

Abortion as a Cause of Death

By Christopher Tietze

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ABORTION affects population growth in 3 ways: (1) In each case by terminating the current pregnancy before the fetus has attained viability, (2) in some cases by making the woman sterile and thus preventing further pregnancies, and (3) by causing the death of a certain number of women. This article is devoted to a discussion of the third aspect only. It is based almost entirely upon published statistics from several countries and has as its objective the appraisal of abortion as a cause of death.

The term abortion as used in this article should be understood as including all terminations of intrauterine pregnancy before the twenty-eighth week regardless of cause, that is to say unintentional, therapeutic, and illegally induced abortions. Deaths from septic and nonseptic abortion will be shown separately. This distinction is important because of the close association known to exist between illegal induction and fatal infection.

All data will be presented in terms of annual mortality rates per million women of reproductive age (15-44 years). This method of presentation has been adopted by the Registrar General for England and Wales, whereas the National Office of Vital Statistics of the United States still adheres to the traditional procedure of computing mortality rates from abortion per 1,000 live births. The fundamental objection against the latter method is that a mortality rate should show the number of deaths in relation to the population exposed to the risk of dying, but women who have

carried their pregnancies to the point of termination by a live birth are precisely the ones who are not exposed to the risk of dying from abortion.

The mortality rate from abortion should not be confused with the fatality ratio of abortion. The latter can be computed from the number of deaths, if an adequate estimate of the number of abortions is available.

Table 1 presents the number of deaths assigned to abortion by the Bureau of the Census for each year from 1933 to 1945.<sup>14</sup> In 1933 the death registration area for the first time included the entire United States. The table also shows mortality rates per million women 15-44 years of age. For comparison, rates for 1927-1928 have been added based upon the special investigation into maternal mortality undertaken by the Children's Bureau.<sup>13</sup> This investigation included 15 states in all parts of the country. The population studied was slightly more rural than the United States as a whole but quite representative in its racial distribution and general level of maternal mortality.

To interpret correctly the numbers and rates presented in Table 1 it is necessary to consider the changes which have taken place in the classification of deaths from abortion. Prior to the Third Revision of the *International List of Causes of Death* adopted in 1920, deaths from abortion were not classified separately. They were included either with puerperal septicemia or with accidents of pregnancy, depending upon the presence or absence of infection. After 1920, septic abortion appeared as

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TABLE 1

*Deaths from Septic and Nonseptic Abortion and Mortality Rates per Million Women, 15-44, in the United States, 1927-1945*

Year	Number of Cases		Rate per Million Women	
	Septic	Nonseptic	Septic	Nonseptic
1927-1928 *	....	...	99	37
1933	2,037	640	67	21
1934	2,204	570	72	19
1935	2,167	602	70	20
1936	1,801	680	58	22
1937	1,531	582	49	19
1938	1,380	436	44	14
1939	1,393	393	44	12
1940	1,334	348	42	11
1941	1,014	370	31	11
1942	929	302	28	9
1943	789	376	24	11
1944	701	295	21	9
1945	587	301	18	9

\* 15 states

a subdivision of the accidents of pregnancy, but the much more important group of deaths from septic abortion was not shown. For this period the only information on mortality from abortion is that contained in the Children's Bureau publication previously quoted.

The Fourth Revision of the *International List* adopted in 1929 included two classifications in reference to abortion: Abortion with septic conditions and abortion without mention of septic conditions. These two categories have remained in use up to the present time. It must be understood, however, that statistics classified under the 1929 list are not comparable with more recent ones for the following reasons: (1) Abortions reported as criminal were not classified as puerperal deaths but as homicides. (2) Deaths due to premature labor or to hemorrhage of pregnancy were assigned to nonseptic abortion. (3) Death certificates on which nonseptic abortion appeared in conjunction with toxemia of pregnancy, placenta previa, perforation of the uterus, and certain other terms were not assigned to abortion but preference was given to the other cause mentioned.

The Fifth Revision of the *International List of Causes of Death* adopted

in 1938, and used in the United States since 1939, defined abortion as the termination of a uterine pregnancy prior to 7 lunar months or 28 weeks of gestation, retaining the division into abortion with and without mention of infection. Several changes were made in the lists of terms included under each title and in the rules for determining primary cause of death. As indicated above the results of these changes were the following: (1) Addition of criminal abortions previously classified as homicide. (2) Exclusion of premature labor and hemorrhage of pregnancy from nonseptic abortion. (3) Allocation of certain deaths to nonseptic abortion which under the rules of 1929 would have been assigned to toxemia, placenta previa, or other puerperal causes.

