The Impact of State Maternal Mortality Study Committees on Maternal Deaths in the United States

DAVID A. GRIMES, MD, WILLARD CATES, JR., MD, MPH

Abstract: State maternal mortality study committees have been widely credited with playing a prominent role in reducing maternal death rates in the United States. To evaluate this hypothesis, we compared the rates of decline in maternal mortality ratios by decades from 1938–40 to 1968–70 for states with such committees to those without. Ratios were calculated from published vital statistics of the United States, and committee initiation dates were obtained from a previous survey. States with committees and those without had nearly equal declines during the first decade; however, states with committees had smaller declines during the latter two decades. Although these committees may have been an important factor in the decline in maternal mortality in the United States, vital statistics data do not document larger declines for states with committees. (Am. J. Public Health 67:830–833, 1977)

Assessment of the relative importance of factors effecting reductions in maternal deaths is essential for planning and implementing needed health programs.[1] Since reduction or elimination of avoidable factors in maternal deaths constitutes a primary goal of maternal mortality study committees,[2] maternal mortality ratios (maternal deaths/100,000 live births) provide useful indices for evaluating the impact of these committees on the quality of health care.[3] Maternal mortality ratios in the United States have declined exponentially since 1930,[1] and state maternal mortality study committees have been widely credited with playing a prominent role in this decline.[1–7] Most attempts to measure the outcome of maternal mortality reviews, however, have lacked comparison groups. Having observed decreases in maternal mortality ratios in states with review committees, many authors[1–7] have inferred a causal relationship. Whether the association between these committees and declining mortality ratios is causal or merely temporal, however, has not been established. To assess the impact of state maternal mortality study committees on maternal death rates, we compared the declines in the maternal mortality ratios by decades from 1938–40 to 1968–70 for states with committees to those without.

From the Center for Disease Control, Bureau of Epidemiology. Address reprint requests to Dr. David A. Grimes, Family Planning Evaluation Division, Bureau of Epidemiology, CDC, DHEW, PHS, Atlanta, GA 30333. This paper, submitted to the Journal November 24, 1976, was revised and accepted for publication February 11, 1977.

Methods

Numbers of maternal deaths and live births were obtained by state of residence from published vital statistics of the United States for the years 1938 through 1970 and committee initiation dates from a previous survey.[4] To reduce the variability in ratios stemming from chance occurrences of infrequent maternal deaths, we analyzed ratios for three-year intervals, as does the National Center for Health Statistics in its analyses of maternal mortality ratios by states. We were unable to examine the first decade of these committees' activity because of incomplete national registration data during the 1930s.

To evaluate the potential influences of race and age on the mortality ratios, we stratified the ratios for 1958–60 and 1968–70 by race and compared the age distribution of women who died of maternal causes in those years. To examine the relationship between committees and declines in maternal death rates in a different manner, we then ranked states individually by per cent decline in maternal mortality ratios from 1958–60 to 1968–70. Finally, to investigate the potential impact of increasing numbers of committees on national declines in maternal mortality, we correlated the number of committees with rates of decline of maternal mortality ratios for the United States from 1930 to 1965.

Results and Discussion

Over the past three decades, declines in maternal mortality ratios have been similar for states with committees and

TABLE 1—Per Cent Decline in Maternal Mortality Ratios by Decades for States[1] with and without Committees, 1938-40 to 1968-70

	No. in 1948	Decline 1938-40 to 1948-50	No. in 1958	Decline 1948-50 to 1958-60	No. in 1968	Decline 1958-60 to 1968-70
States with		%		%		%
Committees	23	76.2	39	60.6	45	38.7
States without Committees	27	76.0	12	65.3	6	43.2
All States	50[2]	76.1	51	61.4	51	39.1

[1]Includes District of Columbia
[2]Excludes Alaska

those without; however, during the last two decades, states with committees had smaller declines (Table 1). Between 1958–60 and 1968–70, not all states with committees had them during the entire interval under consideration; eight states initiated committees between 1958 and 1968.[4] Nevertheless, these eight states had a decline in maternal mortality ratios (42.5 per cent) similar to that of all states with committees in 1968 (38.7 per cent) as well as states without committees (43.2 per cent). During the early years when a minority of states had committees as well as during the later years when a majority did, the existence of committees was not associated with larger declines. During the most recent decade, states with new committees, older committees, or no committees all had similar declines in maternal mortality ratios.

