Recommendations for the Improvement of Fetal Death Statistics

A report by the United States National Committee on Vital and Health Statistics. The committee was formed by the Surgeon General of the Public Health Service at the request of the Department of State in accordance with the recommendations of the First World Health Assembly, 1948. The major objectives of the committee, of which Dr. Lowell J. Reed, Johns Hopkins University, is chairman, are to promote and secure technical developments in the field of vital and health statistics for national and international use.

• •

FETAL MORTALITY is a problem of considerable importance in the United States today. Estimates indicate that fetal deaths now represent a medical and social problem of equal or greater magnitude than that of infant mortality at the turn of the century. In view of this, it seems important that health interests throughout the country turn more attention toward this problem.

More reliable and complete data on fetal mortality are needed to identify the problems in a more precise manner. As a step toward obtaining improvement in fetal death registration, and the reporting, classifying, and tabulating of causes of fetal deaths, the United States National Committee on Vital and Health Statistics is proposing certain recommendations. These recommendations and background information on their development are presented in this report.

Early in 1951 the National Committee on Vital and Health Statistics established a Subcommittee on Causes of Fetal Death. Its major objective was to recommend methods for improving the recording and processing of statistics on fetal deaths so that they would be more suitable for use in studies of medical and social factors related to these fatalities.

A preliminary review and summary (1) sponsored by the national committee indicated the magnitude of the problem and its many ramifications. Most important is the extraordinarily large number of deaths for which the cause is either unknown or is reported in ill-defined terms.

One of the greatest deterrents to adequate progress in the field, it was thought, was the lack of clear-cut and acceptable definitions of terms such as stillbirth, abortion, evidence of life, prematurity, and viability. The adoption by the Third World Health Assembly in 1950 of definitions of live birth and fetal death and a number of accompanying recommendations was an important constructive step in the field (2), making it unnecessary to use "stillbirth," "abortion," and "viability" for vital statistics purposes. However, many important problems remain, particularly with regard to the application of definitions.

Basic problems in the recording and classifying of causes of fetal death stem from the difficulty of relating clinical observations during the life process to pathological findings and are further complicated in that two individuals must be considered, the fetus and the mother. As a result, recorded causes often go no further than describing terminal condition and provide little data on underlying causes.

This lack of knowledge of underlying causes, especially in the group of antepartum deaths,

is probably responsible for the prevailing feeling of apathy on the part of the clinician in his approach to the problem. There is a discouraging lack of useful information on most clinic records of maternity patients. The same feeling of apathy is evident in the field of vital statistics and is reflected in the fact that few, if any, tabulations on causes of fetal deaths are prepared in the local, State, and national offices of vital statistics.

It was recognized, from the beginning, that there are two major tasks requiring attention. One relates to specific problems: definitions, medical certification, classification, and the like. The other, a broader function, is that of acting as a coordinating force for groups concerned with the problem of fetal loss.

It was also recognized that, to do effective work in either of these areas, the subcommittee's activities must be linked to and must benefit from the experience and knowledge of the physicians practicing obstetrics, pediatrics, and of related professional groups. The subcommitfee operated on the basic principle that sources of information outside the group were to be utilized to a maximum in arriving at recommendations. This led to conducting a major survey of medical opinion, testing of a form in two hospitals, review of case histories of fetal deaths, and examination of tabulations of data for evidence of relationships under question, and other activities. As a result, the recommendations represent the results of careful study and reflect a broadly based point of view.

In addition, steps were taken in the direction of the broader mission originally projected. Liaison was established with the Committee on Fetus and Newborn, of the American Academy of Pediatrics, and with the Public Health Conference on Records and Statistics. The Academy of Obstetrics and Gynecology was advised of the subcommittee's program; the attention of chiefs of obstetrical service in many of the teaching hospitals and medical schools was sharply focused on questions affecting the development of statistics; and early recommendations of the subcommittee were widely publicized by the National Office of Vital Statistics, Public Health Service. There is evidence that these actions have contributed to the current increase in interest in fetal mortality. But it is clear that a need still exists for a continuing committee. Such a group, composed of representatives from the disciplines concerned, would provide a forum for the exchange of ideas on scientific, administrative, and reporting issues, and for the promotion of activities designed to reduce reproductive wastage. The investigation of the medical, biological, and environmental factors that affect this loss could thereby achieve the high position of priority it deserves.

