Completeness and Accuracy of Reporting Induced Abortions Performed in Hawaii's Hospitals, 1970–74

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AN ESTIMATED ONE-FOURTH of all pregnancies result in induced abortion, and it is likely that a higher frequency would occur if unmet needs for such service were satisfied. Legal abortion is now considered the most frequently used surgical procedure in the United States (*1*). Thus, the procedure is playing an increasingly important role in public health, necessitating collection of accurate statistics. Activities of the Center for Disease Control (CDC) regarding the need for abortion statistics for the nation have been described by Smith and Cates (*2*).

The question of complete ascertainment of data for induced abortions in the United States has been addressed by the Alan Guttmacher Institute (AGI). In a comparison of data from a nationwide survey of health institutions and private physicians by AGI (*1*) with abortion surveillance data from the official records compiled by CDC (*3–5*), CDC has 82.7 percent of the numbers of induced abortion estimated by the AGI for 1973, 85.0 percent for 1974, and 82.7 percent for 1975.

Although we have better statistical data on legal abortion than on other surgical procedures, underreporting of legal abortions is considerable. The exact extent of underreporting cannot be estimated unless one follows up individual cases from the time of the event until it appears in official records. Furthermore, the question of accuracy and consistency of officially reported data on abortions has never been explored.

The study reported here examined the completeness and accuracy in reporting induced abortion through individual followup of documented abortions performed in hospitals in Hawaii for 1970–74. This procedure was part of a larger study that used record linkage to evaluate the long-term effects of induced abortion on subsequent pregnancy. Thus, this study also provides an opportunity to assess the value of record linkage in investigating the extent of reliability of the vital event as reported to an official agency.

Methodology

When abortions were legalized by the Hawaii State Legislature on March 11, 1970, all induced abortions were made reportable on the standard form—the fetal

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death certificate—to the Hawaii State Department of Health. No separate forms were used for spontaneous abortion, induced abortion, and late fetal death, although the "short form" was used to report spontaneous and induced abortions with gestation of less than 16 weeks. The staff of the health department coded induced abortions into six categories according to the International Classification of Diseases, Adapted (ICDA): elective, 773.0; self-induced, 773.1; criminal, 773.2; therapeutic, 773.3; all others, 773.4; and destruction of live fetus to facilitate birth, 773.9. This data set along with live birth reports on magnetic tape were obtained from the Hawaii Health Department. They are referred to as vital records in the subsequent discussion.

The Hawaii Pregnancy, Birth Control, and Abortion Study was initiated to evaluate effects of the new State law on the use of induced abortion and to investigate personal decision-making processes. Major findings of the study have been published elsewhere (*6–11*). The study included all cases of induced abortion from March 1970 through June 1974 that were performed in all hospitals in Hawaii except for a few small remote ones. Medical and demographic information was obtained from hospital records on each case by specific personnel assigned by the project. The cohort consists of women who had 18,786 hospital-recorded abortions, including therapeutic abortions. This data set is referred to as the abortion file. It should be noted that among the provisions of the original State law were that abortion must be performed in an accredited hospital and that the woman treated must be a resident of the State for a minimum of 90 days before the date of the abortion. The State Attorney General, however, declared these restrictions invalid in October 1974, following the U.S. Supreme Court decision in 1973. From March 1970 through June 1974, the State health department recorded 18,090 induced abortions, including elective, self-induced, and therapeutic.

To follow up abortion events in subsequent reports, the abortion file data were linked by computer with official records of fetal death and live birth. Live birth records were included in the study because of the possibility that some outcomes may have been reported as live birth. The linkage was based on the woman's first name, maiden name, date of the event, age, and race. Unfortunately, it was impossible to link 255 abortions to vital records because of missing names.

Results and Discussion

The results of linkage of identifiable abortion data with the vital records of fetal death and live births for the 5-year period are shown in table 1. Overall, 96.1 percent of the abortions were matched with official certificates. The proportion of matches was 95.1 percent for the first

year, followed by slight improvement over the next 3 years. The best year was 1972, when agreement was 97.8 percent between the two sets of records. The rate, however, had decreased to 90.1 percent in 1974. It should be noted that five induced abortions were reported as live births at the time of the procedure. All were reported as infant deaths occurring on the same dates.

A breakdown of the matched records, according to types of abortion, as described in the abortion file and the vital records is shown in table 2. An abortion procedure was considered therapeutic in the abortion cohort data when it was performed for a medical reason, as indicated by the attending physician. Among 17,800 induced abortions in the abortion file that were matched in the vital data, 250 were considered therapeutic, representing 1.40 percent of the total. Among 17,550 abortions classified as elective, 17,326 or 98.7 percent were reported as elective on the official certificates. The remainder were 19 therapeutic abortions and 205 in the "other" category. A majority of the other category listed "unknown" as the reason for abortion (81.0 percent), and the remainder were classified as spontaneous abortion or abortion due to other causes. Most of the therapeutic abortions in the data were reported as elective in the vital records (63.6 percent), and only 29.2 percent were classified as therapeutic in the official statistics, which indicated some ambiguity in interpretation of therapeutic abortion.

