Reporting of Fetal Deaths in New York City

By CARL L. ERHARDT, B.B.A.

FOR MANY YEARS New York City has tacitly required reporting of fetal deaths at all periods of gestation by omission in its sanitary code of any qualifications as to the gestation age to be reached before reporting is required. Prior to 1938, "still births" were required to be reported within 36 hours of the event whereas live births were reportable within 10 days, but no further definition or distinction was indicated.

In 1937 the late Thomas J. Duffield, then director of the bureau of records and statistics of the New York City Department of Health, realizing that many physicians were failing to comply with the intent of the law, recommended that the code be revised to express more specifically the requirements regarding reporting of fetal deaths. He recognized that data which could be obtained only by mass reporting of early fetal deaths were of value in investigations of early pregnancy wastage and that these data would also provide a more nearly complete base for calculation of a puerperal mortality rate. Accordingly, in 1938 the board of health, with the advice of the obstetric advisory council to the commissioner of health and with the approval of the county medical societies and the New York Academy of Medicine, adopted a complete new section, defining fetal death and specifying signs of life as follows:

"The term 'fetal death' . . . shall mean a stillbirth or a fetus delivered at an abortion (spontaneous, therapeutic or induced), that is, a fetus born dead, including a fetus recovered at operation in a case of ectopic gestation, by cesarean section, and a hydatid or hydatidiform mole delivered spontaneously or by operation.

"The term 'born dead' shall apply to any fetus in which there was no sign of life, such as respiration, heart beat or movement of voluntary muscle, after complete separation (head, trunk and limbs) from the body of the mother, notwithstanding whether the cord was or was not cut or the placenta was or was not removed."

This is the first usage, within the writer's knowledge, of the term "fetal death" in legal reporting requirements. The revision antedates by 12 years the WHO recommendations that the term "stillbirth" be discarded in favor of the term "fetal death" in describing termination of pregnancy otherwise than in a live birth and that statutes require reporting of all fetal deaths regardless of gestation age (*1*).

The revision, together with a determined effort by the health department to familiarize physicians and hospitals with the intent of the law, produced immediate results. However, within a few years, it was seen that the physicians were still confused as to the intent of the law. The phraseology did not make obvious the expectation that all instances in which postabortal indications of pregnancy, even pathologically diagnosed, came to the physician's attention would be reported. In 1947, therefore, the sanitary code was revised to define a fetal death thus:

"The term 'fetal death' . . . shall mean any terminated pregnancy resulting otherwise than in a live birth and regardless of the period of

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Table 1. Ratio of reported fetal deaths to 1,000 live births, by period of gestation, New York City, 1937–51

Year	Total	28 weeks and over	20–27 weeks	Under 20 weeks	13–19 weeks	Under 13 weeks	Unknown period
1937	47.5	26.3	9.1	11.7	----	----	0.4
1938	48.9	26.4	9.1	13.3	----	----	.2
1939	66.8	23.9	9.8	32.1	----	----	1.0
1940	74.4	23.6	9.1	40.1	----	----	1.6
1941	78.5	23.3	9.0	45.2	----	----	1 0
1942	75.9	21.8	8.8	44.3	----	----	1.0
1943	70.7	20.9	8.2	40.9	----	----	.7
1944	81.4	21.1	8.9	50.1	----	----	1.3
1945	80.5	20.2	8.9	50.0	----	----	1.3
1946	85.0	19.3	9.6	54.8	----	----	1.3
1947	82.2	17.9	8.9	53.5	12.9	40.6	1.8
1948	88.7	17.1	9.5	59.8	13.3	46.5	2.3
1949	92.1	16.4	8.7	65.2	13.9	51.3	1.7
1950	105.3	14.9	8.6	78.6	15.7	62.9	3.1
1951	110.3	14.8	8.5	82.0	14.5	67.5	4.5

gestation, and shall include a stillbirth, a fetus and fetal tissues, recovered at a curettage, delivered at an abortion or miscarriage (spontaneous, therapeutic or induced), at operation in a case of ectopic gestation, or by cesarean section, and a hydatidiform mole delivered spontaneously or by operation. The term 'fetus' . . . shall mean and include any of the above."