It is thought, however, that a committee with a much broader base of sponsorship than that of the Subcommittee on Causes of Fetal Death would be required to perform these functions effectively. The appointment of a continuing committee of this type with representatives from the fields of obstetrics, pediatrics, public health, and vital statistics would be an essential step in achieving real progress in the field.

Other recommendations presented in the sections to follow are limited to specific well-defined actions which relate primarily to the improvements in data on the fetal death certificate. Many of these recommendations have already been used extensively by the national and State offices of vital statistics in revising their official certificates of fetal death. The results of 113 responses to a questionnaire sent to obstetricians in 173 hospitals in May 1952 (3) aided materially in arriving at some of these recommendations. The specific recommendations relate to:

• Medical certification of causes of fetal death on the standard form.

• Checklists for all conditions of pregnancy and labor and for methods of delivery.

• Time of death (antepartum, intrapartum) to be reported on the fetal death certificate.

• Tabulations on fetal deaths by national and State vital statistics offices.

• Suggested appointment of ad hoc committees to solve specific problems.

Medical Certification

The medical certification section on causes of fetal death on the fetal death certificate should be revised to a sequential arrangement paral-

Figure 1. The recommended sequential arrangement of the medical certification section has been adopted in the 1955 revision of the standard certificate of fetal death (Form PHS_797). Here, parts I and II of item 22—the medical certification section—replace items 20a, "fetal causes," and 20b, "maternal causes," on the 1949 standard certificate.

	OF							STA	TE FILE N	10.															
PLACE OF DELIVERY a. COUNTY b. CITY (If outside corporate limita, write RURAL and give township) OR TOWN . C. FULL NAME OF (If not in hospital or institution, give street address or location) HOSPITAL OR INSTITUTION						2. USUAL RESIDENCE OF MOTHER (Where does mother live?) a. STATE b. COUNTY C. CITY (If outside corporate limits, write RURAL and give township) OR TOWN d. STREET ADDRESS (If rural, give location)																			
													3. NAME OF FETUS (if given)						4. SEX OF FETUS MALE FEMALE UNDETERMINED						
													5a. THIS SINGLE		TRIPLET		b. IF TWIN C	R TRIPLET. WAS T	HIS FET 3RD		RED	6. DATE OF DELIVER	(Month)	(Day)	(Year)
	7. NAME a. (First) b. (Middle)					c. (Last)				8. COLOR O	8. COLOR OR RACE														
FATHER	9. AGE (At time of delivery) 10. BIRTHPLACE (State or foreign country) 					11a. USUAL OCCUPATION				11b. KIND OF BUSINESS OR INDU															
MOTHER	12. MAIDEN NAME	12. MAIDEN . a. (First) b. (c. (Last)			13. COLOR OP RACE																
		time of elivery) YEARS	15. BIRTI	IPLACE (Stat	e or foreign country)		a. How r	nany	b. How ma	O MOTHER () ny children	c. How me	INV PREVI													
17. INFORMANT							children are were born alive but fetal deaths now living? are now dead? after conception					d at ANY ti													
18a. LENG	COMPLETED WEEKS			OF FETUS	19. LEGITIMATE YES NO	20. W		ETUS D DURIN OR DEI		UNKNOWN															
	2. I. DIRECT AND ANTECEDENT CAUSES (Enter only one cause per li DIRECT CAUSE State fetal or maternal condition directly causing fetal death (do not use such terms as stillbirth or prematurity). OF ANTECEDENT CAUSES State fetal and/or maternal conditions, if any, State fetal and/or maternal conditions, if any,							er line)																	
22. CAUSE OF FETAL	DIRECT Stat fetal pret ANTECEL Stat	e fetal or ma death (do n naturity). ENT CAUSES e fetal and/	iot use si	rnal conditon	Due s, if any, } (b)_	·																			
CAUSE OF	DIRECT Stat fetal pret ANTECEL Stat GIVI THE	e fetal or ma death (do n maturity). DENT CAUSES e fetal and/ NG RISE TO UNDERLYING SIGNIFICAN	or mater THE AB	rnal conditon SOVE CAUSE LAST. TIONS of fett	s, if any, (a) stating Due (c)	to																			
CAUSE OF FETAL DEATH	DIRECT Stat fetal pret ANTECEL Stat GIVI THE II. OTHER hare CON related to by certify	e fetal or ma death (do n nadurity). EENT CAUSES e fetal, and/ NG RISE TO UNDERLYING SIGNIFICAN TRIBUTED to direct cause	or mater THE AE GCAUSE IT CONDI fetal death of fetal death	nal conditon SOVE CAUSE LAST. TIONS of fett b, but, in so fa	bue s, if any, (a) stating bue (c)_ ts or mother which m r as is known, were	to to not	. O., midwile	, or other)	23b. DAT	E SIGNED														
CAUSE OF FETAL DEATH	DIRECT Stat Jetal pret ANTECEL Stat GIVI THE II. OTHER hare 105 related to sby certify is delivery d on the ated above fetus was	e fetal or ma death (do n nadurity). EENT CAUSES e fetal, and/ NG RISE TO UNDERLYING SIGNIFICAN TRIBUTED to direct cause	of use st or matein THE AH G CAUSE IT CONDI Setal death of fetal death NDANT'S	nal conditon SOVE CAUSE LAST. TIONS of jett a, but, in so fa ath. SIGNATURE	(a) stating (b) stating (c) stating (c) stating (c) sor mother which m r as is known, were to (Specify i	to to not	•			23b. DAT		TITLE													
CAUSE OF FETAL DEATH <i>I here</i> that th occurre date st. and the born de	DIRECT Stat Jetal pret ANTECEL Stat GIVI THE II. OTHER hare 105 related to sby certify is delivery d on the ated above fetus was	e [etal or mad death (do n nafurity). EENT CAUSES e fetal and) UNDERLYIN: SIGNIFICAN: TRIBUTED (d) direct cause 23a. ATTEN 23c. ATTEN 25b. DAT	iot use st (or mater) THE AE IT CONDI) fetal death of fetal death NDANT'S NDANT'S	rnal conditon DOVE CAUSE LAST. TIONS of fett 1, but, in so fa ath. SIGNATURE ADDRESS	(a) stating (b) stating (c) stating (c) stating (c) sor mother which m r as is known, were to (Specify i	to ay not I M. D., D If not ended by hysician	24. SIGNA	TURE O	FAUTHORI		L	TITLE (Stat													