Table 3 shows reported fetal deaths that failed to match abortion file data by cause of death. A majority of these cases were spontaneous abortions, which are included in the "other" category. Thus, among these cases the maximum estimate of the proportion of fetal deaths not associated with induced abortion is 6,664 of 7,177 = 0.929 or 92.9 percent. One self-induced abortion was reported during the period. The largest number of abortions were reported as elective or therapeutic in 1970 and 1971. This finding suggested that ascertainment of induced abortions in the original abortion study may have been less complete in earlier years. A total of 512 induced abortions for the entire period includes all cases in which the failure of match can be attributed to the absence of names in the abortion data, changes and errors in the matching information between the two files, and above all, induced abortions that might have taken place in a few small remote hospitals that were not covered in the original survey. It is estimated that 3–4 percent of all live births in Hawaii were in remote hospitals during 1971–76. The exact number of induced abortions performed in these hospitals during the study period is unknown.

An attempt was made to link the 255 cases without names in the abortion file with fetal death records on the basis of hospital, date, mother's age, and race. Complete or nearly complete agreements in these

Table 1. Matches of all identified induced abortions with records of fetal death and live birth, by year

Year	Total in abortion file	Match with fetal death	Match with live birth	Not matched	Proportion of matches
1970	2,870	2,728	2	140	0.951
1971	4,191	4,083	1	107	0.974
1972	4,591	4,488	0	103	0.978
1973	4,632	4,471	2	159	0.966
1974	2,247	2,025	0	222	0.901
Total	18,531	17,795	5	731	0.961

Table 2. Elective and therapeutic abortions by source of data, 1970–74

Year and classification in abortion file	Total	Classification in vital records		
		Elective	Therapeutic	Other
1970:				
Elective	2,676	2,601	4	71
Therapeutic	54	27	22	5
1971:				
Elective	4,029	3,956	3	70
Therapeutic	55	31	16	8
1972:				
Elective	4,430	4,396	6	28
Therapeutic	58	35	18	5
1973:				
Elective	4,420	4,389	5	26
Therapeutic	53	42	11	0
1974:				
Elective	1,995	1,984	1	10
Therapeutic	30	24	6	0
Elective	17,550	17,326	19	205
Therapeutic	250	159	73	18

Table 3. Reported causes of fetal deaths which failed to match with abortion records, by type of abortion, 1970–74

Year	Total	Elective	Self-induced	Therapeutic	Other
1970	1,360	136	0	22	1,202
1971	1,651	122	1	4	1,524
1972	1,671	86	0	2	1,583
1973	1,638	78	0	4	1,556
1974	857	58	0	0	799
Total	7,177	480	1	32	6,664

items of information were found in 181 cases or 71.0 percent (table 4); the rate of matches is expected to be higher if the stringency of the matching criteria was relaxed. The following is a summary of abortion data matches from the two sources:

Abortion data	*Number*	*Total*
Complete matches with vital records	17,800	18,045
Probable matches with vital records	245	
No matches with vital records	731	741
Probable no matches with vital records	10	
Total in abortion file		18,786
Reported in vital records but no matches in abortion data		512

If we apportion the 255 abortion cases with no names into the matched and unmatched categories according to the proportions found with names, we have 245 additional possible matches against 10 unmatched. This brings the total number of abortions "reported" to the State health department as fetal death or live birth to 18,045 against 741 abortions not reported out of a total of 18,786. The number of unreported cases must be considered a maximum estimate since changes and errors in names and other identifying information would have contributed to the failure of matches and corresponding inflation of this number. Thus, the rate of underreporting based on this number is 741 of 18,786 = 0.0394 or 3.9 percent. On the other hand, if we consider all of the unmatched reported fetal deaths with elective or therapeutic abortion ($n = 512$, table 3) as part of the abortion cohort and the failure of match was due to changes and errors in the identifying information, only 229 of the 741 cases remain unreported. On this assumption, the estimate of underreporting is 229 of 18,786 = 0.0122 or 1.22 percent, which must be considered a minimal estimate. However, the true rate of underreporting must lie between the two extreme values, 3.94 percent and 1.22 percent. In the absence of additional information, one might take the midpoint of these values, 2.58 percent, as the reasonable estimate of the true rate of underreporting of induced abortions performed in hospitals in Hawaii during the study period.

