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# THE STATUS OF CIVIL REGISTRATION AND THE COLLECTION OF VITAL STATISTICS THROUGH ALTERNATIVE SOURCES IN PAPAU NEW GUINEA

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# FOREWORD

This is a revised and updated version of a paper presented at the Pacific Seminar on Civil Registration and Vital Statistics held in Apia, Western Samoa from 30 April to 6 May 1985. It has been condensed for publication in the Technical Papers.

This is an account of a country with a law for compulsory registration of vital events but no infrastructure for implementing the provisions of the registration law. Without a national network of registration offices, the registration of births and deaths is virtually nonexistent in the provinces. Even in the National Capital District, registration is very deficient, except for foreign nationals.

Mr. Bakker sees little possibility of a civil registration system developing in Papua New Guinea in the foreseeable future. However, he points out that there are two on-going governmental operations which might be utilized for the collection of vital statistics information. For urban areas, the health services are already collecting data on births and deaths occurring in the health centers and other medical institutions. For the rural areas, there is the possibility of utilizing the results of the periodic updates of the Rural Population Register in some of the more advanced provinces.

While it may be possible to establish a national vital statistics system utilizing the existing governmental programs, this does not provide a solution to the problem of registration of births and deaths. On the other hand, it would seem feasible to give the Department of Health legal responsibility for the registration of births and deaths to provide an infrastructure for the registration of vital events occurring, at least, in the urban areas.

# THE STATUS OF CIVIL REGISTRATION AND THE COLLECTION OF VITAL STATISTICS THROUGH ALTERNATIVE SOURCES IN PAPUA NEW GUINEA

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## I. INTRODUCTION

In his book, "This Perfect Day" (1970), Ira Levin describes a world where all aspects of life are programmed and controlled in the smallest detail by a huge computer called UNICOMP. Births, deaths and marriages are planned by the computer and all vital events can therefore be recorded before they actually occur. The only small problem left, as far as the registration of demographic processes is concerned, is the movement of people. This cannot yet be completely programmed. However, people have been provided with a bracelet inscribed with a person number. When moving from one place to another, they touch computer connected scanners with their bracelet. Since the scanners have been placed in all strategic locations, the movement of all persons is known at any one point in time. Consequently, accurate age specific birth, death, marriage and migration rates are available whenever this information is required. The first of these three sets of rates have already been fixed for many years in advance and are only changed when socio-economic or other factors make a change in these rates desirable.

It is obvious that the registrars of vital events in the world created by Levin would not be particularly interested in the problems connected with the registration of vital events. On the other hand, it is unlikely that the registration offices would be anxious to recommend the introduction of such a system in their countries. However, it is also clear that a registration system of vital events which does not provide reasonably complete and accurate information is of limited legal, administrative and statistical value. This is the present situation in many countries in the South Pacific Region. Although a civil registration system has been in operation for quite a long time in most of these countries, virtually all these systems are still inadequate. In some countries, particularly in Papua New Guinea, civil registration is still almost nonexistent.

The legal responsibility for civil registration in Papua New Guinea is lodged in the Justice Department whilst the Registrar General's Office is responsible for directing and coordinating registration activities.

## II. CIVIL REGISTRATION AND THE COLLECTION OF VITAL STATISTICS IN PAPUA NEW GUINEA

In the first part of this section, registration of births, deaths and marriages through the Registrar General's Office and the completeness and accuracy of the vital statistics derived from the recorded events will be discussed. The second and third part will deal with alternative ways of collecting vital statistics through the Health Department and the National Statistical Office, respectively.

### 1. The Registrar General's Office

#### a. Births

Registration of births is embedded in Part IV of the Civil Registration Act. According to this act, prescribed particulars of the birth of children who are born in compulsory registration areas must be registered within three months after the birth of the child. Particulars of still births must be registered in a separate register.

It is currently impossible to enforce this Act in Papua New Guinea. There are no sub-registrars at the provincial, let alone at the local level. Registration of vital events at a subnational level

was tested during the Lae Pilot Test in the late sixties and early seventies, but this project was a failure.

In the absence of a system of local registrars, the Registrar General's Office attempts to collect information on births in the provinces through the Department of Provincial Affairs. For this, the "Information of Birth" form is used. After completion, these forms are forwarded to the Registrar General's Office and registered in the Register of Births. In some cases, however, the "Information of Birth" forms are completed by hospitals and churches and forwarded directly to the Registrar General's Office.

Given the absence of a proper organizational structure for the registration of vital events, one can hardly expect birth registration to be anywhere near complete. Registration of births in Papua New Guinea is virtually nonexistent in all provinces except the National Capital District (NCD). These are citizen births. However, unregistered noncitizen births are exceptional. Also, a large proportion of all registered births in any year are late registrations.

The extent of under registration has been estimated by applying age specific fertility rates for each of the provinces to the 1980 age structure of females aged 15 to 49. The resulting expected number of births when compared with the number of registered births showed that the completeness of registered births is less than 1 percent for the country as a whole and for all provinces except the National Capital District. There, the estimated percentage of registered births was 12.

b. Deaths

Part V of the Civil Registration Act deals with registration of deaths. The Act states that "the occupier of prescribed premises other than a vessel or aircraft, shall, once in every month, make and forward to the Registrar in the prescribed form a return of all deaths that have occurred on the premises since the making of the previous return, or in the case of a first return of all deaths that have occurred since the premises were established as prescribed premises".