leling the section on the death certificate. The new form should clearly indicate that conditions in both the fetus and the mother should be considered by the physician when entering c a u s e information. Explanatory material should accompany the certificate when introducing the sequential arrangement.

The change to the recommended sequential arrangement was followed in preparing the revised standard certificate of fetal death, placed in effect January 1, 1955. Figure 1 gives the wording of the section (item 22, "Cause of Fetal Death") adopted by the National Office of Vital Statistics and approved by the Public Health Conference on Records and Statistics.

At the time this recommendation was under consideration, the 1949 standard certificate of fetal death was in effect. There was considerable dissatisfaction with the format of the medical certification section, which was in the form of a two-part question, one part requesting information on fetal causes, the other, on maternal causes. When entries appeared in both parts, it was uncertain which condition the physician himself considered to be the underlying cause or how the causes were interrelated.

Another problem in attempting to utilize the fetal death record for studying causal factors was the high proportion of ill-defined causes given on the record, or no causes at all.

The change to a sequential arrangement of the certification section is viewed as an important step in overcoming the problems mentioned. One advantage of the recommended arrangement is its consistency with the certification section on the death certificate. As in the case of general mortality, the form provides a basis for determining the physician's judgment as to the underlying cause. It also increases the possibility of studying causes of fetal death as an integrated pattern, that is, the relationship of maternal to fetal causes.

The sequential arrangement was tested briefly in Johns Hopkins University Hospital and Chicago Lying-In Hospital. The participating physicians were favorably impressed by this arrangement and felt that it was more logical than the two-part form. Furthermore, the nationwide survey of many of the leading obstetricians (3) indicated that a great majority believed the sequential form provided a better basis for interpreting the cause of fetal death information than the present form.

The following guides are proposed for the use of the sequential arrangement:

1. Method of filling out medical certification section—Causes of fetal death should be recorded in part I (of item 22 on the standard form) in a sequence of pathologically or etiologically related conditions in the mother and fetus, with the injury or morbid condition which initiated the sequence of events being stated last. In part II (of item 22) should be entered any condition of the fetus or mother which may have contributed to the fetal death but, insofar as is known, was not related directly to the causes given in part I.

2. Certainty of causal relationships — A physician should enter information in part I according to the best evidence that he has available. In some cases this approach may lead to conflicting judgments, depending on the physician's background. However, at the present stage of knowledge concerning causes of fetal death, there are few positive guides that can be

Subcommittee on Causes of Fetal Death

United States National Committee on Vital and Health Statistics

J. Yerushalmy, Ph.D., subcommittee chairman, University of California School of Public Health.

George W. Anderson, M.D., department of obstetrics, Johns Hopkins University Medical School.

