

# Liberalized Abortion in Oregon: Effects on Fertility, Prematurity, Fetal Death, and Infant Death

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**Abstract:** An analysis of Oregon Vital Statistics data from 1965 to 1975 was conducted to assess the impact of Oregon's 1969 abortion legislation, which substantially increased the number of reported medically induced abortions. This increase was associated with a slight *increase* in the age-adjusted 1970 fertility rate and there was no decrease in births to women in the age groups obtaining proportionately the most abortions. A significant and persistent 11 per cent reduction in premature births to women over age 20 ( $p < .001$ ) and a 22 per cent reduction in spontaneous fetal deaths ( $p < .05$ ) were associated with liberalized abortion. Decreases in neonatal and postneonatal in-

fant mortality were observed, but were indistinguishable from an ongoing trend toward improved infant health. A gradual 25 per cent decline in the age-adjusted fertility rate occurred between 1969 and 1975, but the increase in the number of reported abortions could account for only one-fourth of this decrease. A seven-fold increase in the use of family planning clinics between 1970 and 1973 and more liberalized laws regarding provision of family planning service appeared to account for a much higher proportion of the decreased fertility than did liberalized abortion. (Am. J. Public Health 68:1003-1008, 1978).

It has been suggested that, "legalizing abortion [may be] one of the most useful and effective social reform measures available in our society."<sup>1</sup> Proposed benefits include decreased maternal mortality and morbidity,<sup>2</sup> decreased psychological trauma to women with unwanted pregnancies,<sup>1, 3</sup> decreased "spontaneous" abortion and infant and neonatal mortality,<sup>2</sup> decreased incidence of unwanted births leading to decreased child abuse and improved child health,<sup>1, 3</sup> decreased incidence of births to poverty parents,<sup>1</sup> decreased illegitimacy, and decreased birth rate. A few have argued that liberalized abortions laws would lead to sexual promiscuity or to deterioration of contraceptive practices.<sup>4</sup>

Following liberalization of state abortion laws, a decrease in birth rate,<sup>5-8</sup> a decrease in maternal mortality,<sup>5, 9</sup> a decrease in sepsis due to abortion,<sup>7, 9</sup> a decrease in "spontaneous" abortion,<sup>10, 11</sup> and a decrease in the number of newborns left for adoption<sup>11, 12</sup> have been reported. Reports concerning the effect of liberalized abortion laws on illegitimacy have differed.<sup>5, 6, 8</sup> A study from Harlem Hospital Center re-

ported that in the year following liberalization of New York State's abortion law, the rate of live births of 750 grams or less was 55 per cent lower than during four years preceding the change in the abortion law. Associated with this reduction was a 45 per cent decline in the inhospital neonatal fatality rate.<sup>13</sup> A study of six Brooklyn hospitals found a 36 per cent decrease in the rate of live births 500 to 100 grams during the year following the change in the abortion law.<sup>11</sup> Pakter, et al.,<sup>5</sup> found a 10 per cent decrease in neonatal mortality for the city of New York. Roghmann,<sup>6</sup> however, found no significant change in infant mortality in a county in upstate New York.

Unfortunately, these various studies present data from areas of only two states. Data from other areas, data on a statewide basis, and more longitudinal data are needed to more fully understand the impact of liberalized abortion laws.

In August 1969, the state of Oregon put into effect a new abortion law which allowed medically induced abortions in cases in which the physical or mental health of the mother might be impaired. The effect of the law was to make legal abortions generally available to women in Oregon.

The present study is aimed at assessing the impact of this law on: fertility, the distribution of live births by maternal age, the rate of prematurity, and the rate of fetal, neonatal, and post-neonatal infant mortality.

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## Methods

In 1970, Oregon had a population of slightly over two million, making it the thirty-first largest state in the nation. It has about 30,000 live births annually and consistently has had a lower birth rate and lower neonatal, infant, and maternal death rates than the United States as a whole. The non-white population constitutes about three per cent of the total population. Although this three per cent accounts for a slightly disproportionately higher number of live births and abortions relative to the general population, the impact of this difference was small enough so that separate analysis by racial groups was not warranted. Oregon is considered to be about one-third rural.