Direct reference to reports based upon laboratory examination was included for the first time: ". . . when such report is based upon pathological examination of tissues recovered at an operation such report shall be filed within fifteen (15) days of the operation," rather than within 24 hours as otherwise required.

Effect of Legal Changes on Reporting

The data in table 1 and figure 1 provide ready evidence of the immediate effect of the revisions of the sanitary code. The fetal death ratio to 1,000 live births rose from 48.9 in 1938 to 66.8 in 1939, a 37-percent increase in 1 year. The 1951 ratio of 110.3 to 1,000 live births is more than double that of 1939. The number of reported fetal deaths rose from 4,995 in 1938 to 6,831 in 1939 and has continued a rising trend since that year, reaching nearly 18,000 in 1951. But of more interest than the changes in the total volume are the changes, or lack of them, in groups of fetal deaths divided according to number of weeks of gestation.

The ratio of fetal deaths of 28 weeks' gestation and over to total live births has exhibited a consistent downward trend, reversed in only 1 year, 1944. By 1951 the ratio had declined by 44 percent from that of 1937, from 26.3 per 1,000 live births to 14.8.

No definite trend in the ratio of fetal deaths of 20 to 27 weeks' gestation to total live births is evident. Although the comparatively stationary ratio can be interpreted as lack of any change, it is also possible that a greater proportion of fetuses are carried forward toward term and that this number is compensated by an equal proportion carried beyond the nineteenth week into this interval.

Fetal deaths occurring before the twentieth week of gestation have increased from 48.7 percent of the total reported in 1939 to nearly 75 percent in 1951. It is from this group that the increase in both the number of reported fetal deaths and the ratio thereof to live births has resulted. It would, however, be a fallacy to conjecture any increase in early fetal deaths from these data; the rise is probably due entirely to increased reporting of the early deaths.

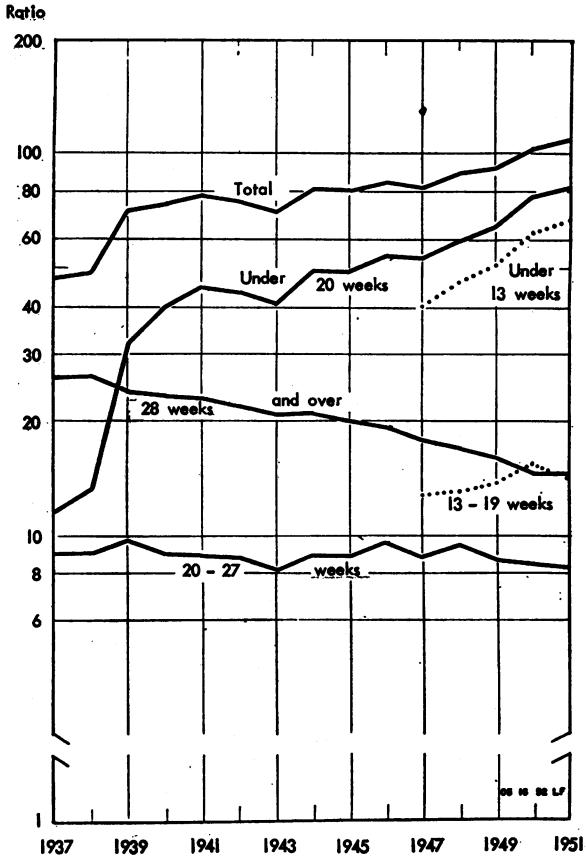
Unfortunately, data for finer subdivisions of this period of gestation are available only since 1947. Even in this brief period, however, considerable increase can be shown for fetal

deaths of 13 to 19 weeks' gestation and for those of less than 13 weeks. The ratio to live births for the latter group increased by 66 percent and for the former by 13 percent.