Carl L. Erhardt, New York City Department of Health.

Alan F. Guttmacher, M.D., department of obstetrics and gynecology, Mt. Sinai Hospital, New York.

Edith L. Potter, M.D., department of obstetrics and gynecology, University of Chicago.

Robert B. Reed, Dr.P.H., Harvard University School of Public Health.

Edward R. Schlesinger, M.D., New York State Department of Health.

Iwao M. Moriyama, Ph.D., subcommittee ex officio member, National Office of Vital Statistics, Public Health Service.

Sam Shapiro, subcommittee secretary, Health Insurance Plan for Greater New York, and formerly with the National Office of Vital Statistics.

given to the physician. In view of this situation, the physician should be given full freedom in making entries rather than restricting him by a series of "don't's" on which there may not be agreement. Obviously incorrect (or impossible) statements of cause sequences that might result could be handled in the coding operation as is now being done in the case of general mortality statistics.

3. Use of certain terms—The terms "asphyxia" and "anoxia" should be acceptable as entries on the fetal death certificate. There is a possibility that their indiscriminate use may result. However, in many instances, antecedent causes standing by themselves would be considered incomplete by the physician since they would not be viewed as the cause of death. For example, it could be argued that placenta praevia would not cause the fetal death, but rather it was in the chain of events which cut off the supply of oxygen to the fetus. Recording asphyxia as the direct cause would seem more logical to the physician than banning the use of the term. Also, asphyxia and anoxia may at times be highly informative even when they are the only causes given.

4. Entry of "unknown" as cause of fetal death—There are instances when the clinician does not know the causal factors, and "unknown" is the only honest entry that he can make. Despite the dangers inherent in making "unknown" an acceptable term, physicians should be advised that their judgment on the matter will be accepted. An official action of this type would greatly aid in gaining acceptance of the fetal death certificate.

Official agencies are urged to take the following promotional measures to improve the reporting of cause of fetal death data:

1. Development of interest at the local level, particularly among individual physicians, in fetal death statistics—The aid of State and local medical societies and maternal welfare committees should be solicited. There is a growing realization of the importance of fetal death statistics, and the climate is more suitable today for promotional activities than at any other time in the past.

2. Distribution of explanatory materials along with the new certificate—The cover used for binding books of certificates should contain instructions which will remind the physician how to fill out the sequential form.

3. Production and distribution of a film on the need for fetal death statistics on problems in reporting cause information and on methods for filling out the medical certification section— This will require a major effort and should be viewed as part of the long-range approach to dealing with the problem.

New Supplemental Checklists

The present form of reporting "complications of pregnancy and labor" and "operations for delivery" should be replaced by checklists of "conditions present during pregnancy and labor" and "methods of delivery." Effort should be directed at obtaining reports of all conditions, both major and minor. The same checklists, except for inapplicable terms, should be placed on both the live birth and fetal death certificates in those areas that plan to use this type of item. The checklists shown in figure 2 are suggested as guides for changing the form of the items. Provision should be made for evaluating the completeness and accuracy of information obtained on the checklists and the need for changes in the terms covered.

The change is recommended as a basis for improving the accuracy and completeness of reports on these items. For more than 10 years, medical items on complications of pregnancy and labor and operative procedures (on the 1949 standard certificate of fetal death, they appear as item 21, "State any complications of pregnancy and labor," and item 22, "State all operations for delivery") have been on the records of many States because of their potential value in dealing with modbid conditions present in the mother and child at birth (4). However, gross under-reporting and lack of uniformity in the data have appreciably reduced their usefulness (5).

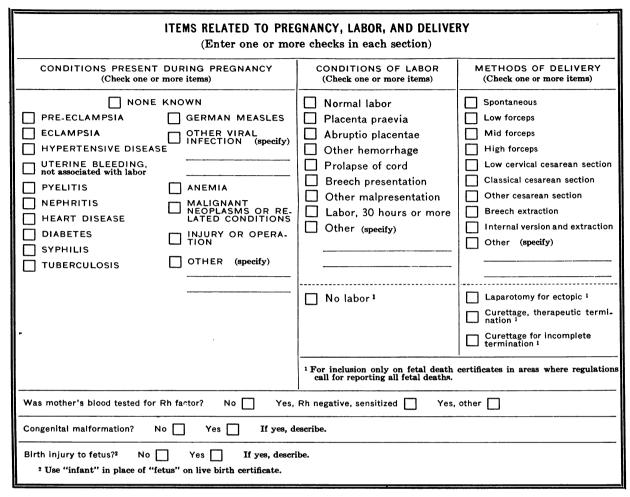
Prior to the subcommittee's study of the problem, the New York State Health Department had designed a checklist form for reporting the information. Despite the hazard of having physicians omit terms that do not appear on the checklist, this approach seemed to offer a convenient and relatively simple method to help overcome present difficulties.