The data reported here are based on Oregon vital statistics records from 1965 to 1975. The analysis used birth, infant death, fetal death, and induced abortion certificates for Oregon residents only. Oregon maintains an exchange system with adjacent states for birth and death records to assure completeness of data for Oregon residents. The number of certificates without the age of the mother was less than 100 in all years and the number without the birthweight was less than 40 in all years. Fetal deaths are less well reported and, therefore, reporting of rates by maternal age is not possible. Prior to 1970, medically induced abortions were reported on fetal death certificates, but were designated as medically induced abortions. Since 1970, Oregon law has required a separate report form for medically induced abortions. It is believed that underreporting is minimal. Although an exchange system similar to that for births and deaths does not exist for abortions, data from the California Department of Health<sup>14</sup> and preliminary data from the Washington Department of Social and Health Services\* indicate that outflow from Oregon for abortions is minimal. "Abortion" figures in this study include reported medically induced abortions only.

Fertility and abortion rates were age-adjusted to the 1970 census population of women ages 15 through 44. Population figures for noncensus years were calculated from 1960 and 1970 U.S. Census data and 1975 projections of the Portland State University Center for Population and Census using LaGrange Interpolation, modified to account for variations in migration patterns.<sup>15, 16</sup>

Statistical analysis was performed with the Statistical Analysis System software package.<sup>17</sup> Means were compared by the standard student *t*-test with Satterthwaite's estimate of the degrees of freedom for tests involving two sample sizes with unequal variances.

## Results

### 1. Abortion Rates and Ratios

The statewide age-adjusted abortion rate was 16.4 per 1,000 women of reproductive age (ages 15 to 44) in 1970, the

\*Personal Communication with Eugene Sabotta, Health Services Division, Washington State Department of Social and Health Services (1970).

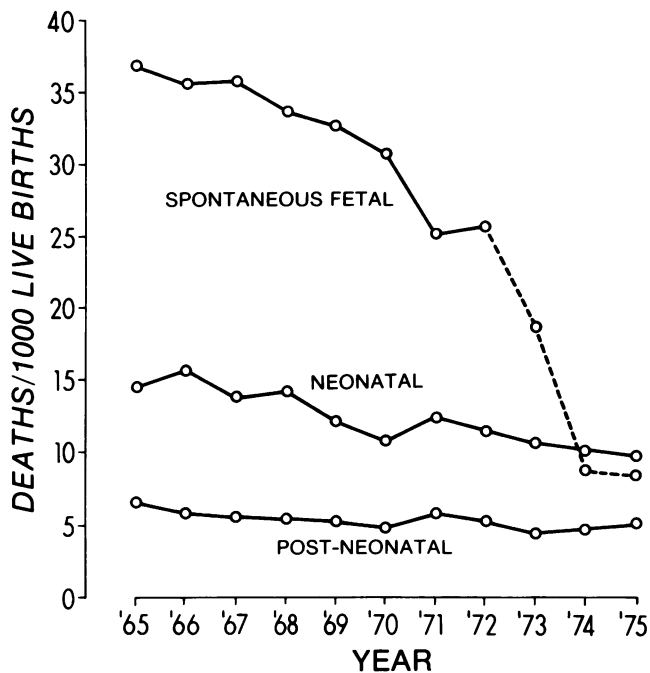


FIGURE 1—Age-adjusted Abortion and Fertility Rates: Oregon, 1965-1975

first full year after the law changed (Figure 1). This rate reflects over 7,000 reported abortions in 1970, in comparison to less than 400 to 1968.

The abortion rate decline slightly between 1970 and 1973, but rose again in 1974 and 1975. The 1974 and 1975 increases occurred in all age groups under 35 and are attributed by the Oregon Vital Statistics Section to Supreme Court actions decreasing the restrictions in first trimester abortions.<sup>18</sup>

The ratio of abortions per 1,000 live births rose gradually from 200 abortions per 1,000 live births in 1970 to 300/1,000 in 1975, as the number of live births decreased and the number of abortions increased. As expected, women over age 34 and under age 20 had the highest abortion ratios. By 1975, the abortion ratio for women over age 34 exceeded 400 abortions per 1,000 live births; the ratio for women under age 20 exceeded 700/1,000, while the ratio for women ages 20 to 35 was under 300/1,000 (Table 1).