General Pattern of Fetal Loss

Data showing fetal deaths by 4-week intervals of gestation period were assembled for 1939, 1944, and 1950 to demonstrate by narrower

Figure 1. Ratio of reported fetal deaths to 1,000 live births, by period of gestation, New York City, 1937–51.



subdivisions of fetal life the improvement in reporting (table 2). Little success can be seen in obtaining reports of abortions during the first month. Because of the failure of the woman to seek medical attention or at times even to suspect that she is pregnant and the inability of the physician to diagnose pregnancy readily by the end of the first month, it is impossible to expect any approach to completeness of reporting for this period. Similar circumstances probably preclude complete reporting at even later periods.

Reported fetal deaths for the 4-week intervals subsequent to the first interval, however, have in turn trebled, quintupled, quadrupled, and doubled since 1939. Reported deaths at 20 to 23 weeks' gestation increased 55 percent between 1939 and 1950. For later intervals, smaller increments are noted; and for the period 40 weeks and over, the number of fetal deaths declined. Two opposing forces are in operation: the one—a higher conception rate in recent years and improved reporting of earlier cases—tends to increase the numbers while the other—a decline in pregnancy losses by intrauterine death (which can be demonstrated for late fetal deaths although not for early ones)—tends to decrease the numbers. The relative importance of the several groups to the total numbers of reported fetal deaths is shown in table 2 by percentage distributions.

The pattern of fetal deaths by period of gestation as a function of the number of females of child-bearing age was investigated although it was recognized that division of the numbers by a different constant would change the picture little. The rate per 100,000 females aged 15 to 44 years was calculated for each gestation

Table 2. Fetal deaths reported in New York City, by period of gestation, 1939, 1944, and 1950

Period of gestation (in weeks)	Number			Percent distribution [1]		
	1939	1944	1950	1939	1944	1950
Total	6,831	9,987	16,405	100.0	99.9	100.0
0–3	54	100	85	0.8	1.0	0.6
4–7	700	1,190	2,179	10.4	12.1	13.7
8–11	1,110	2,590	5,620	16.5	26.3	35.3
12–15	725	1,350	2,937	10.8	13.7	18.5
16–19	690	915	1,434	10.2	9.3	9.0
20–23	565	675	894	8.4	6.9	5.6
24–27	440	423	443	6.5	4.3	2.8
28–31	383	388	417	5.7	3.9	2.6
32–35	313	367	404	4.7	3.7	2.5
36–39	447	549	468	6.6	5.6	2.9
40 and over	1,303	1,285	1,039	19.4	13.1	6.5
Unknown	101	155	485	-----	-----	-----

[1] Excludes those of unknown period of gestation.

interval for the years 1939 and 1950. The results are given in table 3 and figure 2.

Possible Extent of Fetal Loss

The fairly smooth curve produced by the fetal death rates per 100,000 females beginning with that for 8 to 11 weeks' gestation implies that, were full reports available for deaths at less than 8 weeks' gestation, a J-shaped curve might result for the entire range. Projection of a curve fitted to the data beyond the seventh week provides an estimated fetal loss of 528 per 100,000 females in the selected age group for the 4-to-7-week interval and 909 per 100,000 for the 0-to-3-week interval. (Compare these with the corresponding rates of 112 and 4.4 derived from reported fetal deaths.)

If this conjecture be accepted as appropriate, a total fetal loss rate of more than 2,100 per 100,000 females 15 to 44 years is obtained. With a live birth rate of 7,900, a total pregnancy rate of 10,000 is derived. It may be estimated, then, that 10 percent of the female population aged 15 to 44 years conceives in the course of a year, not considering repeated conceptions, which are of course possible. A closely similar estimate of the pregnancy or conception rate is deduced if the published estimate of deficiency (*2*), approximately 50 percent, is applied to the known fetal loss rate. If these estimates could be demonstrated to be true, it would mean that about 20 percent of pregnancies result in loss of the fetus and 80 percent in live births at the present time.