As in the case of birth registration, it is clear that under the present circumstances this act has not been and cannot yet be enforced. To date, virtually all deaths which are recorded are those which take place in hospitals and health centres. These institutions are, at present, the "compulsory registration areas" for the registration of death. It is clear that these deaths constitute only a fraction of all deaths in Papua New Guinea. Hospitals and health centres complete an "Information of Death" form. These forms are then forwarded to the Department of Health in Port Moresby. Copies are sent to the Registrar General's Office. In the Registrar General's Office, the recorded deaths are entered in the Register of Deaths.

c. Marriages

Papua New Guinea has a very extensive Marriage Act, but Part II, para 3 of this act states under "Customary marriages" that (1) Notwithstanding the provisions of this Act or of any other law, a native, other than a native who is a party to a subsisting marriage under Part V, may enter, and shall be deemed always to have been capable of entering, into a customary marriage in accordance with the custom prevailing in the tribe or group to which the parties to the marriage or either of them belong or belongs. (2) Subject to this Act, a customary marriage is valid and effectual for all purposes.

Marriages in Papua New Guinea may be registered by the Provincial Secretaries and Ministers of religion of recognized denominations which have been nominated by the Registrar General. Certificates of the marriages which have been solemnized by the Provincial Secretaries and nominated Ministers of religion are sent to the Registrar General's Office and registered in the Register of Marriages. Because a very large proportion of all marriages in Papua New Guinea are customary marriages, for which no official certificate of marriage is required, registration of marriage is very incomplete. Since there is no other source of data from which the total number of marriages contracted in a particular year can be derived, it is not possible to make an estimate of the extent of underregistration of marriage.

2. The Department of Health

a. Births

Townsend and Nou-Taboro (1984) compared the numbers of new antenatal attendances in 1982 with the target population, i.e., the estimated number of births in 1982. They came to the conclusion

that "nationally sixty percent of births occur to women who have received some antenatal care, although only about a third of deliveries are actually supervised in health centres and hospitals. The coverage of antenatal clinics varies from six percent in the poorest district to virtually all births in places like Port Moresby and the Gazelle Peninsula," (ibid, p.4). In addition to that, 36 percent of all children in Papua New Guinea aged 0-4 were seen each month by the Community Health Nursing Services (CHNS) in 1982. Again, interprovincial and interdistrict differences in coverage of CHNS are very large. "In some districts fewer than three percent of children are seen, in others virtually all children are seen at some time and many are reached more than once in a month", (ibid, p. 3).

These coverage figures for antenatal care and especially CHNS are by no means high, but they are very high compared to the estimated percentages of legally registered babies. Since a large proportion of children born in the last ten years have some kind of medical record, it is clear that civil registration of births can be improved immensely by better coordination between the Health Department and the Registrar General's Office.

b. Deaths

Deaths which are brought to the attention of medical personnel in hospitals and health centres, are registered on the "Information of Death" form as well as on the Medical Certificate of Death. Both forms provide detailed information about deceased persons. If these forms were to be completed for all or most deceased persons, they would be an extremely important source of death and cause of death statistics. In actuality, however, these forms are completed for a very small and completely unrepresentative proportion of all deceased persons. Practically all deaths which are recorded are those that occurred in hospitals or health centres. Consequently, the death and cause of death statistics based on these recorded deaths are not only very incomplete but also have a very clear urban bias. The cause of death statistics published so far probably give a very misleading picture of the mortality situation in Papua New Guinea.

An attempt will be made to estimate the coverage of registration of death by the Health Department. As reference year we have again used 1980, since the expected number of deaths in this year can be estimated from 1980 census data. The expected number of deaths of citizens by sex in 1980 for each of the 20 provinces in the 4 regions of Papua New Guinea were calculated by applying age-sex specific death rates estimated from 1980 census data to the 1980 age-sex structures. The expected numbers of deaths were then compared to the number of citizen deaths which were actually recorded by the Department of Health. The percentages range from only 1 percent in Central Province to 36 percent in the National Capital District (NCD). It should be stressed that the provincial figures are not strictly comparable. The expected number of deaths refers to the population living in a particular province whereas the recorded number of deaths refers to the province where people happened to die. Hospitals, and especially the base hospitals for the four regions in Port Moresby, Goroka, Lae and Rabaul naturally receive many patients from other provinces apart from those in which these base hospitals are located. If patients die in one of these hospitals, they have so far been registered as deaths for the provinces in which the base hospitals are located and not for the provinces in which the deceased persons usually resided. This partly explains why the percentages for NCD, Eastern Highlands, Morobe and East New Britain are somewhat higher than the national average, whereas in provinces with smaller hospitals, (and especially in Central Province which has no General Hospital), the percentages are in most cases lower than the national average. The regional figures are more comparable than the provincial figures although the General Hospital in Port Moresby in particular attracts a significant number of patients from regions other than the Southern Coastal Region. Finally, the national figures are comparable. That means that registration coverage of death for total Papua New Guinea in 1980 was less than 10 percent.