Stratified by patient race, rates of decline in maternal mortality ratios from 1958–60 to 1968–70 remained similar. The ratios declined 40.4 per cent for whites in states with committees compared to 41.1 per cent in states without. The corresponding figures for women of black and other races were 41.3 per cent and 42.4 per cent respectively. In 1958–60 and 1968–70, the age distributions of women who died of maternal causes were similar for states with and for those without committees (Table 2). Other characteristics of women who died from pregnancy and childbirth, e.g., parity and delivery in a hospital, are unavailable in published vital statistics.

Five of six states without committees in 1968 had declines in maternal mortality ratios from 1958–60 to 1968–70 equal to or greater than the median (Table 3). Thus, states without committees compared favorably with other states in rates of decline, excluding the possibility that one or two populous states having large declines dominated the aggregate statistics for the six.

Increasing numbers of committees have not been consistently associated with more rapid declines in maternal mortality ratios in the United States (Table 4). Prior to 1950, increasing numbers of committees were temporally associated with larger declines. Thereafter, however, the opposite trend occurred: increasing numbers of committees were related temporally to smaller declines. This biphasic relationship suggests that these committees may have had a beneficial effect, reaching a point of diminishing returns in 1950, although the analysis in Table 1 militates against this hypothesis. In addition, the number of active state maternal mortality committees decreased 16 per cent between 1968 and 1975, and some states have curtailed dissemination of their findings (see Appendix).

The initiation of state maternal mortality study committees in the 1930s coincided with the beginning of dramatic declines in maternal deaths in the United States. However, mortality rates for other populations, e.g., infants and children, were also declining exponentially during the 1930s.[1]

In the years after 1930, other major changes in the practice of American obstetrics transpired, including advances in

TABLE 2—Age Distribution of Maternal Deaths in States with[1] and Those without[2] Maternal Mortality Study Committees, 1958-60 and 1968-70

	1958-60 Age Distribution (Per Cent)								Median Age	Total Number Maternal Deaths
	10-14	15-19	20-24	25-29	30-34	35-39	40-44	≥ 45		
States with Committees	0.3	8.4	17.9	21.2	22.6	20.4	8.3	0.9	30.5	4,396
States without Committees	1.1	13.0	16.6	16.0	23.5	21.5	8.0	0.3	30.7	362
All States	0.3	8.7	17.8	20.8	22.7	20.5	8.2	0.9	30.5	4,758
	1968-70									
States with Committees	0.6	12.8	22.3	20.5	18.0	16.9	8.1	0.7	28.5	2,291
States without Committees	1.2	12.2	20.3	26.2	18.6	12.8	8.7	0.0	28.1	172
All States	0.6	12.8	22.2	20.9	18.1	16.6	8.2	0.6	28.4	2,463

[1]Includes District of Columbia
[2]Alaska, Arkansas, Idaho, Louisiana, Tennessee, Vermont

TABLE 3—List of States[1] in Order of Per Cent Decline in Maternal Mortality Ratios, 1958-60 to 1968-70

State	% Decline	State	% Decline
Rhode Island	81.6	Utah	38.7
South Dakota	76.4	Mississippi	38.5
Delaware	75.3	Texas	37.5
Alaska[2]	69.9	Oklahoma	36.5
Oregon	66.2	Maryland	36.4
Wisconsin	61.9	California	36.0
Virginia	59.8	Ohio	34.0
South Carolina	56.1	New York	31.9
Massachusetts	55.9	New Jersey	30.1
Maine	53.1	North Dakota	29.2
Alabama	52.3	West Virginia	29.2
Georgia	50.6	Nebraska	29.0
Kentucky	50.2	Kansas	28.2
Arkansas[2]	49.4	Indiana	24.9
Michigan	49.1	Iowa	22.8
Connecticut	47.7	Wyoming	22.3
Colorado	47.6	Arizona	22.1
Montana	47.6	Idaho[2]	21.8
Florida	42.3	New Hampshire	18.0
Louisiana[2]	42.1	Minnesota	13.7
Pennsylvania	41.8	Illinois	12.5
Missouri	41.3	Washington	9.8
New Mexico	41.0	District of Columbia	7.8
Vermont[2]	41.0	Hawaii	2.3
North Carolina	39.7	Nevada	+20.4
Tennessee[2]	39.7		

[1]Includes District of Columbia
[2]States without Committees in 1968

TABLE 4—Cumulative Number[1] of State[2] Maternal Mortality Study Committees, Maternal Mortality Ratios, and Per Cent Decline in Ratios by 5-Year Intervals, United States, 1930-1965.

