	4379	31	1	1082	74	2
2011	4149	-	-	1007	-	-

Table 2. Total Abortion Rates (TARs): Ireland, Northern Ireland, and Great Britain

Year	Irish Republic	Northern Ireland	England & Wales	Scotland
1980	0.14	0.14	0.36	0.27
1990	0.15	0.15	0.47	0.31
2000	0.21	0.14	0.51	0.36
2004	0.19	0.12	0.53	0.38
2009	0.13	0.09	0.52	0.38
2010	0.13	0.09	0.52	0.37
2011	0.13	0.08	0.52	0.36

Table 3. Parous and Nulliparous Abortions of Irish Women Performed in England in Selected Years since 1968

	Irish Republic			Northern Ireland		
	Nulliparous	**Parous**	**% Nulliparous**	**Nulliparous**	**Parous**	**% Nulliparous**
1971	428	136	75.89	441	188	70.11
1981	2,480	1,106	69.16	965	486	66.51
1991	2,802	1,411	66.51	1,192	587	67.00
2001	4,194	2,479	62.85	936	641	59.35
2009	2,512	1,910	56.81	609	514	54.23
2010	2,500	1,902	56.79	566	535	51.41

after April 1968. Within Ireland, older restrictive laws on abortion remain in force. There are some induced abortions, fewer than 100 per year in hospitals, in Northern Ireland, in cases in which a continuing pregnancy would have "a severe effect" on the health of the woman, and no recorded abortions in hospitals in the Republic.

For women resident in the Republic of Ireland and Northern Ireland, Table 1 shows the trend in abortions performed in England and Wales,[11] the Netherlands,[12] and Scotland,[13] in representative years since 1968. Additional information on abortions in Scotland carried out on Irish women under the Abortion Act of 1967 were obtained from Notifications to the Chief Medical Officer for Scotland (personal communication). Additional information on legally induced abortions within Northern Ireland were obtained from the Department of Health, Social Safety and Public Health in Northern Ireland (personal communication). Numbers of induced elective abortions within the Republic are not reported and assumed to be zero. These numbers fluctuate but demonstrate that the number of Irish women obtaining abortions has remained relatively constant.

Official statistics include abortion numbers by age group. Using these numbers as numerators, and the corresponding mid-year female populations at each age of women as denominators, we can compute age-specific abortion rates for each year in each country and sum these rates to derive the total abortion rate (TAR), shown in Table 2.

The method for deriving the TAR is comparable to that used for determining total fertility rate (TFR). The birth rate for women at any age in a year is calculated by taking the number of live births born to women at each age as numerator, and the mid-year female population for that age as denominator. The TFR is the sum of these fertility rates over all ages of women for that year. While almost all countries publish their TFRs, few publish their TARs.

These rates are instructive since they demonstrate a relatively low TAR in both Irish jurisdictions compared with England, Wales, and Scotland (Great Britain). The Irish numbers include all the women previously noted in Table 1 who obtained abortions elsewhere.

Nulliparous and Parous Abortions

Nulliparous abortions, occurring when the woman has not previously given birth after a full-term pregnancy, are particularly consequential for women's health. These effects are most noticeable in the increased incidence of preterm birth in women who had an abortion prior to an incident pregnancy. Two recent meta-analyses and a 2012 report from Klemetti et al. from Finland found significant increases in the risk for preterm birth prior to 37 weeks with induced abortion.[15-17] The majority of abortions in the Irish Republic and Northern Ireland have been nulliparous.

Figure 1 shows the nulliparous and parous TARs in the Republic of Ireland and Northern Ireland since 1968. These are derived from age-specific tabulations supplied to the authors by the Department of Health in London. In both Irish jurisdictions the nulliparous abortion rate is less than half the English rate in the 1980s. Higher parity in Northern Ireland among single parents contributes to the especially low rate of parous abortions there, while the high proportion married there corresponds to the especially low rate of nulliparous abortions. Single parents choose in Northern Ireland to have additional children when their contemporaries in Great Britain tend more often to have abortions. And in Ireland expecting couples often choose to marry while their British contemporaries are more prone to have abortions.