A great majority of the obstetricians surveyed on the matter favored a checklist form (3). This survey also elicited suggestions for changes on the New York form and established that the term "complications" in the form's heading, "Complications of Pregnancy and Labor," was being interpreted variously. Specific comments were weighed carefully in arriving at the terminology and lists given in figure 2. Decisions on important points and the reasoning behind these decisions follow:

The term "conditions" replaced "complications" to convey the idea that reports were to be made without regard to severity or physician's judgment concerning the condition's effect on the outcome of the pregnancy.

Instead of having two columns, one headed "diseases related to pregnancy" and one, "other diseases," as in the New York form, it was decided to use a single column with the heading, "conditions present during pregnancy." This single heading eliminates a point which the

Figure 2. The supplemental checklists recommended for inclusion on live birth and fetal death certificates.



subcommittee and the obstetricians in the survey had found troublesome, that is, which conditions should be grouped together under each of the columns, "diseases related to pregnancy" and "other diseases."

Qualifications for reporting "german measles"—first trimester—and "anemia"—less than 11 grams hemoglobin—were excluded. It was agreed that, for this type of item, the vital record could not be expected to give all the qualifications. More intensive investigations would have to be based on follow-back studies using the record as the starting point. The decision about anemia was based on the result of correspondence with three outstanding hematologists who indicated that the measurement of hemoglobin level must be supplemented by other observations in order to determine whether a pregnant woman is anemic. There is apparently no agreement on the normal range of hemoglobin in pregnancy.

The item "high forceps" appearing on the New York form was retained in the recommended checklist although this method of delivery is not considered good obstetrical procedure. A byproduct of the statistics will be to indicate how much progress has actually been made in eliminating this method of delivery.

Items on analgesia and anesthesia and induction of labor were suggested by a number of obstetricians in the survey (3) but were not included because they would have required too much amplification on the form before useful information could be derived. This decision was consistent with the general policy of keeping the number of terms in the lists to a minimum and giving priority to those terms that could be stated in a simple, clear, and meaningful way. In line with these objectives other items such as anomaly of cord, contracted pelvis, and other dystocia were excluded.

Time of Death

The standard certificate of fetal death, and subsequently State certificates, should include an item to determine whether the fetus died before or during labor. Use should be made of the information particularly when tabulating cause of fetal death data.

Such an item, which now appears as item 20 on the 1955 revised standard certificate (fig. 1), was also a part of the standard certificate until 1949, when the item was dropped because of an apparent lack of interest.

However, there are now definite indications that distinguishing between fetal deaths that occur before labor and during labor or delivery would greatly aid in understanding causal factors. Statistics tabulated by one of the States demonstrated the marked difference between the two groups in the distribution of causes of death. For example, placental and cord conditions were given as causes for a third of the fetal deaths that occurred "before labor" as compared with similar statements for more than half of the "during labor" group. Also, diseases and conditions of pregnancy and childbirth ranked second in groups of causes of fetal death in the antepartum period but were reported for very few of the intrapartum fetal deaths.

More extensive tabulations of this type and those which take into account such characteristics as age of mother, birth order, and period of gestation would be a great aid to medical research and public health programs.

Tabulations on Fetal Deaths

National and State offices of vital statistics should be encouraged to prepare:

1. Comparable tabulations on fetal deaths and live births in order to facilitate computation of

fetal death rates—Attention should be given to comparability in definitions.

A review of published and unpublished data showed that some of the tabulations of fetal deaths did not parallel the detail on live births. This has created problems for the research worker who wishes to compute rates. The tabulation of data on birth order (excluding fetal deaths) for live births and birth order (including fetal deaths) for fetal deaths was cited as a confusing practice. To compute fetal death rates by birth order, data should be available for both live births and fetal deaths on an "including fetal deaths" basis.

2. Experimental tabulations comparing the distribution of cause of death data for early neonatal deaths with cause data for late fetal deaths—For the purpose of this comparison, the term "early neonatal" refers to deaths occurring during the first week after birth, and "late" fetal deaths refer to those of gestations of 28 weeks or more—group III in the international recommendations (2).