### 2. Fertility Rates and Births By Maternal Age

Since most abortions occur within the first trimester, utilization of abortion has an impact on the fertility rate six months later. Thus the change of the Oregon abortion law in August 1969 would begin to have an effect on the fertility rate in March 1970. However, the age-adjusted fertility rate increased from 80.8 births per 1,000 women ages 15 to 44 in 1969 to 81.5 per 1,000 in 1970 (Figure 1). An increase was seen even among women less than age 20, for whom the abortion ratio in 1970 was over 400 abortions per 1,000 live births.

Between 1970 and 1973, the age-adjusted fertility rate

**TABLE 1—Estimated Abortion Ratios and Rates by Age of Women: Oregon Residents, 1969–1975**

Age of Women	1969	1970	1971	1972	1973	1974	1975
Abortions Per 1,000 Live Births							
All ages	40	200	210	230	230	250	300
Under 20	90	410	480	480	490	560	720
20 to 24	30	180	160	190	190	210	270
25 to 29	20	100	100	120	120	130	150
30 to 34	30	180	170	200	180	190	200
Over 34	90	360	380	400	380	460	420
Abortions Per 1,000 Women							
All ages	3	16	15	15	14	16	19
15 to 20	5	23	25	23	23	26	33
20 to 24	5	29	25	24	22	24	30
25 to 29	3	14	12	14	13	15	17
30 to 34	2	11	9	9	8	9	10
35 to 44	1	5	4	4	4	4	4

declined substantially, while the abortion rate, as noted earlier, also declined slightly. During 1974–1975, fertility flattened out, while abortions rose slightly.

Contrary to expectations, no significant impact of the law on the distribution of live births by maternal age was observed (Figure 2). Despite a ratio of roughly two reported abortions for every five births to women less than 20 years of age, the per cent of live births to these women remained essentially constant during the period in which the new law went into effect.

The per cent of live births to women over age 34 decreased and that to women ages 25–29 increased; however, this appears to be part of a trend which had been fairly steady throughout the late 1960s and was unaffected by the implementation of the 1969 abortion law.

### 3. Prematurity Rates

The rate of births 2,500 grams or less decreased from a mean of 64.9 per 1,000 live births for the 1965–1969 annual rates to a mean of 57.9/1,000 for the years 1970 to 1975. This decrease is due primarily to significant decreases in the age-specific prematurity rates for women 20 years of age and over, rather than to fewer births among the higher risk teenage group (Table 2). The timing of the decrease corresponds well to the change in the abortion law, as demonstrated by Figure 3, which gives the annual rates for all age groups.

### 4. Spontaneous Fetal Death Ratios

Spontaneous fetal deaths\* are only comparable for the years 1965 to 1972; Oregon law was changed (effective, August 1973) from requiring reporting of all fetal deaths at any gestational age to requiring reporting of only fetal deaths of 20 weeks gestation or more.

The mean annual spontaneous fetal death ratio decreased significantly ( $p < .05$ ) from 35.0 ( $\pm 1.6$ ) deaths per 1,000 live births for the years 1965–1969 to 27.3 ( $\pm 3.2$ ) per

1,000 for the years 1970–1972. This 22 per cent decrease also corresponds in timing to the implementation of the 1969 abortion law (Figure 4).