Table 3 shows the numbers of Irish women having parous and nulliparous abortions. The percentage of nulliparous abortions of around 57% in 2010 in the Republic remains higher than in England and Wales. In both Irish jurisdictions the increased proportion of parous abortions in recent years can be linked to the growth in single parenting and the decline in marriage. This reflects the continuing Irish tendencies toward late marriage, late childbearing, and higher Irish birth rates, by comparison with England and Wales. Further, it reflects the lower proportion of births outside wedlock in Ireland. The very low Northern Irish rate for nulliparous abortions can be linked to the higher proportion of women married in the age group 25-29. For England and Wales the proportion of nulliparous abortions has been lower. The percentage of nulliparous abortions was 53% in 2000 and 50% in 2010.

Maternal Health and Neonatal Health of Infants in Ireland since 1968

Women who have had previous induced abortions are at higher risk of having stillbirths, premature births, and also low

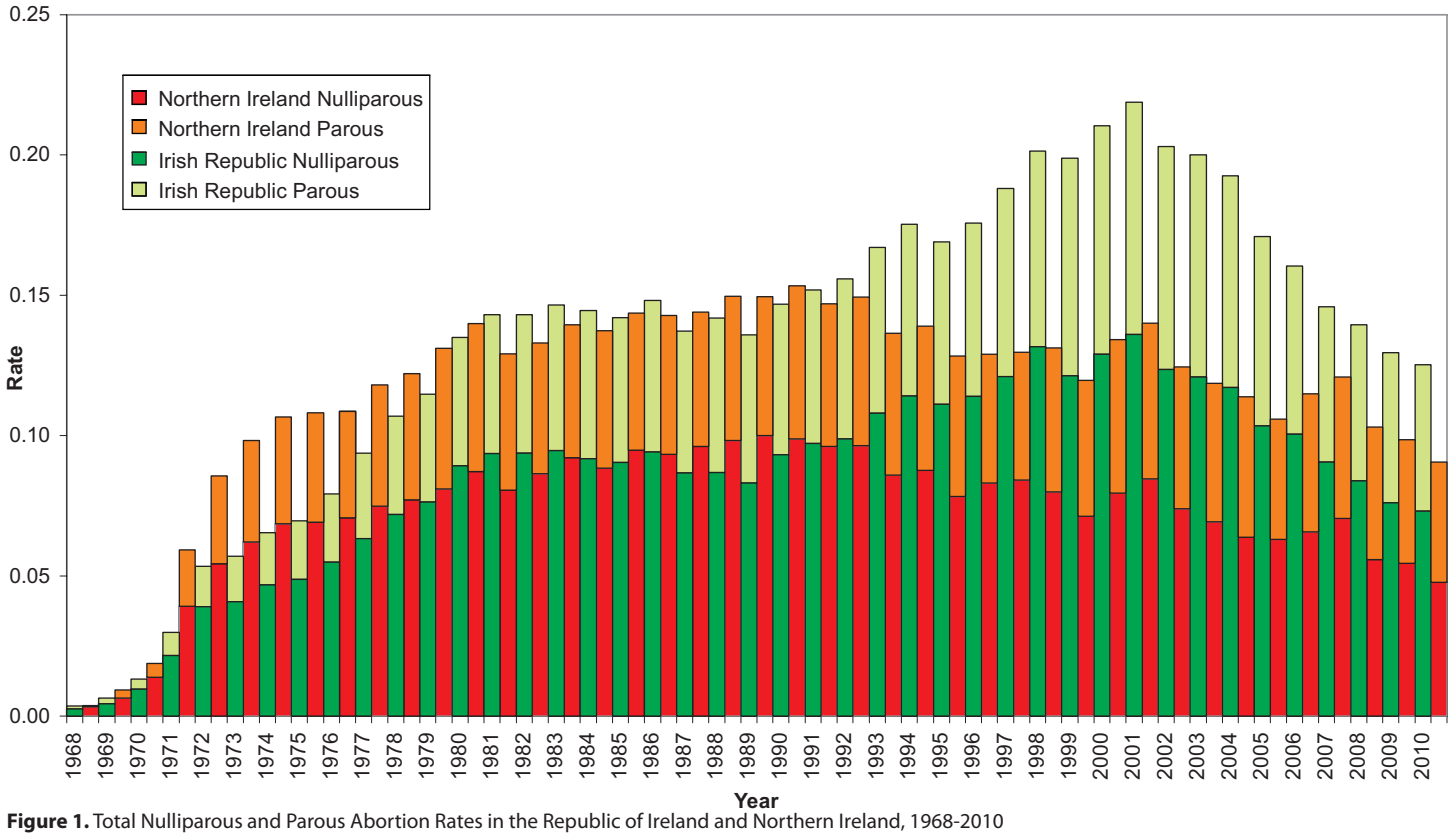

Figure 1. Total Nulliparous and Parous Abortion Rates in the Republic of Ireland and Northern Ireland, 1968-2010

Table 4. Preterm Births rate per 1000 Live Births in Ireland and Great Britain

	Irish Republic	Northern Ireland	England & Wales	Scotland
2000	43.1	n/a	72.8	73.1
2005	43.4	-	69.7	73.3
2007	43.0	-	39.7	69.1
2008	44.9	-	51.8	70.9
2009	45.9	-	71.3	75.6
2010	42.3	74.3	48.7	72.0

Table 5. Stillbirth Rate per 1,000 Live Births in the Irish Republic, Northern Ireland, England and Wales, and Scotland

	Irish Republic	Northern Ireland	England & Wales	Scotland
1971	18.0	14.3	12.5	13.3
1981	8.2	8.8	6.6	6.3
1991	7.6	4.7	4.7	5.5
2001	5.7	5.1	5.3	5.5
2009	3.2	4.8	5.2	5.1
2010	3.8	4.1	5.1	5.1

Table 6. Low Birth-Weight Births (under 2,500g) per 1,000 Live Births, Ireland and Great Britain

	Irish Republic		Northern Ireland		England & Wales		Scotland	
	All	Singleton	All	Singleton	All	Singleton	All	Singleton