To make comparison possible throughout the series the mortality rates for the years before 1939 must be adjusted to the Fifth Revision of the *International List*. This adjustment has been made with the help of a special study published by the Bureau of the Census in 1944.<sup>12</sup> In this study the deaths of 1940 in the United States were classified according to both the Fourth and Fifth Revisions of the *International List* and cross-tabulated. From this cross-tabulation it appears that only 1,152 deaths

would have been assigned to septic and 331 to nonseptic abortion if the Fourth Revision had been used in 1940 against 1334 and 348 deaths under the Fifth Revision. To make the series comparable, the number of deaths and the mortality rates from septic abortion were therefore increased by 15.8 per cent for the period 1933-1938 and those from nonseptic abortion by 5.1 per cent. For 1927-1928 the mortality rate from septic abortion was increased by 10 per cent to allow for deaths reported as criminal abortion and classified as homicide. No adjustment is needed for nonseptic abortion because the investigation by the Children's Bureau included all cases of abortion listed in conjunction with other puerperal causes but excluded premature labor and hemorrhage of pregnancy.

The first two columns of Table 2 present the adjusted series of mortality rates per million women of reproductive age for the United States as a whole.

The usefulness of official statistics for the study of the mortality due to abortion has often been questioned and some authorities have felt tempted to discount them altogether. Is this attitude justified by the facts? A careful appraisal of the available evidence is necessary to answer this question. Deaths from abortion may be assigned to other causes for various reasons: (1) Abortions reported in conjunction with a nonpuerperal cause of death which takes precedence over abortion. Such cases numbered 133 in 1940<sup>4a</sup> which is 7.9 per cent of the number assigned to abortion. Of these 133 cases, 21 were assigned to tuberculosis, 18 to appendicitis, 14 each to syphilis and accidents, 11 to chronic nephritis, 9 each to cancer, heart disease, and pneumonia, 6 to hernia, 5 to nonmalignant tumors, 4 to suicide, 3 to diabetes, 2 each to typhoid fever and pellagra, and 6 to a miscellany of other diagnoses. This list suggests that in many of these

cases the abortion was listed either as a non-fatal complication of a fatal disease or as an unsuccessful therapeutic measure rather than the cause of death.

(2) Deaths reported as due to a puerperal condition but without mention of the fact of abortion or the period of gestation. Such cases are assumed to have occurred in the third trimester of pregnancy and therefore not classified as abortions. Errors of this type were found fairly frequently in the early studies of maternal mortality in the United States. They amounted to 20.9 per cent of all septic abortions in the survey of 1927-1928 made by the Children's Bureau, to 15.7 per cent of all abortions in New York City in 1930-1932,<sup>6</sup> and to 14.9 per cent in Philadelphia in 1931-1933.<sup>7</sup> Unfortunately no further such investigations have been published in more recent years. It is believed, however, that the strong efforts made by health departments and by the special committees on maternal mortality established in many cities have resulted in much more accurate reporting of puerperal deaths than was customary 15 or 20 years ago. In this connection it is worth noting that in 1945 more than 78 per cent of all deaths from puerperal causes occurred in hospitals against 55 per cent in 1927-1928.

(3) Deaths reported as septicemia or peritonitis without mention of pregnancy, childbirth, or the puerperal state. If such death certificates refer to women of reproductive age they are usually queried by the registrar and the complete diagnosis ascertained. Between the ages of 15 and 45 years, nonpuerperal septicemia appears more often as the cause of death for males than for females. It is therefore unlikely that many septic abortions are concealed under this diagnosis. For peritonitis of unknown origin, the Census Bureau regularly reports more deaths of women of reproductive age than of men. During the 3 year period 1942-1944

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the average annual excess amounted to 100 female deaths. Of these, 40 occurred in white and 60 in colored women. A number of these deaths were probably caused by septic abortion.