Disposal of Fetuses

A problem which occasionally arose prior to 1947 had to do with the disposal of fetuses. It must be remembered that a large proportion of the reports submitted to the New York City Department of Health are based only upon pathological examination of tissue recovered at curettage or other operative intervention—about 50 percent currently refer to fetal death before the twelfth week. However, when macroscopically identifiable fetuses are recovered, two factors should be considered: the wishes of the parents and the usual practices involving the disposal of dead bodies. Provisions had to be made, therefore, for direction from a parent as to the manner of disposal and for a permit from the health department when a certain specified period of gestation had elapsed before termination of the pregnancy. The "critical fetal age" was set at 16 weeks of gestation after long consideration and consultation with religious authorities. A pertinent paragraph was added to the sanitary code at the time of the 1947 revision:

"A fetus as defined in this section may be kept for anatomical purposes and/or disposed of by the person in professional attendance, with the consent of a parent, without a permit from the department of health provided a report of the fetal death has been made as required herein and provided, further, that not more than sixteen (16) weeks of gestation elapsed before the delivery. Whenever a parent or parents have specified that a dead fetus shall be buried, regardless of the period of gestation, or whenever the fetus has reached the sixteenth week of gestation, the fetus shall not be disposed of without a permit from the department of health."

The increase in the number of permits for disposal of fetuses has been relatively small as a result of these stipulations, and the registration offices in the city have not been overburdened by the obligation.

Table 3. Rate of reported fetal deaths per 100,000 females aged 15 to 44 years, New York City, 1939 and 1950

Period of gestation (in weeks)	1939 [1]	1950 [2]
Total	358.0	843.1
0–3	2.8	4.4
4–7	36.7	112.0
8–11	58.2	288.8
12–15	38.0	150.9
16–19	36.2	75.7
20–23	29.6	45.9
24–27	23.1	22.8
28–31	20.1	21.4
32–35	16.4	20.8
36–39	23.4	24.1
40 and over	68.3	53.4

[1] Rate based upon 1940 population of 1,908,360 reported by Bureau of the Census.
[2] Rate based upon population of 1,945,856, reported from sample data by Bureau of the Census.

Cooperation and Controls

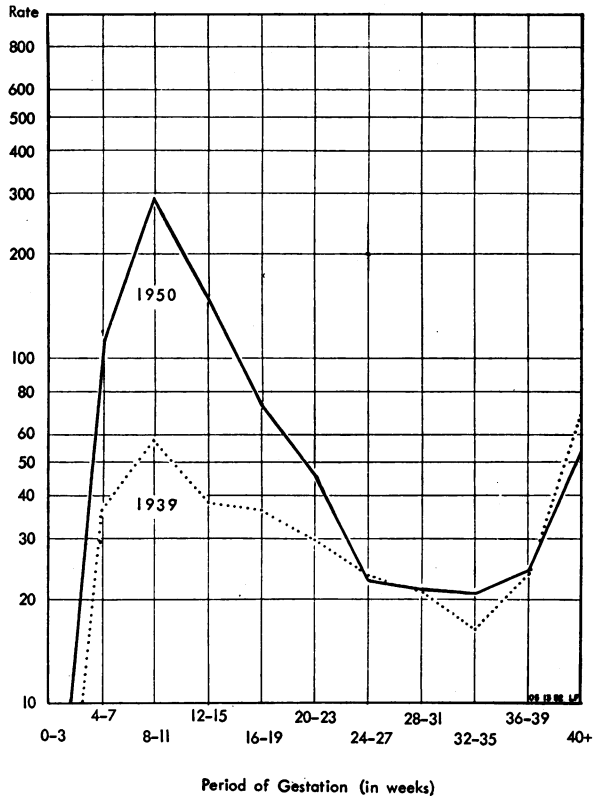
Obtaining reports of early fetal deaths rests largely upon convincing the physicians in the community of the value of such reports. Since the chance of getting reports of very early abortions at home is virtually nil, efforts should be concentrated upon hospitals, where postabortal patients needing attention and those submitting to therapeutic abortions will be gathered.

One large factor in the success of New York City is the fact that filing of reports of vital events occurring in hospitals or on hospital ambulance services is primarily the responsibility of the superintendents of the hospitals. This immediately reduces the control program, for there is understandably less effort to enforce reporting among some 200 hospital superintendents than among the much larger number of physicians practicing in these hospitals. Even considering that home cases must still be managed on an individual basis, concentration on the hospital group reduces the problem by an appreciable margin. Ability to utilize specific control measures, however, depends upon the auspices of hospital operation.