The Department of Health figures do not necessarily represent all the deceased persons for which a death certificate has been issued. It is likely that a considerable number of death certificates issued by physicians and health personnel in hospitals and health centres get lost somewhere en route, i.e., from the issuing officer to the Provincial Health Officers and/or Medical Record Officers in the provinces, and/or from the latter to the Health Statistician of the Department of Health in Port Moresby.

3. The National Statistical Office

This office compiles and analyses the vital statistics which have been collected by other departments (Department of Health and Registrar General's Office). It is clear from the foregoing sections that the statistical value of the data on vital events collected by these departments is close to nil. The information on births, deaths and marriages is so incomplete that it cannot be

used meaningfully for an assessment of the demographic and health situation in the country nor for evaluation of health projects or for future planning. The National Statistical Office has therefore endeavoured to collect the most basic information on births and deaths in alternative ways. The two methods currently used are; the Provincial Data System (PDS), and the National Census.

a. The Provincial Data System

In the past, the collection of some information on births and deaths in the Rural Village Sector was a function of the patrol officers of the Department of Districts Administration (DDA). Children who were born between visits of the patrol officers and survived until the most recent visit were recorded in the so-called Village Books and deceased persons were crossed off. This system performed reasonably well, at least in those areas which were under sufficient administrative control. However, the system usually provided very little information on children who died in infancy and early childhood, i.e., for children who were born and died between visits. Also, no attempt was ever made to compile any statistics on deaths by age at death and births by age of mother at the time of birth. The demographic information which the system provided was not much more than a headcount of residents in particular patrol areas, although some attempts were made to compile births and deaths in order to calculate crude birth and death rates from the data incorporated in the Village Books.

Unfortunately, in the early seventies, the system of Village Books was neglected and fell into disuse. Prior to the 1980 census, it was felt that the system of Village Books should be revitalized as a component of an integrated Provincial Data System. During the first round of PDS, which was basically a part of the preparations for the 1980 census, population data including information on births and deaths were collected on the Annual Census Form (ACF).

After collection of the information, the ACFs stayed in the province. A summary of the data was sent to the National Statistical Office. The summarized demographic information on this form is of limited statistical value, even if all the information is complete and accurate. Age is only given in four broad age groups, i.e., 0-5, 6-17, 18-45 and 46+. Since the ACSs were compiled by hand in the provinces, a PDS Users Committee decided that the summarized information should be kept very simple. The rather unconventional age groups were a compromise between the conflicting requirements of several departments. The ACS shows total numbers of births by sex only. Deaths are recorded by sex and separately for "children" and "adults". Births and deaths are supposed to refer to a reference period of one year prior to the visit of the PDS team. In reality, the information on births and deaths often referred to completely different reference periods.

From this limited and often very incomplete and deficient information, it is possible to derive only crude measures of birth and death. This was done prior to the 1980 census, in order to obtain some information on fertility and mortality at the province level for stratification purposes. Further attempts to analyse the information incorporated on the ACS came to naught mainly because the data were never entered into the computer because it was felt that the crude rates derived from the data would give a very incomplete and probably misleading picture of the demographic situation.

Because of the limitations of the ACF, the National Statistical Office decided in 1984 to modify this form drastically in order to make it more responsive to new data requirements, and suitable for computer processing. The revised form will be discussed in Section IV of this paper.

b. The National Census

So far, the only reasonably accurate statistical information on birth and death in Papua New Guinea at the national, regional and provincial level, has been derived from census data using indirect estimation techniques. Abridged lifetables for the citizen population by geographic sector (Rural Village, Rural Non-Village, Urban and All Sectors) and by sex have been constructed from information collected during the most recent census (1980) for each of the provinces and regions and for total Papua New Guinea.

Fertility estimates based on the 1980 census include, inter alia, crude birth rates, general fertility rates, age specific fertility rates, total fertility rates and gross and net reproduction rates. These rates are also available at the provincial level and for each of the geographic sectors within provinces.

Indirect estimates of fertility and mortality, though on a far more restricted basis, have also been derived from previous (sample) censuses in 1966 and 1971. Consequently, recent trends in

fertility and mortality levels and patterns in Papua New Guinea can be established from subsequent censuses. Furthermore, the estimates of the extent of underregistration of birth and death in Papua New Guinea could be made only because the expected number of births and deaths had been estimated from 1980 census data.

## III. SOME REASONS FOR THE INCOMPLETENESS AND INACCURACY OF VITAL REGISTRATION IN PAPUA NEW GUINEA

Most reasons for the incompleteness and inaccuracy in the registration of vital events in Papua New Guinea are not very different from those usually quoted for other countries with deficient registration systems. However, some are rather specific for Papua New Guinea. This section discusses a few of the reasons which seem to be relevant for the situation in Papua New Guinea.

### 1. Inaccessability, communication and related problems

Large parts of rural Papua New Guinea were not brought under some basic form of administrative control until the early 1960s. Prior to the 1966 census, it was decided that considerable parts of the Rural Village Sector should not be included in the census. This was because a sampling frame (from DDA Village Books) was not yet available for these areas. Inaccessability, transport and communication problems and consequently a high level of illiteracy are usually mentioned as the most important reasons why data collection is so extremely difficult in Papua New Guinea. The situation is aggravated by another factor which is rather specific for Papua New Guinea, namely, the extreme cultural and linguistic diversification.