(4) A fourth group of deaths due to abortion but not reported as such are the cases where a false and apparently innocuous diagnosis is entered on purpose in order to conceal a criminal abortion. I do not believe, however, that this happens very often, especially in urban communities. As a rule a woman seriously ill after an illegal operation is not allowed to die in her home under the care of the abortionist or a conniving family physician but is taken to a hospital in an effort to save her. It is not possible to estimate the number of such concealed deaths. The late Frederick J. Taussig<sup>10</sup> tried to do it by arbitrarily allocating one-half of the excess mortality of females, 15-44, over males from respiratory tuberculosis, diseases of the circulatory system, and acute and chronic nephritis to abortion; but his attempt is now only of historical interest. Dr. Taussig later admitted<sup>4b</sup> that his estimate had been considerably too high.

The Registrar General for England and Wales recently<sup>11</sup> expressed the opinion that "there is no reason to suppose that the understatement of abortion on death certificates amounts to more than ten per cent" in that country. The data presented here suggest that coverage may be less complete in the United States. It is felt, however, that the official statistics include the great majority of all deaths from abortion. It should be noted that the mortality from abortion as reported is generally highest in those sections of the American population where omissions and errors may be assumed to occur most frequently. Furthermore—and this is most important—there is every reason to believe that the quality of death registration has improved a great deal during the

last 20 years. The outstanding fact about mortality from abortion is the steady and sometimes precipitous decline which has been observed almost everywhere. The reality of this decline cannot be doubted, and the extent of the fall is in all likelihood understated by the official statistics.

Four general statements can now be made concerning the development of mortality from abortion in the United States as a whole: (1) From 1927 to 1945 mortality from abortion has decreased by approximately four-fifths—from about 150 to about 30 per million women of reproductive age. (2) Mortality from abortion has decreased at a steadily accelerating pace, the rate per million women having dropped 32 per cent from 1927 to 1933, 44 per cent from 1933 to 1939, and 52 per cent from 1939 to 1945. (3) Deaths from septic abortion have outnumbered deaths from nonseptic abortion throughout the period at a ratio of about 3 to 1. (4) During the last few years, mortality from septic abortion has decreased much faster than mortality from nonseptic abortion.

It is suggested that this development has been due to a combination of several causes. (1) Contraceptive methods have been improved and are more generally used than formerly. Fewer women, therefore, resort to illegally induced abortion. (2) Abortionists have become more skillful in avoiding infection. (3) Many lives have been saved by improved methods of treatment, especially by the use of sulfa drugs and penicillin.

Table 2 also presents mortality rates from septic and nonseptic abortion for the white and colored population of the United States. Three facts are strikingly evident: (1) Mortality from abortion has been much higher among colored than among white women. (2) It has declined much faster among the whites than among the colored.

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TABLE 2

*Deaths from Septic and Nonseptic Abortion per Million Women, 15-44, in the United States, 1927-1945, by Color (Adjusted Series)*

Year	Total Population		Septic Abortion		Nonseptic Abortion	
	Septic	Nonseptic	White	Colored	White	Colored
1927-1928 *	109	37	..	...	..	..
1933	78	23	73	119	20	43
1934	84	20	79	119	17	39
1935	81	21	76	123	19	37
1936	67	23	61	114	21	38
1937	57	20	50	111	17	40
1938	51	15	44	104	12	36
1939	44	12	38	95	10	30
1940	42	11	35	93	9	28
1941	31	11	25	80	9	28
1942	28	9	24	65	8	22
1943	24	11	19	61	10	25
1944	21	9	17	58	7	24
1945	18	9	13	52	7	26

\* 15 states

TABLE 3

*Deaths from Septic and Nonseptic Abortion per Million Women, 15-44, in the Divisions and Regions of the United States, 1939-1941, by Color*

Divisions and Regions	Septic Abortion		Nonseptic Abortion	
	White	Colored	White	Colored
New England	23	•	9	•
Middle Atlantic	27	143	7	17
East North Central	31	76	8	17
West North Central	39	75	8	•
South Atlantic	36	77	12	28
East South Central	43	86	14	32
West South Central	39	93	12	33
Mountain	55	•	16	•
Pacific	26	83	8	•
Northeast	26	143	8	17
North Central	33	76	8	21
South	39	83	13	31
West	34	83	11	•
United States	33	90	10	28

\* Less than 15 cases

(3) These statements are true for septic and nonseptic abortions.

The available evidence, meager as it is, indicates that in the United States the incidence of induced abortion is lower among colored than among white women. It seems, therefore, that the shockingly high mortality rates recorded for the colored population are due to the poor caliber of the abortionists and to the general inadequacy of the medical services available to nonwhites.