In a recent paper by Baumgartner and her colleagues (*2*), it was shown that reporting of fetal deaths from proprietary institutions was more complete than from other types of institutions. The reason is not obscure. These hospitals are licensed by the city, and the city department of hospitals is the inspecting agency which determines whether a license shall be issued or an annual renewal be granted. One of the criteria used for assessing the adequacy of hospital operation is the completeness of reporting of fetal deaths occurring or diagnosed in a hospital. Hospital charts are examined by inspectors of the department of hospitals, and lists of cases are searched against the indexes of the health department's bureau of records and statistics to determine whether fetal death certificates have been filed. Continued failure to file such records can be grounds for refusal to renew a license. This practice has provided an effective control over reporting from proprietary hospitals.

In municipal institutions, professional staff turnover makes it difficult to rely upon professional staff to initiate reports, especially when

Figure 2. Rate of reported fetal deaths per 100,000 females aged 15 to 44 years, New York City, 1939 and 1950.



such reports are based on requirements which differ from those which hold generally. Persons familiar with New York State law regarding reporting of fetal deaths, or that of any other area, cannot be expected to know local requirements unless specifically instructed. In the turmoil of introducing new staff, reporting of fetal deaths will be considered a relatively minor matter; therefore, other means than instruction of professional staff must be devised for continuing complete reporting.

Following the analysis of reporting of fetal deaths previously cited (*2*), the reporting of fetal deaths in municipal institutions was discussed with the director of the medical statistics and records service of the department of hospitals. As a result, the commissioner of hospitals approved an addition to the "Manual of Administrative Procedures" of that department, defining the situations where reports are required, outlining the reporting procedures, and prescribing follow-up measures by the hospital

record room to assure that reports are made.

Results of this order were evident immediately. In one municipal institution the number of fetal deaths increased from 68 in one year to 484 in the next while the number of live births in this institution remained relatively constant and the gynecological service showed no appreciable rise in number of patients. Obviously, fetal deaths had not been properly reported in previous years.

Direct control measures, such as exist with proprietary and municipal hospitals, are not available for use with voluntary, State, and Federal institutions. Efforts to obtain cooperation must be handled either indirectly or individually. An administrative officer of one of the larger institutions evinced some surprise not long ago to discover that stillbirths less than 20 weeks had to be reported! Now, the manual for that hospital includes such statements as: "In all cases where there is any product of conception, the doctor will fill out a report of birth. . . . All products of conception under 500 grams will be sent to the pathology laboratory. . . ."

Analysis of Fetal Death Statistics

Brief reference should be made to the influence of reporting requirements upon certain vital statistics data and upon interpretation of these data.

Infant Mortality

That reporting requirements have an influence on the infant mortality rate is well known. However, the degree to which infant deaths may be understated needs emphasis. For example, 36 infant deaths (under 1 week of age) at less than 20 weeks' gestation age were reported in 1949, and 74 such infant deaths were reported in 1950. There were 294 and 329 such infant deaths at less than 24 weeks of gestation age reported in these 2 years. One wonders what would have happened to these cases if reports of fetal deaths had been required only after 20 or more weeks' gestation had elapsed. It is not illogical to surmise that infant deaths at such an early gestation age might have been classed as stillbirths, and no report made if stillbirths need not be reported. But the cited 329 infant deaths in 1950 comprised 8.5 percent of the total infant deaths. Investigation of mortality among prematures would certainly be hampered if such cases were not reported.

The completeness of registration of fetal deaths close to the minimum period of reporting is questionable when an arbitrary gestation limit is stipulated. Resolving whether a fetus is 19 or 20 weeks' gestation age may be uncertain at best and is likely to be decided in favor of the answer which does not require reporting. It can be concluded that statistics on both infant deaths and fetal deaths will be based upon more nearly complete data for any specific period of gestation if all terminated pregnancies must be reported.