The above reasons are undoubtedly valid but it is questionable whether they constitute the most important reasons for the almost nonexistent registration of vital events through the civil registration system. If these reasons were the most important ones, it would logically follow that civil registration in the Urban Sector of Papua New Guinea would be considerably better than in the Rural Village Sector. This is undoubtedly so for deaths recorded by the Department of Health. However, civil registration of births is only marginally better in the urban areas than in the rural areas. In all provinces, excluding NCD, there is hardly any registration of births at all in any of the geographic sectors. Even in the case of NCD, where inaccessability and communication problems cannot be considered as important reasons for underregistration, death registration through the Health Department covered less than 40% of all deaths. (As mentioned before, this figure includes a significant number of deaths of persons who lived in provinces other than NCD but died in the General Hospital in Port Moresby and were registered there). Furthermore, registration of birth in NCD is still not much higher than ten percent. Consequently, the statement that inaccessability, communication and related problems are the main reasons for the incompleteness and inaccuracy of the civil registration system seems to be, at least, doubtful.

### 2. Lack of funds

Registration of vital events does not usually have a very high priority in the allocation of funds. It should, however, be mentioned that in most countries the recurrent costs of a civil registration system are not very excessive, i.e., once the system is in operation and the infrastructure, the registrar, sub-registrars and other officials involved in the registration of vital events are part of the establishment. However, the cost of setting up the organizational network, and the cost of enforcement of the civil registration laws in Papua New Guinea will definitely not be low.

### 3. Lack of interest

Two aspects which are often high on the list of reasons for incompleteness and inaccuracy of the civil registration system are: i. The lack of interest by registrars, especially at the lowest level, in the implementation of the system, and ii. The lack of interest in the registration of vital events by the general public and the lack of incentives to register vital events.

It is clear that cooperation of the registrars at all levels and the general public is a first requirement for the success of a civil registration system. However, the initiative for registering a vital event has to be taken by close relatives of the persons involved in the event. Broad and active support from these close relatives can hardly be expected if there is little or no incentive to register the event.

The above aspects seem to be of some importance in many countries in the eastern and central part of the South Pacific Region. In some of these countries, a civil registration system has been

in existence for more than 100 years. Nevertheless, in most of these countries the registration of vital events, particularly infant deaths, is still far from complete. It is also clear that in these countries improvements in civil registration often go hand in hand with increasing socio/economic development. With increasing development, more and more people will need a birth certificate as an identity document (school enrollment, marriage, passport, driving license, job application, electoral enrollment, etc.); whereas, for the burial of deceased persons a death certificate and a burial permit will be required.

The situation in Papua New Guinea is completely different from that in other countries in the South Pacific Region with the possible exception of the Solomon Islands. As mentioned before, a comprehensive organizational network for civil registration does not yet exist. Therefore, it is obviously impossible for the Justice Department and the Register General's Office to enforce civil registration in the rural areas.

It is possible that lack of interest plays a role in urban Papua New Guinea. Admittedly, the proportion of Papua New Guinean people who have needed a birth, death or marriage certificate so far is still very small indeed. This may change drastically in the near future, especially in the case of birth certificates. For instance, persons who join the Public Service nowadays need an identity document stating their date of birth. Since a birth certificate is seldom available, the aspirant public servant asks the Village Councillor or Church Leader of the village where he/she was born to write a letter which states his/her birth date. (In many cases the person in question drafts the letter him/herself and the letter is then signed by an official person). The procedure to obtain a passport is much the same. Also, some schools have started to ask for a birth certificate before a child is enrolled. The existence of a letter which "proves" that a person has been born does not automatically mean that the birth of this person will also officially be registered. This is definitely not so for public servants and owners of passports, driving licenses, etc. Official birth registration in urban areas could be improved considerably if certified identity documents stating "proof of birth" were accepted as official declarations of birth and these cases were entered in the Register of Birth in the Registrar General's Office.

The need for death and marriage certificates is, at present, almost negligible. In Papua New Guinea, a death certificate is not required before a person is buried, and it seems completely unrealistic to introduce such a restriction in the rural areas in the near future. Furthermore, in a society where polygomous unions are widespread and most marriages are still common-law marriages, there is not yet much need for marriage certificates either. However, changes here are probably only a matter of time.