1999	49.9	37.0	61.9	49.9	75.7	-	71.2	54.8
2000	48.7	38.0	61.0	49.0	75.5	62.6	72.8	57.2
2001	51.8	39.4	59.6	51.1	75.8	62.2	71.2	55.4
2002	49.4	38.2	62.9	49.4	77.0	65.0	71.5	55.6
2003	45.0	38.3	59.5	45.0	76.5	68.8	71.5	57.7
2004	49.8	36.3	59.0	49.8	75.3	66.8	74.4	59.6
2005	50.3	36.2	60.1	50.2	74.8	64.5	69.5	55.7
2006	50.1	38.7	63.3	50.1	74.8	60.6	72.4	59.1
2007	52.8	40.2	58.7	52.6	71.4	57.7	65.3	53.4
2008	57.4	41.3	59.8	56.2	71.4	59.4	67.0	53.9
2009	54.3	39.7	61.1	53.1	-	56.3	68.4	52.3
2010	50.0	38.5	60.5	-	69.4	-	66.6	51.4

birth-weight babies. This risk, owing to residual damage caused by abortion, has long been recognized.[18] Preterm births at less than 37 weeks gestational age are also of less frequent occurrence in the Republic of Ireland, as shown in Table 4, and this measure is not affected by the genetic tendency of Asians to have lower birth weights.

For the time since 1968 we have British and Irish national data for stillbirths, as shown in Table 5. There has been a noticeably greater improvement in the Republic of Ireland and Northern Ireland in this rate over the period than in England, Wales, and Scotland. Irish rates of stillbirths are now lower than British. The lower incidence of induced abortion among Irish women has possibly helped to accomplish this health gain.

Studies find that stillbirths are associated with deprivation, single parenting, smoking, and alcohol and substance abuse. These other adverse risk factors, often linked to abortion, tend to have increased in all the countries considered in recent years.[19] In smaller countries more year-on-year variation in stillbirth rates, from random variation, is to be expected. However, in the Republic stillbirth rates at 3.8 per 1,000 live births in 2010 remain much lower than in Great Britain with a rate of 5.1 per 1,000 in 2010. This is even after some recent increase in the Republic. Even in Northern Ireland, where there is a higher rate of deprivation, single parenting, and substance abuse, the stillbirth rates remain lower than in Great Britain.

