Under-Registration and Estimation of Births and Deaths in a Philippine Municipality*

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The registration of vital events in the Philippines has long been defective and is therefore an unreliable indicator of birth and death rates. Tests for completeness of birth and death registration made in 1956 in the province of Nueva Ecija in Central Luzon indicated an under-registration of births by 35 per cent and deaths by 10 per cent. More recently, a survey on the completeness of death registration throughout Luzon revealed that of the randomly selected names of persons buried in cemeteries during the period 1959-1962, an average of 40 per cent were not found registered by the local civil registrars. Cognizant of the need for developing methods of vital and health registration suited to the needs of modernizing countries, the Inter-Agency Committee on Vital and Health Statistics resolved as early as 1958 to request the President of the Philippines to issue an Executive Order creating the National Committee on Vital and Health Statistics. The objectives of such a National Committee are essentially those defined by the First International Conference on National Committees in London in 1953. Although an Executive Order was drafted for consideration by the President in 1962, no action was taken and no National Committee created to date.

In view of the need for accurate data on births and deaths, the Statistical Center of the University of the Philippines initiated an experimental study of vital statistics registration in the municipality of Imus, Cavite on June 1963.[1] The experiment consisted of two phases: one aimed at collecting data on births and deaths for the period 1960-1963 while the other was directed toward the establishment of a continuing system of registration by a field worker residing in the municipality. The information compiled by these two phases is compared with the records of the Civil Registrar to ascertain the relative under or over-enumeration in each case. This paper deals with only the first phase of the project and the results of the second part of the inquiry will be reported in a separate paper.[2]

The Setting:

The municipality of Imus, Cavite consists of 16 *barrios* and one *poblacion* situated some 23 kilometers southeast of Manila. The total area is about 8,905

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[1] This study is being financed by the Population Council of New York. Since then, several other surveys with similar objectives have been started in Sta. Rosa in Laguna, Calasiao in Pangasinan, Tiwi in Albay and Miagao in Iloilo. The Sta. Rosa project is under the direction of the Institute of Hygiene with financial aid from the National Science Development Board and the Population Council. The Calasiao and Tiwi studies are supported by the U.P. Social Science Research Council while the Miagao survey is the first study under the auspices of the Population Institute with support from the Ford Foundation.

[2] The project also included a fertility survey of a sample of currently married women, 15 years old and older. Information on knowledge and use of contraceptive measures was gathered along with opinions concerning the ideal family size.

ha. with a population of 31,660 found in 5,449 dwelling units as of 1960. On the average, eight out of ten inhabitants of the villages are literate and close to 40 per cent of the total population have attained some level of primary schooling. Owing to its proximity to Greater Manila, a section of the employed population work in the city and its environs. For the remainder, the main occupation is agriculture.

Registration Procedure:

Registration of births and deaths in the municipality follows that procedure decreed by the Civil Registry Law (Act No. 3753 approved in 1930) which states that:

> Sec. 5 *Registration and Certification of Births.* — The declaration of the physician or midwife in attendance at the birth or, in default thereof, the declaration of either parent of the newborn child, shall be sufficient for the registration of a birth in the civil register. Such declaration shall be exempt from the documentary stamp tax and shall be sent to the local civil registrar not later than thirty days after the birth, by the physician or midwife in attendance at the birth or by either parent of the newborn child.
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> In such declaration, the persons above mentioned shall certify to the following facts: (a) date and hour of birth; (b) sex and nationality of infant; (c) names, citizenship, and religion of parents or in case the father is not known, of the mother alone; (d) civil status of parents; (e) place where infant was born; (f) and such other data as may be required in the regulations to be issued.
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> Sec. 6 *Death Certificate and Register.* — No human body shall be buried unless the proper death certificate has been presented and recorded in the office of the local civil registrar. The physician who attended the deceased or, in his default, the health officer concerned, or in default of the latter, any member of the family of the deceased or any person having knowledge of the death, shall report the same to the local health authorities, who shall issue a death certificate and shall order the same to be recorded in the office of the local civil registrar. The death certificate, which shall be issued by the attending physician of the deceased or, in his default, by the proper health officer, shall contain the following data which shall be furnished by the person reporting the death: (a) date and place of birth; (b) full name; (c) age; (d) sex; (e) occupation or profession; (f) residence; (g) status as regards marriage; (h) nationality of the deceased; and (i) probable cause of death.
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> Sec. 3 *Local Civil Registrars.* — x x x the treasurers of the regular municipalities, municipal districts, and cities shall be local civil registrars of the respective municipalities, municipal districts or cities, and shall perform the duties imposed upon them by this Act without extra compensation, in addition to their ordinary duties.