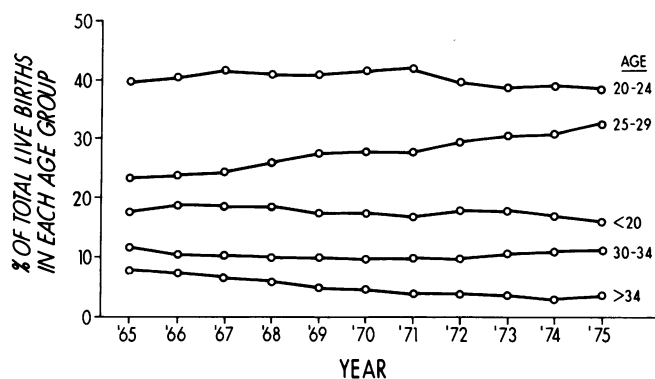
### 5. Infant Mortality

The mean neonatal mortality rate was 14.1 ( $\pm 1.3$ ) per 1,000 live births for the period from 1965 to 1969 and 10.9 ( $\pm 0.9$ ) per 1,000 for the 1970 to 1975 period. This represents a significant ( $p < .01$ ) decrease of 3.2 neonatal deaths per 1,000 live births. The post-neonatal mortality rate decreased by 0.7, from 5.8 ( $\pm 0.5$ ) per 1,000 live births in the earlier period to 5.1 ( $\pm 0.5$ ) per 1,000 in the later period ( $p < .05$ ).

A substantial decrease between 1968 and 1970 is seen in the neonatal death rate (Figure 4). However, there is also a substantial rebound in 1971. It is impossible to distinguish for either neonatal or post-neonatal deaths an impact of the abortion legislation from the long-standing downward trend in infant death rate.

## Discussion

With regard to the abortion rates and the fertility rates,

**FIGURE 2—Distribution of Live Births by Age of Mother: Oregon Residents, 1965–1975**

\*Medically induced abortions excluded.

**TABLE 2—Prematurity Rates by Age of Mother: Oregon Residents, 1965–1975**

Age of Mother	Live Births 2,500 Grams or Less per 1,000 Live Births				Difference Of Means	Per Cent Change
	1965–1969		1970–1975			
	Mean	(SD)	Mean	(SD)		
Under 20	75.0	(2.5)	74.3	(2.8)	-0.7 <sup>NS</sup>	-0.1
20 to 24	61.3	(2.1)	55.9	(1.4)	-5.4 <sup>**</sup>	-8.8
25 to 29	58.8	(2.6)	49.9	(1.1)	-8.9 <sup>***</sup>	-15.1
30 to 34	64.7	(4.9)	55.6	(4.5)	-9.1 <sup>*</sup>	-14.1
Over 34	83.7	(7.3)	73.5	(8.6)	-10.2 <sup>NS</sup>	-12.2
All ages	64.9	(0.9)	57.9	(1.3)	-7.0 <sup>***</sup>	-10.8

NS = not significant ( $p < .05$ )

\*  $p < .05$

\*\*  $p < .01$

\*\*\*  $p < .001$

Mean is the unweighted average of the annual rates for each age group; SD reflects year-to-year variation.

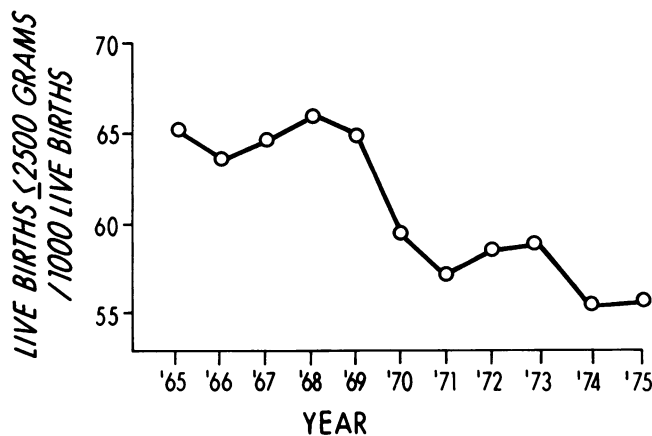
the most interesting finding is that both the number and the age-adjusted rate of live births increased in the year following the change in the abortion law. The slight birth rate increase in the face of large numbers of reported induced abortions and the lack of expected fertility changes within maternal age groups can be attributed to one or more of the following effects: 1) A major increase in coital rate in distinct age groups offset by abortions in those same age groups; 2) A major decrease in birth control use in distinct age groups offset by abortions in those same age groups; 3) Large numbers of legal out-of-state abortions prior to 1969 and a major shift to in-state abortions starting in late 1969; 4) Large numbers of induced abortions performed before 1969 being reported as spontaneous fetal deaths, with the 1969 law impacting on reporting practices as well as the actual induced abortion rate; and 5) A major underestimation of conceptions prior to 1969 as a result of large numbers of unreported illegal abortions.