The Irish Republic has a much lower incidence of low birth-weight babies (< 2,500 g) born than England and Wales, and Northern Ireland also has a lower incidence of this condition. This

Table 7. Very Low Birth-Weight Births (under 1,500 g) per 1,000 Live Births, Ireland and Great Britain

	Irish Republic		Northern Ireland		England & Wales		Scotland	
	All	Singleton	All	Singleton	All	Singleton	All	Singleton
1999	8.3	6.5	9.5	n/a	12.8	-	10.6	7.8
2000	8.4	6.6	11.7	-	12.4	10.8	10.6	8.0
2001	8.5	6.0	10.7	-	12.5	11.1	11.6	8.9
2002	8.2	6.3	11.9	-	12.5	11.5	10.6	8.0
2003	7.1	6.0	11.5	-	12.7	14.6	11.1	9.0
2004	8.8	6.3	10.9	-	12.3	12.0	11.2	8.9
2005	8.4	6.2	12.0	-	12.4	11.5	10.9	8.8
2006	8.6	6.5	11.2	-	12.3	9.6	11.1	8.6
2007	9.0	6.8	10.6	-	11.4	9.2	10.1	8.2
2008	10.7	7.8	11.0	-	12.3	12.4	10.7	8.8
2009	10.5	8.2	-	-	-	9.0	10.7	7.7
2010	10.8	8.1	12.9	-	11.9	-	9.8	7.4

Table 8. New Cases of Cerebral Palsy in Northern Ireland

	Number of Cases per Year	Rate (per 1,000 lives born)
77-08	55	2.19
98-08	50	2.21
2004	56	2.51
2005	47	2.10
2006	51	2.19
2007	40	1.64
2008	44	1.72

Source: Register of Cerebral Palsy in Northern Ireland, Belfast[21]

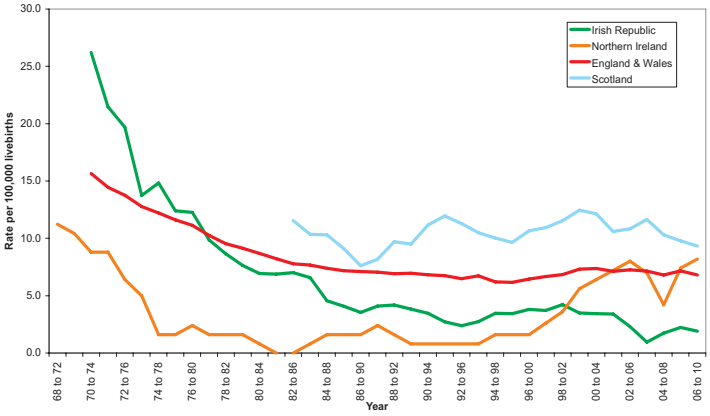

Figure 2. Maternal Death Rates in Ireland and Great Britain since 1968

is shown in Table 6, which details rates per 1,000 live births, both for all births and singleton births only. Again the low Irish rates can be linked to the lower Irish incidence of induced abortion. The proportion of low birth-weight multiple births can be influenced by use of modern fertility treatments that lead to multiple births. English studies[20] have shown that the rate of low birth-weight babies is much higher among unmarried mothers, where abortions are more common, and the difference is greater than can be explained by deprivation or socio-economic conditions. The difference between the Republic and Northern Ireland, whereby Northern Ireland has proportionately more low birth-weight babies, is consistent with the higher proportion of births outside marriage in Northern Ireland. Unmarried women are more likely to exhibit other risk factors such as deprivation, poor diet, and smoking that are risk factors for low birth weight.

Table 7 shows a similar pattern with respect to very low birth-weight births (< 1,500 g). Scotland has an abortion rate that is intermediate between England and Ireland but has a higher proportion of births outside wedlock than England. Some of the higher incidence of low birth-weight births in England is attributable to a more numerous community of Asian origin who have lower birth weights as a genetic tendency.