Whites and Nonwhites

Wide differentials have been found in fetal death statistics between whites and nonwhites. However, as has already been pointed out, the bulk of reports of early fetal deaths is obtained from patients in hospitals, and very early fetal deaths are unlikely to be reported, especially in the absence of medical care. That nonwhites receive less medical care than whites will not be argued. (Of the 11,206 fetal deaths reported in 1949 as white, 411 were reported following dilatation and curettage; of 3,249 reported as nonwhite, only 14 were such cases. The comparative incidence of such cases is therefore 36.7 to 4.3 per 1,000 fetal deaths.) This factor alone makes hazardous any comparison between the two groups as to incidence of fetal deaths or other analytical areas.

Complications of Pregnancy

The total incidence of reported complications increases with lower fetal age at delivery except among nonwhites. The question naturally arises, of course: Is incidence of complications actually lower among nonwhites, or are nonwhites more likely to have only terminal care from physicians who do not know the patient's history and therefore do not report complications to the same extent as for whites?

The analysis of both live birth and fetal death statistics as to complications of pregnancy is hampered by the lack of a commonly accepted definition of a "complication." While one physician may report any concurrent medi-

cal condition in the mother as a complication, another physician may consider such a condition, which is well controlled and causing no difficulty in management of the patient, as of no consequence and thus not reportable. The statisticians need clinical advice as to the point of view which should be adopted and recommended to physicians.

Summary and Conclusions

The reporting of fetal deaths has improved remarkably and steadily in New York City during the past 12 years. There is, however, a group of unknown size which is unlikely ever to be reported, namely, those which are unrecognized as termination of an early pregnancy and those which terminate without requiring or receiving medical attention.

The increase in the number of fetal deaths reported in New York City has been caused entirely by the increase in reported fetal deaths of less than 20 weeks' gestation. Little change has occurred in the ratio to live births for those of 20 to 27 weeks' gestation, and the ratio for those of 28 weeks' and over has decreased.

The problem of disposing of young fetuses, the different approaches to various hospital groups in attempting to obtain more nearly complete reporting, and the influence of incomplete reporting on analysis of statistics have been discussed.

Certain conclusions pertinent to the WHO recommendations may be drawn:

1. Required reporting of all recognized fetal deaths will provide more nearly complete statistical data regarding pregnancies terminating at the twentieth week of gestation or later than the required reporting of fetal deaths only after such a period.

2. The earlier the pregnancy terminates, the less is the likelihood of obtaining a report of the event, regardless of reporting requirements.

3. Lack of medical or hospital care in any particular group of the population will make difficult the interpretation of statistics resulting from the reports.

REFERENCES

(*1*) U. S. National Office of Vital Statistics: International recommendations on definitions of live birth and fetal death. PHS Publication No. 39. Washington, D. C., U. S. Government Printing Office, 1950.

(*2*) Baumgartner, L., Wallace, H. M., Landsberg, E., and Pessin, V.: The inadequacy of routine reporting of fetal deaths. Am. J. Pub. Health 39: 1549–1552 (1949).

Evaluation of Cancer in Connecticut, 1949

The Connecticut State Health Department reports 8,782 persons with active cancer at some time during 1949. Connecticut's cancer rate for that year was 443.5 per 100,000 population.

The report shows a downward trend in female cancer deaths, as shown by age-adjusted rates, and an upward trend in male cancer deaths until 1949, when the rates for males dropped.

Age specific incidence rates for females were higher than those for males from 15–54 years of age. But among children under 5, cancer was more prevalent in boys than in girls, and in persons over 60, the disease was more prevalent among men than among women.

Reporting of cancer in Connecticut is not required by law. The detailed data on cancer incidence, prevalence, and mortality were gathered through the voluntary register maintained by the division of cancer and other chronic diseases of the State health department. Connecticut hospitals, out-of-state hospitals, and the bureau of vital statistics of the State health department were the three sources of reports sent to the registry. Eighty-five percent of the cancer cases diagnosed in 1949 were reported by hospitals.