4. Inaccuracies in the registration of vital events

The limited number of vital events which have been registered are often recorded inaccurately. This refers particularly to registration of death and probably even more so to cause of death. In this section, we will discuss inaccuracies in the recording of age at death, cause of death, stillbirth, neonatal and post-neonatal deaths. The problems caused by the recording of adopted children as natural children will also be discussed.

a. Age at death

In a society where only a small proportion of adult persons know their age, one cannot expect accurate reporting of age at death, the more so since for the report of age at death, one is entirely dependent on information provided by proxy respondents. Recording of age at death on death certificates will remain rather inaccurate for many years to come.

b. Causes of death

Cause-of-death statistics compiled by the Department of Health are probably even more deficient, affected as they are by diagnostic as well as coding errors. These errors are, to some extent, present in the cause-of-death statistics of all countries in the world. In the first place, but especially in developing countries, it cannot be expected that a physician will always be in attendance when a person dies. The cause of death declaration, if any, is therefore dependent on the evaluation of the description of symptoms by relatives. Quite often, these relatives describe the mode of dying and not the diseases or the conditions leading to death. However, in Papua New Guinea, practically all cause-of-death declarations which are available have been issued in hospitals and health centres. This does not necessarily mean that all causes of death are properly diagnosed. It is often extremely difficult to establish what the actual cause of death is. Often,

there are many cases of multiple and hidden diseases and the question of the underlying cause of death cannot be adequately addressed without a post mortem examination. Many declarations of death made by Health Extension Officers and sisters in the health centers are often rather vague and inaccurate. Moreover, many people in Papua New Guinea are very much opposed to the idea of an autopsy, and post mortem examinations are carried out only in a very limited number of cases. This reduces the quality of cause of death statistics even further.

Translating the often deficient diagnosis of cause of death into an acceptable code for a statistical publication causes additional inaccuracies in the cause of death statistics. During the coding phase, multiple causes of death when reported are reduced to one underlying cause. Since 1979, the 9th revision of the International Classification of Disease" developed by the World Health Organization has been used for classification purposes in Papua New Guinea, (WHO, 1978). The "Code for Surgical Operations", (ABS, 1975) is used for coding operations. In practice, however, it is found that the WHO classification provides too much detail for the present statistical needs of Papua New Guinea. The Department of Health publishes only the total number of persons dying from approximately 20 leading causes of mortality.

In conclusion, nationwide studies on the cause structure of mortality in Papua New Guinea, undertaken sofar, are not only of a very limited scope because of the extremely limited coverage of death statistics, but they are also affected by the far from optimal quality of these statistics.

c. Stillbirths and neonatal and post-neonatal deaths

In Papua New Guinea, very little is known, let alone published, on stillbirths, deaths in the neonatal (first 4 weeks of life) and the post neonatal phase (remaining 48 weeks of the first year of life). This is hardly surprising since these detailed statistics are usually rather inaccurate even when death registration in general is almost complete. An example of this in the South Pacific Region is Niue, a country where virtually all deaths are covered by the civil registration system, but where registration of stillbirths and neonatal and post-neonatal deaths is still deficient. (Bakker, 1979, pp. 171-177). It cannot be expected that reasonably reliable statistics on stillbirths and neonatal and post-neonatal deaths will be available in Papua New Guinea in the near future.

d. Inaccuracies in birth registration caused by adoption

Adoption is very widespread in Papua New Guinea and during censuses and surveys, parents often make no difference at all between reporting of natural and adopted children. The adoption bias in patterns of fertility derived from census and survey data is therefore very serious. There is also an adoption bias in the births recorded in the Register of Births. If the birth of a child has been reported to the Registrar General's Ofice by the natural parents, and the child is later officially adopted, the original birth record is destroyed and replaced by a record stating particulars of the foster parents. However, official registration of adoption is at present more an exception than a rule, and the adoption bias in the Register of Births is a problem which is still negligible. However, it will almost certainly become significant in the future, if and when the coverage of births by the civil registration system is improved.

## IV. SOME SUGGESTIONS FOR IMPROVEMENT IN THE NEAR FUTURE

In this section the potential of three approaches to improve the coverage and accuracy of vital registration in Papua New Guinea will be discussed. These are: (1) nationwide enforcement of the civil registration system through the Registrar General's Office, (2) introduction of a nationwide collection system of vital events on a sample basis through other government departments, and (3) improvement of the collection of vital events through the PDS and the Health Department.

### 1. Nationwide enforcement of the civil registration system through the Registrar General's Office

It is obvious that the first and most important requirement for the enforcement of the civil registration system in Papua New Guinea is the establishment of a nationwide system of local registrars. It is not likely that this will happen in the near future. Recently, however, there have been some notions about improving the registration of vital events in some of the most advanced provinces, or parts of provinces. For instance, it would seem that the problems connected with the operation of a civil registration system are not much worse in the provinces in the Islands Region of Papua New Guinea than in countries like the Solomon Islands and Vanuatu. It should be

possible to improve the coverage of civil registration significantly with relatively little effort within a very short period of time in some provinces and/or areas, e.g., Manus, most of New Ireland Province, the Gazelle Peninsula of East New Britain and Kieta District in North Solomons Province.

As mentioned before, the registration of vital events can be improved significantly now by better coordination between the Registrar General's Office and other government departments, especially the Health Department. However, it cannot be expected that even if the organizational structure needed for civil registration was established and all registrars and sub-registrars were appointed within the next few years, that this would automatically result in a reasonably complete and accurate civil registration system within the next few decades. In this respect, it seems instructive and advisable to look at the experiences with civil registration systems in other countries in the South Pacific Region.