Year	Number of Committees	Maternal Mortality Ratio[4]	Decline In Ratios
			%
1930-34[3]	5	636.0	
1935-39[3]	11	493.9	22.3
1940	11	376.0	23.9
1945	18	207.2	44.9
1950	25	83.3	59.8
1955	34	47.0	43.6
1960	40	37.1	21.1
1965	43	31.6	14.8

[1]Assuming continuity since initiation
[2]Includes District of Columbia; excludes Montana
[3]Data available only by 5-year grouping
[4]Number of deaths per 100,000 live births

professional skills, improvements in hospital facilities, and better health and socioeconomic status of women.[8] Advances in blood banking, intravenous fluid therapy, antibiotics, and increasing percentages of hospital deliveries have been cited as factors in the reduction of maternal deaths.[9] The modern era of antibiotic therapy began with the clinical use of sulfanilamide in 1936, then flourished with the production of penicillin in 1941.[10] Between 1940 and 1970, the percentage of living children born in hospitals increased from 55.8 per cent to 99.4 per cent. The national trend toward childbearing at earlier ages, advances in contraception, and improvements in maternal nutrition may have reduced maternal deaths as well.

Although our study provides a comparison group, there are several sources of potential bias. First, our determination of committee existence assumed committee continuity since initiation, whereas only 38 committees existed without interruption.[4] Second, we have not controlled for numerous variables such as differences in environment, patient characteristics, or medical care that may have affected maternal mortality ratios. Third, sampling of maternal mortality ratios for groups of states with widely disparate ratios may have biased our findings. For example, identical absolute declines in maternal mortality ratios would yield a lower per cent decline for the group with the higher initial ratio. This potential bias is unlikely to have influenced our findings, however, since during the first decade, maternal mortality ratios were higher for states with committees than those without, whereas the opposite was true for the latter two decades. Fourth, differences between states in classification of maternal deaths or changes in classification of maternal deaths between 1938 and 1970 could not have biased our ratios, since we used data classified by the National Center for Health Statistics rather than by individual state health departments. Birth and death data from all states were subjected to uniform definitions and classifications during all years under consideration.

Other methodologic limitations necessitate cautious interpretation of our findings. These committees may have accelerated declines in maternal mortality ratios, but other factors such as antibiotics may have had a relatively greater impact, thus obscuring the committees' influence. Another possible explanation for the lack of association between the existence of committees and larger declines in maternal mortality ratios is diffusion of committees' benefits into states without committees, thus invalidating comparisons. Alternatively, maternal death reviews at hospital, city, or county levels may have contributed to declines in mortality for states without statewide committees. Philadelphia[4] and New York City[3] both had pioneering committees, but limited historical information about committees in other metropolitan areas precludes statistical comparisons.

In conclusion, many reports lacking comparison groups have cited declining maternal mortality ratios as evidence of the benefits of state maternal mortality study committees. When we compared declines in maternal mortality ratios for states with and those without committees, however, we were unable to demonstrate a selective advantage to states with committees, except perhaps prior to 1950. Although our study provides a comparison group, more sophisticated analyses are required to assess the relative importance of factors responsible for declining maternal mortality in the United States.

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APPENDIX
CURRENT NATIONAL STATUS OF STATE MATERNAL MORTALITY STUDY COMMITTEES IN THE UNITED STATES

Despite renewed interest in state maternal mortality study committees as paradigms of peer review,[3] the most recent information on their status was obtained in 1968.[4] To update their status, we surveyed State Directors of Maternal and Child Health, Executive Secretaries of State Medical Societies, and Chairpersons of State Maternal Mortality Study Committees throughout the United States in October 1975. Between 1968 and 1975, the net number of states with active committees declined from 45 to 38, a decrease of 16 per cent. Committees in nine states ceased functioning, while those in two states began operating. Most committees function under the aegis of a state medical society and deal exclusively with maternal health. The mean number of committee members, meetings per year, and cases investigated per year are 15, three, and 13 respectively. Committees typically investigate deaths by requesting records or by visiting hospitals and physicians. Most committees determine preventability by consensus, then publish their findings. Medicolegal concerns appear to have impeded case investigations or to have limited dissemination of findings in several states. Further details concerning state maternal mortality study committees in the United States as of October 1975 are available on request to the authors.

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