Possibilities 1 and 2 seem somewhat unlikely, particularly since the suggested changes in behavior would have to occur over a relatively short period of several months in order to explain the rapid change in the conception curve. To account for the observed abortion and fertility rates, the greatest changes would have had to have been among teenagers. Sexual activity among teenagers was relatively high during the years included here,<sup>19</sup> but changes in such activity occur gradually and can hardly explain a greatly increased conception rate over a two-year period.

Although some have argued that liberalized abortion inhibits the use of contraception, most observers have not found a decline in birth control practices. In Oregon, data from the State Family Planning Program Data from the Oregon State Family Planning Program indicate that Oregon experienced a substantial increase in the availability and use of family planning services beginning in 1970. Thus it would appear that neither changes in coital rate nor changes in birth control practices account for the seemingly inconsistent fertility and abortion rates.

Replacement of legal out-of-state abortions by legal in-state abortions constitutes the third possible explanation for the observed rates. Of the four states contiguous to Oregon, only California had more permissive abortion laws. Although California liberalized its abortion law in 1967, in 1968 there were only 80 abortions reported in California for out-of-state residents and in 1969 there were approximately 350.<sup>14</sup> A state-by-state breakdown for the totals is not available, but even in the unlikely event that all were for Oregon residents the numbers are too small to attribute a significant portion of the observed rise in reported abortions in Oregon simply to shift from out-of-state to in-state abortions. Furthermore, in 1970 the total number of abortions performed in California almost doubled and for out-of-state residents the number exceeded 4,000. On the basis of proximity alone, it might be expected that as many Oregon residents went to California for abortions in 1970 as in 1969.

With regard to possibility number 4, the decline in the number of reported spontaneous fetal deaths was minimal in

**FIGURE 3—Prematurity Rates: Oregon Residents, 1965–1975**

1970 and only became significant in 1971 and 1972. Even if the entire 1970 decline were an artifact of a change in reporting patterns, it could account for only a fraction of the increase in reported induced abortions.

Possibility number 5 seems to be the most likely explanation for the stable 1970 birth rate in the face of a large rise in reported abortions. Using an approach first suggested by Tietze,<sup>20</sup> it is possible to estimate the number of unreported abortions prior to 1969 from expected fertility rates. Abortions performed during the first year under the new law (September 1969 to August 1970) will have their impact on birth rates six months later (March 1970 to February 1971), since most terminations occur in the first trimester or early in the second trimester. During the 12-month period from March 1969 to February 1970, there were 34,182 live births to Oregon women. Application of the age-specific birth rates for this 12-month period to the estimated age distribution for the next 12-month period yields an expectation of 35,700 live births for the year March 1970 to February 1971. The observed number of births was 35,324 or about 400 less than expected. It takes more than one abortion to avert one live birth.<sup>21</sup> Using a figure of 1.2 abortions to replace one live birth,<sup>20</sup> it is estimated that 480 abortions would be needed to account for the reduced birth rate. This assumes that all potential births were averted by abortion, rather than increased contraception. Between September 1969 and August 1970, 5,190 abortions were performed, yielding an increase of 4,490 abortions during the first year under the new law. Of these 4,490 abortions, 480 or roughly 10 per cent were required to prevent 400 births six months later. The remaining 4,010 (90 per cent) are estimated to represent pregnancies which would have been terminated illegally, had the new law not been in effect.