As has been mentioned in Section III of this paper, no civil registration system in the region is as yet complete, although some of these systems have been in existence for more than 100 years. Therefore, it seems ludicrous to assume that the establishment of such a system in Papua New Guinea would lead to complete and accurate vital statistics within a few decades, the more so since the difficulties in operating such a system in Papua New Guinea would be considerable compared with those encountered in other countries in the region. It should, however, be stressed that a civil registration system can be very valuable from the legal and/or administrative point of view long before it becomes of statistical value. Vital events collected by civil registration systems are first of all recorded for legal and administrative purposes and collection of vital statistics is only a byproduct of such systems. In many countries, the compilation of vital statistics from civil registration records has a very low priority or no priority at all.

Recently, it was proposed to set up a vital registration system in a Study Area in Papua New Guinea and to collect information of all vital events in this area. Manus Province was selected as the easiest of the 20 provinces for a Study Area. Manus Province is the smallest province in Papua New Guinea, the communication system and the educational level of its population is superior to that of other provinces, excluding NCD. The experience gained in the Manus blueprint will probably lead to a better understanding of all problems connected with the introduction and management of a civil registration system in Papua New Guinea.

2. Introduction of a nationwide collection system of vital events on a sample basis through other government departments

Such systems include a Sample Registration System (SRS), a Dual Record Vital Event Recording System (DRVERS), and Single and Multi-Round Retrospective Surveys (SRRS and MRRS). To date, collection of information on vital events through a SRS or through a DRVERS has not yet been attempted in any country in the South Pacific Region. There are some very obvious and good reasons for this. In the case of the DRVERS, it is clear that this system must be considered as less suitable for the South Pacific Region, in general, and Papua New Guinea, in particular. This system is extremely costly and administratively rather complicated and can only be introduced successfully and maintained if abundant external assistance is available. For countries like Papua New Guinea with excessive administrative and communication problems, the introduction of such a costly and complicated system is not to be recommended. Moreover, the basic prerequisite for this system, viz., the necessity of complete independence of the two basic data sources, will be difficult to obtain in most countries in the region, including Papua New Guinea.

The usefulness of a SRS in a country with a decentralized system of government like Papua New Guinea also seems doubtful. A SRS or any other data collection system should not only provide national estimates of age specific fertility and mortality but also provincial and probably even district estimates. The size of the sample required to obtain age specific fertility and mortality rates with acceptable standard errors will be discussed further on in this section.

A number of retrospective population surveys have been conducted in Papua New Guinea, but most of these surveys were not meant to collect information on vital events and/or they collected information for small areas in the country only, (e.g., the Tari project in Southern Highlands Province). It is not statistically feasible to extrapolate the findings of these small area studies to larger areas. The only nationwide attempt to collect data on mortality and fertility through a sample survey was the 1981 sample survey in the Rural Village Sector as part of the 1980 census operation. Data from this stratified cluster sample survey were used as input for indirect estimation of mortality and fertility indices. For instance, no direct question on deaths which occurred in the year prior to the survey, were asked. Direct computation of mortality indices from

answers to questions of this type would need a sample survey of a considerable size. The following example will illustrate this point: One wants to make an estimate of the crude death rate in a province in Papua New Guinea through a sample survey. During this survey all selected households are asked to report deaths which occurred during the year prior to the survey. It is unrealistically assumed that the information is not affected by non-sampling errors, in other words, all deaths are recorded once and only once, there is no confusion about live births and stillbirths, there are no reference period errors, etc. If the required precision of the sample estimate of the crude death rate is maximally 1 per thousand (95% confidence interval), and it is further assumed that the actual crude death rate is 15 per thousand, the sample size should be approximately 70,000. To become a statistically worthwhile exercise such a sample survey should not only provide a crude measure of mortality but reasonably accurate age-sex specific mortality rates as well. In order to achieve this, the sample size would have to be increased drastically.

Experiences from demographic surveys in other developing countries indicate that the optimal size of the sample in a SRRS which attempts to estimate age-specific mortality for 5-year age groups directly, ranges from 100,000 to 200,000 persons. A sample of 100,000 persons or approximately 20,000 households should be considered as the absolute minimum for a demographic sample survey of this type, if it is attempted to estimate mortality indicators directly. If the sample is smaller, the number of events in the smallest subgroup for which information is required becomes too small and consequently no reliable information of sufficient detail will be obtained. If the sample is much larger than 200,000, the non-sampling errors usually increase rapidly, and the gain in decreased sampling errors will most likely be nullified by the increase in non-sampling errors. If the reference period is increased to a longer period than one year, the sample size can of course be reduced. However, in that case, reference period errors will usually increase drastically.

A MRRS, conducted over a period of several years, with visits at regular intervals, would definitely offer better prospects as far as the reliability of the results is concerned. In the case of a MRRS, the sample could be considerably smaller and reference period errors would be reduced to a minimum. The size of the sample would still approach the total population size of some of the smaller provinces in Papua New Guinea. In addition, the administrative, communication, identification and many other problems connected with the introduction and operation of a MRRS would almost be insurmountable and the costs might well be prohibitive, the more so since the interval between the rounds should ideally not be more than one year and preferably less. It should be noted here that the Rural Population Register (RRP) which has now been introduced in the Rural Village Sector of Papua New Guinea shares some characteristics with the MRRS. The RPR, however, attempts to give a full coverage of the population in the Rural Village Sector. So far, it does not seem to be feasible to update the RPR in all provinces at regular intervals and the period between updates are much longer than what is considered as desirable in a MRRS. The possibilities of the RPR will be discussed under point 3 of this section.