Method of the Survey:

In Phase I, (which began on 1 June 1963) an enumerator canvassed every household listing the resident population by age, sex, marital status, relationship to head of household, place of birth and place of residence in 1948.[3] All children

[3] Data were collected by a team of enumerators under the supervision of Mr. Antonio Pakinggan, field worker. The processing of the lists was done by research assistants under the direction of Mrs. Elvira Mendoza-Pascual of the Statistical Center.

listed under 3 years of age were asked for exact dates of birth. These children were presumed to be survivors of births which occurred during the 3-year period, 1960-1963. The enumerators were also instructed to inquire about and record all births and deaths occurring in the household during the same period. Births and deaths occurring outside the municipality to those usually residing in the municipality were also listed. These events may not be recorded in the official register unless a transfer from place of occurrence to place of residence is sought and in that case would be duly noted in the registrar's record.

With the cooperation of the Bureau of the Census, a comparison was made between the enumeration schedules of the 1960 Population Census and the 1963 lists prepared by the enumerators. Each name in 1960 could then be matched with that found in 1963. In this manner, it was possible to verify all the entries in the 1963 lists and trace those who were enumerated in 1960 and were not listed in 1963. These persons had either died or moved out of the municipality during the 3-year interval. In the event that names found in 1963 were not enumerated in the 1960 Census, it was assumed that these persons were in-migrants or if less than 3 years of age, born after the Census date. The comparison of these two enumeration lists enabled the investigator to verify the existence of the persons resident in the municipality.

A list of births and deaths was prepared from the 1963 lists and later compared with the civil registry records maintained by the local civil registrar. This was done barrio by barrio and results showed that both lists had not recorded all the vital events occurring in the municipality. Table 1 lists the births and deaths missed by the local civil reg-

TABLE 1
Comparison of Enumeration and Registration Lists, Imus, Cavite

Registry Record	BIRTHS			DEATHS		
	Enumerated	Not Enumerated	Total	Enumerated	Not Enumerated	Total
1960-1961						
Registered	395	72	467	62	110	172
Not Registered	641	*117*	*758*	27	*48*	*75*
Total	1036	*189*	*1225*	89	*158*	*247*
1961-1962						
Registered	506	66	572	67	92	159
Not Registered	470	*61*	*531*	34	*47*	*81*
Total	976	*127*	*1103*	101	*139*	*240*
1962-1963						
Registered	595	66	661	84	74	158
Not Registered	532	*59*	*591*	51	*45*	*96*
Total	1127	*125*	*1252*	135	*119*	*254*
1960-1963						
Registered	1496	204	1700	213	276	489
Not Registered	1643	*237*	*1880*	112	*140*	*252*
Total	3139	*441*	*3580*	325	*416*	*741*

NOTE: Figures in italics are estimates derived from the equation given in the section on method of the survey.

istrar but listed by the enumerator, and those missed by the enumerator but recorded by the registrar.

Out of the 3,139 births which were listed by the enumerator as having occurred in the municipality during the period 1960-1963, only 1,496 were registered by the local civil registrar. On the other hand, 204 births recorded by the civil registrar were missed by the enumerator. The 1847 cases missed by either the enumerator or the registrar were investigated to ascertain whether these had actually occurred within the reference period inside the municipality or outside the area. It was found that of the number enumerated but not registered, 57 had occurred following the reference date or had taken place outside the municipality. However, of the 204 births registered by the civil registrar but not enumerated by the investigator all but one were found to have occurred within the specified period and in the municipality.

The data for deaths presented a different picture. Of the 325 deaths enumerated in the lists, 213 were found to be registered. However, among the 489 deaths appearing on the civil registration records, 276 were not enumerated by the investigator. All told, there were 388 cases of deaths missed by the enumerator or the civil registrar. Of the total deaths, 15 were found to have occurred outside the reference period.