Cerebral Palsy

There are on average 55 newly diagnosed cases of cerebral palsy per year in Northern Ireland, with an overall live-birth prevalence of 2.2 per 1,000 for the period 1981-2007.[21] Table 8 shows how the number of cases of cerebral palsy recorded by the Northern Ireland Register has tended to average around 50 per year in Northern Ireland since 1998, and the rate has been around 2.21 per 1,000 live births with the average rate in the 5 years 2004–2008 being 2.03. While the Register of Cerebral Palsy in Northern Ireland still operates, most regional registers in the UK have ceased operations. For the UK as a whole the rate of cerebral palsy is understood to be around 1 in 400 live births or 2.5 per thousand. It is among premature births and especially among very low-weight births that cerebral palsy is most often diagnosed.[15-18] This analysis finds that the preterm birth rate in Northern Ireland is low, and that this is accompanied by a low rate of cerebral palsy. The trend in late 20th century cerebral palsy in Northern Ireland was flat: "Prevalence of CP was 2.2 per 1000 live births without significant change over time. Among very low birthweight (<1500 g) live births prevalence was 44.5 per 1000 (95% CI, 32.3-59.8) from 1994 to 1997…."[22]

These findings suggest the critical need to further evaluate the effects of abortion on preterm birth, especially in the light of new information on preterm birth and its relationship to abortion.[23] Public health officials and other members of government must thoroughly evaluate this women's health issue because of its social cost as well as its effect on women and families.

Maternal Deaths

Abortion laws have been liberalized in countries in which there have been large numbers of maternal deaths attributed to clandestine abortions. Koch et al. challenged this assertion in their 2012 paper on 50 years of maternal deaths in Chile.[24] Koch et al. used national birth registry statistics over two time periods: one with legal abortion covering 1957-1988, and one with prohibition of abortion covering 1989-2007. They found by careful analysis that the legal status of abortion had no relationship to maternal mortality, which decreased after abortion was prohibited, likely because of better education and obstetrical care for women. Also, Koch et al. showed, using ICD-10-coded, abortion-linked data, that legalization of abortion in the Mexico City jurisdiction compared with the remainder of the Mexico did not decrease maternal deaths, and that the key to decreasing maternal mortality was improved prenatal and postpartum care.[10]

In the Republic of Ireland, where abortion has always been illegal, the trend in maternal deaths over the time since 1968 compares favorably with that in England and Wales, as shown in Figure 2. Ireland is a small country, and there is year-on-year variation in the rates. One or two more maternal deaths, when there are only 50 or 60 thousand live births in a year, as in the Republic, can double the mortality rate from 3 per 100 thousand to 6 per 100 thousand. To achieve some smoothing of the year-on-year fluctuations, Figure 2 shows a 5-year moving average for the graph of these rates. For Northern Ireland, even smaller, with less than half the population of the Republic, there is shown to be an increase recently in this 5-year average. There is much deprivation and drug abuse in Northern Ireland and more single parenting there than in the Republic.

While the Irish Republic has shown considerable improvement in this measure, over this period Northern Ireland, where the numbers are small, has historically had very few maternal deaths. Even with some apparent increase since 2000, Northern Irish rates and rates in the Republic remain low. Whereas maternal deaths were zero in 2007 and 2008, there were five in 2009 and two in 2010.

Conclusions

Over the 40 years of legalized abortion in the UK there has been a consistent pattern in which higher abortion rates have run parallel to higher incidence of stillbirths, premature births, low birth-weight neonates, cerebral palsy, and maternal deaths as sequelae of abortion. In contrast, both Irish jurisdictions consistently display lower rates of all morbidities and mortality associated with legalized abortion. Women, women's health policy advocates, and national health systems ought to take careful note of these adverse ecological findings as a result of 40 years of legalized abortion in the UK compared with abortion-free Ireland.

The use of cohorts of contemporaneously obtained, record-linked, and socio-demographically similar populations provide evidence substantiating the risks to maternal health for elective abortion. The Republic of Ireland shows the lowest rates, and Great Britain shows higher rates for all these conditions. In England, around one-third of the women, at current rates, are likely to experience abortions. But in both the Irish jurisdictions this proportion is much lower, less than 10%. Acknowledging this difference makes these comparisons of women's health and neonatal health more explicable. Further socio-demographically diverse studies are needed to confirm these findings.

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