It is also possible to obtain information on births and deaths through indirect estimation from data collected during a sample survey. As mentioned before, this was done during the 1981 sample survey in the Rural Village Sector as part of the 1980 census operation. If indirect estimation is used, the size of the sample can be considerably smaller. However, in the case of indirect estimation, models have to be used to make up for the dearth of basic data. Generally speaking, mortality and fertility patterns can often be represented adequately by a model. In estimating fertility and particularly mortality indices from census data in Papua New Guinea, extensive use has been made of models. Mortality patterns in 1980 have been derived using two-parameter model lifetables. The same procedure could be used in a sample survey of a limited size where the relevant retrospective questions have been asked.

Last but not least, it should be stressed that the collection of vital events in a Study Area, as mentioned under point 1 in this section, should not be confused with the collection of vital events in sample areas. The Study Area selected, Manus Province, is not at all representative of total Papua New Guinea as far as fertility and mortality conditions are concerned. Manus Province has been selected because it is at this stage the only province where such a study can be conducted with a reasonable chance of success.

From all the comments in the foregoing, it follows logically that the collection systems based on a sample are not the most obvious systems for the direct estimation of mortality and fertility indices at the provincial (or lower) level in Papua New Guinea. Indirect estimation from data collected during reasonably sized sample surveys seem to offer better prospects but only if the ideal conditions underlying the methods which are used in the estimation procedure are approximated in reality and the non-sampling errors are within reasonable limits.

Finally, it should be stressed that all systems discussed under point 2 of this section are statistical systems and that they can never fully replace a legal civil registration system.

3. Improvements in the collection of vital events through the PDS and the Health Department

Apart from the small-scale surveys mentioned under point 2 in this section, some churches and missions in Papua New Guinea also collect information on vital events. This information, however, is usually restricted to the members of a particular church or mission only and is therefore of limited use as a source of statistical information. The PDS as well as the Department of Health attempt to collect vital statistics on a nationwide basis, although the PDS provides information for the Rural Sector of each province only. In this section, the current situation and the potential of both sources of information as far as the collection of vital events is concerned will be further discussed.

a. The Provincial Data System

As mentioned in Section I, the system of "Village Books" as part of the PDS was revitalized prior to the 1980 census. The pre-1980 rounds of PDS collected vital events in a very elementary form on the ACFs. The aggregated data on the ACSs is of very limited statistical value. In 1984, however, the ACF was replaced by the Rural Population Register (RPR). This is a modified and computerized version of the ACF. It is clear that the RPR offers, at least theoretically, much better possibilities than the ACF. If all births (by age of natural mother) and deaths (by age) which occurred since the previous update are recorded on the RPR during a visit of the PDS team, it is possible to calculate patterns and levels of fertility and mortality directly from these data. It is very unlikely that all births and deaths which occurred in the interval between visits will be reported. In order to obtain a good coverage of the vital events in the interval, the interval has to be short, say six months but definitely not more than one year. Even with such a short interval between visits, many infants who are born and die between visits will not be reported, especially if these infants die before they have been given a name.

Because of the inaccessability of large parts of the country and the related transport, communication, administrative, financial and other problems, it was deemed unfeasible from the outset that in most provinces the interval between visits of the PDS team would be less than three years. In a MRRS with the objective of collecting information on births and deaths, such a long interval would be completely unacceptable.

In reality, the situation is even worse. After the 1978/1979 round, many provinces did not attempt to update their PDS. With recall periods running to five years or more, it is certain that a very significant proportion of the vital events which occurred between updates will never be reported. At present, the recall period problem is eased somewhat because the first RPR for each province has been computer generated from 1980 census data. The drawback of this approach is that some persons who were on the Village Book of a particular census unit in 1978/1979 and were not enumerated in that census unit in 1980, may not be added on to the RPR during the next update.

It is still hoped that in the near future, at least the "easier" and most advanced provinces will be able to update their RPRs at triennial intervals. What kind of results can then be expected from the RPRs in these provinces? As far as births are concerned, these will almost certainly be underreported. Consequently, the RPR will provide an underestimate of the level of fertility. The pattern of fertility will be somewhat biased. The extent of the bias will depend on the proportion of adopted children which will be linked with their fostermother instead of their natural mother, and also on the extent of age misreporting by mothers. It may be expected that the adoption bias in the fertility pattern estimated from the RPR will be less than the adoption bias in the fertility pattern estimated from the 1980 census, especially when the interval between rounds is not going to exceed 3 years.

Babies born between updates that died before the most recent update and are not reported have some impact on the fertility indices and a very significant impact on infant death statistics. As long as the intervals between rounds cannot be reduced to one year or less, it cannot be expected that reasonably reliable infant death statistics will be obtained from the RPR.

It should be possible to obtain a reasonable picture of adult mortality from the RPR. Once a person has been recorded on an RPR and he/she is not present any more during the most recent round, he/she has either moved out or died. If he/she died, it should not be too much of a problem to

establish the year of death, even if the interval between rounds is 5 years or more. The computer then calculates the age at death from the recorded birth date (for older persons only an estimate of the year of birth is usually available) and the date of death. An estimate of the age at death by proxy-respondents is, therefore, not required in this system.