If the field investigators and the civil registrar were assumed to have recorded all the births which had occurred in the municipality during the three-year period and had not missed any event, then the total births and deaths amount to 3,343 and 601, respectively. However, it would not be safe to assume that no births and deaths were missed by either of them taken together. It would be better to assume that the probability of the enumerator detecting an event out of those registered by the registrar is the same as the probability that he detected an event which was not recorded by the civil registrar. The relationship can be shown as follows:

$$\frac{E}{e} = \frac{e'}{e''}$$

where:
- E = the number of entries found in the enumerator's lists and also in the registrar's record
- e = the number of entries recorded by the civil registrar
- e' = the number of entries listed by the enumerator but not recorded by the civil registrar
- e'' = estimated number of events which were missed by the registrar

Then:
- $e + e''$ = estimated total number of events in the specified period
- $e - E$ = the number of entries missed by the enumerator but recorded by the civil registrar
- $e' - e''$ = estimated number of events which were missed by both the investigator and the registrar.

Calculations made on the basis of the above relationships show that 3,580 births and 741 deaths occurred in the municipality instead of the 3,343 births and 601 deaths recorded and listed during the period of the niquiry.

Under-Registration:

It was stated earlier that the enumerators listed a total of 3,139 births and 325 deaths. In the enumeration, some events were listed which had occurred outside the reference period or outside the municipality. The lists also failed to include some cases which had taken place

during the reference period. If the first type of occurrence is termed "over-reporting" and the second "under-reporting," then nearly 2 per cent of the births and of the deaths were over-reported. Nearly 6 per cent of births and 37 per cent of the deaths were under-reported. The civil registrar under-registered 46 per cent of all births and 15 per cent of all deaths estimated to have occurred during the three-year period. As expected, there was no over-registration of vital events on the part of the civil registrar. This is due to the fact that vital events are recorded at the time of their occurrence and the chance of including those events which did not occur within a period is small. On the other hand, when inquiries are made after a lapse of some time, respondents are likely to include events which may have occurred outside the reference period. Despite the time lapse, however, under-enumeration of birth on the part of the field investigators was very small when compared to that of the local civil registrar. Births were 39 per cent more accurately reported by the field investigator while deaths were only 5 per cent better enumerated by the enumerator than the civil registrar.

The local civil registrar whose primary function is to collect revenue considers the registration of vital events an unnecessary chore for which he receives no additional compensation. He does not realize the importance of collecting data on births and deaths since this duty does not give him any importance in the municipality. Moreover, people do not care to record births unless they see the advantages accruing from such an act. And when there are no manifest advantages, there seems to be no point in registering an event.

Estimation of Birth and Death Rates:

In 1960-1961 the estimated total number of births for the municipality as a whole using the estimation formula presented earlier was 1,225 with a standard error of about 20.[1] The following year the number of births declined to 1,103 with a standard error of 12. For 1962-1963, the estimated was 1,252 with a standard error of 11. It may be noted that the standard errors, though still quite large, declined with each year. The corresponding figures for deaths in the three years were 247, 240, and 254 with computed standard errors of 14, 13, and 12, respectively.

For computing birth and death rates, the population enumerated in 1963 was used together with that reported by the 1960 Census. Birth rates were estimated at 39 per 1,000 persons in 1960-1961 and 1962-1963 but was lower (35/1000) during the second year. For all three periods, the death rate stood at 8 per 1,000 persons.

Conclusion

It is clear that the registration system prevailing in the municipality is far from adequate as under-registration is still very high. Even the method of collecting data by a special investigator is unlikely to yield accurate results in view of the over- and under-listing of vital events. Although the overall figures of births and deaths reported by the field investigator are quite satisfactory, there is still considerable room for improvement. However, it can be stated that the method of collecting data by trained fieldmen even after a three-year interval is far better than the present system. While the field investigators obtained fairly accurate birth data, their performance regarding deaths was not so satisfactory. One of the reasons perhaps could be the hesitation in questioning respondents concerning recent deaths in the household.

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[1] The standard error was calculated using the method presented by Chandrasekaran and Deming in their article entitled "On a Method by Estimating Birth and Death Rates and the Extent of Registration," *Journal of the American Statistical Association*, Vol. 44, No. 245, (March 1949), pp. 101.115.