Table 4. Probable matches of abortion records without names with fetal death data, 1970–74

Year	*Previously unmatched*	*Probable matches*	*No matches*	*Proportion, probable matches*
1970	88	50	38	0.568
1971	82	65	17	0.793
1972	39	33	6	0.846
1973	21	19	2	0.905
1974	25	14	11	0.560
Total	255	181	74	0.710

For 1973, the last year in which all abortions were to be performed in hospitals in Hawaii, AGI reported 4,730 legal abortions in the State (*12*). For the same year, the Hawaii Department of Health listed 4,534 elective abortions in the annual report (*13*). Taken at face value, this number represents 4.1 percent underreporting to the department of health, which is close to our maximum estimate of 3.9 percent. It should be noted, however, that the AGI data are approximations. Furthermore, the AGI survey covered both nonhospital and hospital sources of abortion. According to AGI, 200 abortions were performed in physicians' offices in 1973. It must also be pointed out that elective abortions reported by the department of health excluded other types of induced abortion. Thus, the results of the present study and the AGI data indicate that the State of Hawaii has, in general, an excellent record of reporting induced abortions performed in hospitals, which may be partly attributed to the State's geographic isolation and its mandatory reporting of induced abortion. No comparative data are available from other States at present.

The completeness of reporting legal abortions to the health department seemed to have deteriorated considerably since 1974 when abortion procedures were first legally allowed outside hospitals. The numbers of elective abortions reported by the health department were 4,158 for 1974 and 4,545 for 1975, in contrast to 5,310 and 5,930 reported by the AGI (*1*), yielding the "underreporting" rates of 21.7 percent and 23.3 percent, despite the legal provision that all induced abortions be reported regardless of place of occurrence. This underreporting points to the serious difficulty the State health department faces in collecting accurate data on induced abortions performed in nonhospital institutions. We do not know what portions of the induced abortions were performed in nonhospital institutions in those 2 years. But if we make an assumption of underreporting rates of 2.58 percent of hospital abortions and 100 percent of nonhospital abortions, from the preceding data we can estimate the frequency of nonhospital abortions as 19.6 percent for 1974 and 21.3 percent for 1975. However, these should be considered as maximum estimates, inflated to the extent that the underreporting rate of nonhospital cases is overestimated.

We have no concrete information on comparative demographic characteristics of women who have abortions in hospitals versus those who receive abortions in nonhospital institutions. However, a quick analysis of State health department annual reports indicated that fewer elective abortions, 7 weeks' gestation or less, were performed during 1974–77 (18.5 percent) than in 1970–

73 (21.3 percent). The results of this analysis suggest that disproportionately larger numbers of unreported early abortions occurred in nonhospital institutions after the place of abortion procedure was liberalized in 1974.

The variables used in linking the two sets of data in this study were first name, maiden name, date of the event, age, and race of the woman. In general, these variables served adequately in conducting linkage, except for occasional questions on race when linking persons with mixed ancestry. This situation was expected because of the longstanding racial admixture of people in Hawaii, especially persons with Hawaiian ancestry. A woman with mixed Hawaiian background might call herself a part-Hawaiian and on another occasion she might list all or some of her ancestral background. For all these cases, we considered the match to be complete if the Hawaiian component was mentioned in both files with agreement in the other items of information. Date of the event and age were powerful discriminating variables. Birth date would have been more useful, however, if it had been required on fetal death certificates. Thus, when all the variables were considered, there was little ambiguity in linkage. Wherever ambiguity existed, no match was declared; thus, the linkage process was conservative.

We believe that record linkage is a valuable and economic process for checking data for completeness and accuracy or studying separate vital events on the same persons.

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SYNOPSIS

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This study examined the completeness and accuracy of reporting induced abortions to the official agency by following up documented cases of abortions performed in hospitals in Hawaii for the years 1970–74. The following two sets of records were initially linked by computer on the basis of first name, maiden name, date of the event, age, and ethnic background: (*a*) a total of 18,531 induced abortions ascertained in hospitals with complete linking information and (*b*) official fetal death and live birth records filed at the State health department.

Overall, 96.1 percent of the hospital abortions were matched in the official certificates. Of 17,550 abortions classified as elective, 98.7 percent were so recorded in the certificate file, whereas the remainder were reported as mostly either therapeutic or unknown for cause of fetal death. When the probability of matches for those abortions without complete linking information and possible errors in the information were considered, the estimates of underreporting to the health department were a maximum of 3.9 percent and a minimum of 1.2 percent; the mean value was 2.6 percent.

The extent of underreporting of induced abortions is becoming serious with the widespread practice of abortion procedures in nonhospital institutions in recent years. The results of the study also demonstrated the utility of the record-linkage process in checking data for completeness and accuracy or studying separate vital events on the same persons.