For the present, the major purpose of these experimental tabulations is to develop a body of data which will clarify the difficulties in comparing causes being certified for fetal deaths and deaths in early infancy. With time, as the reported data improve and coding problems are resolved, the statistics can be studied for evidence of a continuum of conditions affecting the outcome of the pregnancy.

3. Tabulations of causes of fetal death on a multiple-cause basis—In view of the relatively small volume of records involved, preparing multiple-cause tabulations should not prove to be too heavy a burden. Single-cause tabulations would not be highly productive at this stage when so little is known about the causal relationships.

The function of statistics on causes of fetal death is, broadly, to provide information that will be useful in the prevention of fetal loss. Prevention may take the form of an immediate program which requires data on conditions whose etiology is clearly and uniformly understood, or its beginning may be found in slowly evolving research which utilizes data for causal factors whose preventability or etiology may not be known. Single-cause tabulations would not be highly productive for the latter purpose, which is the more important of the two today. Instead, attention should be focused on multiple-cause tabulations.

No recommendations have been made on the items to be studied in relation to the causes recorded. But it would be desirable to initiate experimental tabulations which relate causes to other medical information and to biological factors such as birth order and age of mother.

Ad Hoc Committees

A number of problems associated with the classification and reporting of causes of fetal deaths and diseases of early infancy emerged in the course of the subcommittee's deliberations. It is recommended that ad hoc committees be appointed to study these problems. Among the problems which were specifically mentioned are:

1. Changes in the Y-code (causes of fetal death code) of the International Classification of Diseases, Injuries, and Causes of Death— Although the Y-code as it now stands appears to be adequate for most purposes, there is a need for reviewing the code principally to see whether any of the causes given in the "ill-defined" category should be treated separately and whether any combinations of causes, as in the case of Y-37, "birth injury," should be provided.

2. Recording of maternal conditions as causes of early neonatal deaths—Where applicable, maternal conditions should be reflected in the medical certification of causes of death for infants who die shortly after birth. However, the physician who fills out the death certificate usually does not have available to him information concerning maternal conditions that may have caused the death. One of the questions needing consideration is how to deal with this issue, which fundamentally requires bridging the gap between the obstetrician and the pediatrician.

There are other practical sides to the issue. For example, a physician who has all of the information concerning the pregnancy may still have to make a choice between a maternal condition whose etiology is not too well known and a condition found in the infant that has a specific meaning for him. Obstetrical and pediatric case histories would undoubtedly clarify the practical problems that would face a physician in applying the principle that appears to be acceptable at this point.

A related question which needs consideration concerns the reconciling of the Y-code (causes of fetal death code) and the "700" rubrics (deaths in early infancy) of the international statistical classification. At the present time the "700" rubrics do not classify maternal conditions that would appear in the medical certification section if the above program were successful.

3. Development of a list of causes of fetal death for physician use-A number of respondents in the survey (3) of obstetricians suggested that physicians be furnished a list of acceptable terms to use in entering causes of fetal death. Proponents argue that such a list could be brief, containing basically just those terms which are needed for classification purposes. The counter position is that the list is really a nomenclature which would be difficult to reduce to a manageable set of terms. It is also contended that if the nomenclature and classification listings were viewed as interchangeable the result would be to confuse the physician and either force him into a narrow pattern of reporting terms or cause a breakdown in the reporting.

REFERENCES

- Yerushalmy, J., and Bierman, J. M.: Major problems in fetal mortality. *In* Vital Statistics— Special Reports, vol. 33, No. 13. Washington, D. C., U. S. National Office of Vital Statistics, 1952.
- (2) U. S. National Office of Vital Statistics: International recommendations on definitions of live birth and fetal death. Public Health Service Publication No. 39. Washington, D. C., U. S. Government Printing Office, 1950.
- (3) Potter, E. L., and Shapiro, S.: Survey of opinions of obstetricians concerning official reporting of fetal mortality. Am. J. Obst. & Gynec. 67: 651– 660, March 1954.
- (4) Connecticut State Department of Health: Report of study of complications shown on birth certificate supplement. Conn. State Med. J. 15: 148–152, February 1951.
- (5) Lilienfeld, A. M., Parkhurst, E., Patton, R., and Schlesinger, E. R.: Accuracy of supplemental medical information on birth certificates. Pub. Health Rep. 66: 191–198, Feb. 16, 1951.