The estimate that 90 per cent of the increase in abortions during the first year under the new law represented replacement of illegal abortion is slightly higher than Tietze's estimate of 65 to 70 per cent for New York City.<sup>20</sup> However, it represents a ratio of about 130 abortions per 1,000 live births. This ratio is somewhat lower than the pre-liberalization estimates of 175 to 200 illegal abortions per 1,000 live births for North Carolina,<sup>22</sup> New York City,<sup>20</sup> and the United States.<sup>23, 24</sup> Thus, in comparison to New York City and to the rest of the United States, it appears that before the abortion law was changed, Oregon women were resorting to illegal abortion less frequently than were women elsewhere. However, based on increases during the first year of liberalized abortion, it appears that Oregon women were nevertheless obtaining a high proportion of the potentially desired number of abortions; only about 10 per cent of the increase in reported abortions during the first year appears to be attributable to "new" abortions.

In the second 12 months under the new law (September 1970 to August 1971) 7,508 abortions were performed—2,318 more than during the first 12 months. Between March 1971 and February 1972, about 33,450 live births were recorded. This is 3,350 births less than the 36,800 which would have been predicted by applying the 1970–1971 birth rate to the 1971–1972 female population total. The 2,318 additional abortions would account for roughly 1,930 (1.2 abortions to

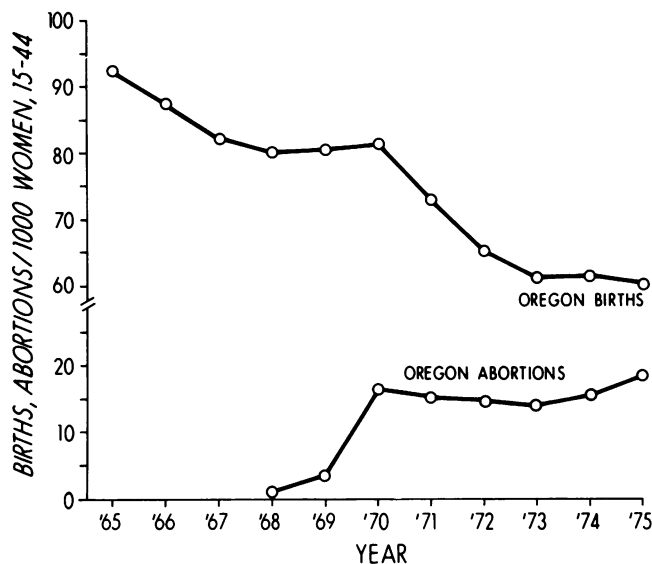


FIGURE 4—Fetal and Infant Deaths: Oregon, 1965–1975. Solid Line = Fetal Deaths of All Gestational Ages; Dotted Line = Fetal Deaths of 20 Weeks or More Gestational Age (see text)

avert one live birth, as above) births or 60 per cent of the 3,350 decrease. The remaining 40 per cent must be accounted for by factors other than abortion. The continuing decline in the fertility rate in 1972 and 1973 (Figure 1) cannot be attributed to legalized abortion either, since the rate of reported abortions remained essentially constant over this period. Based on these data, about one-fourth of the decrease in fertility between 1969 and 1975 is quantitatively associated with increase in abortion.

The declining fertility rate does correlate with increasing federal funding (DHEW) of family planning in Oregon beginning in fiscal year 1970, to legislation effective in October 1971 which made birth control services available to minors without parental consent, and to substantial increases in the number of Oregon residents served by family planning clinics. Between 1970 and 1973, for example, the total number of patients seen at Oregon family planning clinics increased nearly seven-fold, from 5,000 to almost 35,000 per year.\*

The timing and extent of the increases in the availability and the provision of contraceptive services suggest that growing use of contraception accounted for a greater portion (up to three-fourths) of the 1969 to 1975 decrease in fertility than did liberalized abortion.

In summary, it would appear that in Oregon liberalized abortion served to replace large numbers of previously illegal abortions with legal abortions, was associated with significant decreases in prematurity rates and fetal mortality rates, and contributed to a declining birth rate. There was no evidence that liberalized abortion resulted in a decline in the use of contraceptive and family planning services. To the

\*Mimeographed data from Family Planning Program, Health Division, Oregon Department of Human Resources (1976).

contrary, with increases in federal funding and more liberal family planning legislation the use of family planning services have grown substantially during the period of liberalized abortion.

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