In addition to the color differential, marked regional differences are found within the United States (Table 3). Among white women, mortality from septic abortion is lowest in New England, the Middle Atlantic States, and on the Pacific Coast. It is highest in the Mountain Division and generally high throughout the South. The pattern is similar for nonseptic abortion. As far as the colored population is concerned, mortality rates from septic abor-

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tion show comparatively little variation with the exception of a very high figure observed in the Northeast. Mortality from nonseptic abortion is highest in the South.

Through the courtesy of Dr. Halbert L. Dunn the National Office of Vital Statistics has furnished the author with a tabulation of deaths from abortion by color, region, and size of community for 1945 (Table 4). This tabulation is based not on place of death but on usual residence. Total numbers of cases are small and our estimate of population is less reliable than one would like to make it. With these reservations the following observations are in order: Mortality from septic abortion appears to be on the same level in larger and smaller cities and only slightly lower in rural areas. This finding is at vari-

ance from the widely held belief that death from septic abortion is by far most common in the metropolis. Mortality rates from nonseptic abortion tend to be highest in the country and lowest in the large cities. Additional data covering several years will be necessary to test the validity of these observations.

Turning now to the international scene we find in Switzerland<sup>9</sup> the longest series of mortality rates from abortion. What makes this series particularly valuable is that a confidential death certificate has been used in Switzerland since the turn of the century. Unfortunately the series is limited to septic abortion. Mortality from this cause doubled between 1901-1905 and 1916-1920, rising from 38 to 81 per million women of reproductive age.

TABLE 4

*Deaths from Septic and Nonseptic Abortion and Mortality Rates per Million Women, 15-44, in the United States, 1945, by Color, Region, and Size of Community*

Color and Region	Number of Cases			Rate per Million Women		
	Cities 100,000+	Other Urban	Rural	Cities 100,000+	Other Urban	Rural
SEPTIC ABORTION						
White						
Northeast	36	30	17	10	10	8
North Central	36	33	36	12	13	10
South	30	45	80	21	21	18
West	17	17	13	14	16	9
United States	119	130	146	13	14	13
Colored						
North and West	46	3	8	51	•	•
South	27	49	59	60	75	47
United States	73	52	67	54	57	47
NONSEPTIC ABORTION						
White						
Northeast	18	19	14	5	6	7
North Central	13	23	23	4	8	7
South	9	14	40	•	7	9
West	5	12	17	•	11	12
United States	45	68	94	5	8	8
Colored						
North and West	20	7	2	22	•	•
South	10	15	40	22	23	32
United States	30	22	42	22	24	30

• Less than 10 cases

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TABLE 5

*Deaths from Septic and Nonseptic Abortion per Million Women, 15-44, in the United States, England, Prussia, and Germany, 1920-1945*

Year	Septic Abortion			Nonseptic Abortion		
	United States	England	Prussia	United States	England	Prussia
1920	..	..	121	..	..	34
1921	..	..	121	..	..	35
1922	..	..	133	..	..	32
1923	..	..	132	..	..	32
1924	..	..	122	..	..	34
1925	..	..	112	..	..	27
1926	..	..	109	..	..	25
1927	..	..	..	..	..	..
1928	109*	..	..	37*	..	..
1929	..	..	Germany	..	..	Germany
1930	..	..	..	..	..	..
1931	..	29	..	..	17	..
1932	..	31	93	..	17	17
1933	78	32	89	22	18	18
1934	84	37	82	20	16	14
1935	81	33	69	21	14	15
1936	67	29	64	23	13	13
1937	57	23	49	20	14	12
1938	51	23	37	15	13	10
1939	44	25	..	12	11	..
1940	42	16	..	11	11	..
1941	31	21	..	11	12	..
1942	28	24	..	9	8	..
1943	24	25	..	11	8	..
1944	21	25	..	9	7	..
1945	18	18	..	9	6	..

\* 15 states

From this peak the rate has fallen 70 per cent to 23 per million in 1941-1945.

1901-1905	38
1906-1910	67
1911-1915	70
1916-1920	81
1921-1925	57
1926-1930	44
1931-1935	42
1936-1940	40
1941-1945	23

Freudenberg<sup>2</sup> and Nevermann<sup>5</sup> have studied the course of mortality from abortion in Berlin and Hamburg. Both authors report steeply increasing numbers of deaths between the early part of the 20th century and the years immediately after World War I. Their material, however, included deaths of nonresident women and therefore presents an exaggerated picture. The number of nonresident cases can only be estimated. If they are excluded, the combined mortality from septic and nonseptic abortion in Berlin and Hamburg

probably ran to about 400 per million women of reproductive age in 1920.

Table 5 presents the available data on mortality from abortion for the United States, England,<sup>1</sup> Prussia,<sup>8</sup> and Germany<sup>3</sup> for the period from 1920 to 1945. The mortality rates from septic abortion are comparable throughout the table but whereas each series of mortality rates from nonseptic abortion is uniform their mutual comparability is limited by the different rules for determining primary cause of death used in each country. As Prussia included two-thirds of the population of Germany during the inter-war period it has been considered permissible to show the rates in the same column.

The following generalizations suggest themselves: (1) Mortality from septic and nonseptic abortion has declined in each country. (2) Mortality from septic abortion has been on the same general level in Germany and the United

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States but seems to have fallen faster in the former country between 1933 and 1938. These were, of course, the years of the all-out population drive in Germany and strong efforts were made to suppress illegal abortion. (3) England had a much lower mortality rate from septic abortion in the 'thirties than either Germany or the United States, but decline has been slower and for the last few years her rates have been almost identical with those observed in America.

### SUMMARY

The general picture of mortality from abortion in all countries studied is one of steady decline over the past 30 years. In the United States the rate per million women of reproductive age has decreased by about four-fifths from 1927 to 1945. It has decreased more rapidly for white than for colored women and is now nearly 4 times as high among the latter. In addition, marked regional differentials prevail. The actual level of mortality from abortion cannot be accurately determined but the downward trend is certainly real.

### REFERENCES

1. England and Wales, Registrar General. *Statistical Review of England and Wales for the Year 1945*. London: H. M. Stationery Office, 1947 and earlier volumes.

2. Freudenberg, Karl. Berechnungen zur Abtreibungsstatistik. *Ztschr. f. Hyg. u. Infektionskr.*, 104(4): 529-550, 1925.

3. Germany, Statistisches Reichsamts. Die Bewegung der Bevölkerung in den Jahren 1938 und 1939. *Statistik des Deutschen Reichs*, Vol. 587. Berlin: Verlag für Sozialpolitik, Wirtschaft u. Statistik, 1942 and earlier volumes.

4a. National Committee on Maternal Health. *The Abortion Problem*. Baltimore: Williams & Wilkins, 1944, p. 6.

4b. *Ibid.*, p. 28.

5. Nevermann, Hans. Zur Frage der Mortalität durch Schwangerschaft, Geburt und Wochenbett. *Zentrabl. f. Gynäk.*, 52(37):2351-2357, 1928.

6. New York Academy of Medicine. *Maternal Mortality in New York City*. New York: Commonwealth Fund, 1933.

7. Philadelphia County Medical Society. *Maternal Mortality in Philadelphia, 1931-1933*. Philadelphia: Philadelphia Co. Med. Soc., 1934.

8. Prussia, Statistisches Landesamt. Die an Zufällen der Schwangerschaft, der Entbindung und des Wochenbetts (einschl. des Kindbettfiebers) in Preussen im Jahre 1926 verstorbenen Frauen. *Medizinisch-statistische Nachrichten.*, 16(4):269-273, 1929 and earlier volumes.

9. Switzerland, Eidgenössisches Statistisches Amt. *Statistisches Jahrbuch der Schweiz 1945*. Basel: E. Birkhäuser, 1946.

10. Taussig, Frederick J. Abortion and Its Relation to Fetal and Maternal Mortality. *Am. J. Obst. & Gynec.*, 33(4):711-714, 1937.

11. United Kingdom, Ministry of Health and Home Office. *Report of the Inter-Departmental Committee on Abortion*. London: H. M. Stationery Office, 1939.

12. United States, Bureau of the Census. Comparison of Cause of Death Assignments by the 1929 and 1938 Revisions of the International List. Deaths in the United States, 1940. *Vital Statistics—Special Reports*, 19(14):153-277, 1944.

13. United States, Children's Bureau. *Maternal Mortality in Fifteen States*. Washington: Govt. Printing Office, 1934.

14. United States, National Office of Vital Statistics. *Vital Statistics of the United States, 1945*. Washington: Govt. Printing Office, 1947, and earlier volumes published by the Bureau of the Census.