If a person has moved out, he/she will still be considered a resident of the census unit, if the period of absence is not more than six months. This means that he/she will still be included in the denominator of rates. If he/she died during those six months, the event will be included in the numerator of death rates for the place he/she usually lived before dying.

If adult deaths are not all recorded, but the proportions of the unrecorded deaths is reasonably constant by age, it is possible to make an estimate of underreporting of adult deaths and hence adjust the death rates. One method which has been applied in several countries in the South Pacific Region is Brass' "Growth Balance Method", (Brass, 1975, pp. 117-123). The method cannot be used meaningfully in cases where omission of deaths of adults cannot be considered as independent of age, in cases where there has been a very substantial decrease in the birthrate in recent years and in cases of populations affected by massive in-or-out migration.

In the near future, an increasing proportion of persons will probably die, and an increasing proportion of women will probably give birth in an institution (hospital, health centre, maternity unit, etc.). It is imperative that these deaths and births are recorded on the RPR of the census unit where the persons usually live (or lived). As has been seen in Section I, this is often not done in the case of birth and death records of the Health Department.

An important aspect of the RPR is its complete coverage of the population in the Rural Sector. This means that eventually fertility and mortality rates (specified by age, sex and possibly other characteristics) can be calculated for small geographic units, (district, census division, community government area, etc.). When the results of the first update after the 1980 census have been processed, it will be possible to estimate provincial indices of fertility and adult mortality if the basic data are of a reasonable quality. Also, by aggregating the deceased persons into broad age groups, and by aggregating deaths over longer periods (say 5 years), some estimates for small geographic units can be made after the first update, given reasonable quality of the basic data. It should be stressed again that the RPR is a data collection system for the Rural Sector only. It is not feasible to extend the system to the Urban Sector. This is only one of the reasons why the RPR can never replace a civil registration system.

It should also be pointed out that updating the PDS is a provincial responsibility. The National Statistical Office has produced the first RPRs for all provinces from 1980 census records and assisted in the training of field staff. In the future, the editing and processing of PDS data will be done in the provinces and the National Statistical Office will receive copies of the provincial tapes in order to produce regional and national estimates. It is imperative that the editing and processing procedure will be under very strict control of the National Statistical Office, in order to ascertain that the output will be as uniform as possible for all provinces.

Some variation in output is, of course, inevitable and even desirable because of specific requirements of the provinces. However, there is hardly any scope for variation in the output of vital statistics. A decentralized development of the PDS as a source of vital statistics without proper control at the national level is not desirable. This refers, not only to the PDS in the processing phase, but to all phases from planning, data collection, processing and compilation to analysis, publication and dissemination. In all these phases, it is of utmost importance that a uniform set of rules be applied. The application of different concepts and coverage rules for the numerators of vital rates (the vital events) as well as different coverage rules for the denominators of these rates (the population undergoing the risk of these vital events) may well render the vital rates derived from the PDS data almost useless, especially if these rates are used for interprovincial comparisons of the demographic situation.

In conclusion, it may be stated that the potential of PDS as a source of information on the most basic characteristics of a population, including vital events has been greatly enhanced since computerization. In addition, it is also possible now to cross-classify data from PDS with data from other sources (such as censuses, the National Nutrition Survey and the Urban and Rural Household Surveys) as long as these sources use the same geographic framework as the 1980 census.

It is not yet possible to assess how well the revised version of the PDS will perform in practice. The first provinces have only just started to use the RPR for the update of their PDS.

Since the PDS is a provincial responsibility, it is clear that the quality of the data will, to a very large extent, depend on the interest which provinces have in the results of the system. The interest factor has been very variable in the past and this will probably remain so in the future. In most provinces, it is unlikely that the quality of the PDS data will be very high in the initial phase. However, in those provinces where there is enough interest to update the PDS at relatively short and regular intervals and a reasonable effort is made to train the interviewers and to collect, edit and process the data, the PDS will be an extremely valuable source of information on the basic characteristics of the population in the province.

b. The Department of Health

From what has been said in Section I of this paper, it is obvious that the coverage of the registration of vital events by the Department of Health is also very deficient. However, the collection of vital events through the Department of Health has a number of advantages over that through the PDS, viz.:

i. A rudimentary network of "local registrars" is already available through the Health Department. Recently, there have been plans in the Department of Health to make more use of the aidpost orderlies (APOs) in the health registration system. At this stage, however, these plans are still in an early phase because of the difficulty of obtaining a complete register of all health facilities run by the department as well as by institutions (such as churches and missions), private companies, etc., in many of the provinces.

ii. Information on vital events collected through the PDS is of the most basic nature. For assessment of the health situation, evaluation of health and health-related projects and health planning, much more detailed information than that now being collected by the PDS is required. This information includes diseases, cause of death, death in the neonatal, post-neonatal and perinatal phase, stillbirths and abortions, maternal mortality, nutritional and environmental information, etc. It is clear that this type of information can only be collected by health personnel in hospitals, health centres, maternity units, CHNS clinics, and by special health teams. It is not feasible to collect it through provincial administrative patrols during a PDS update.

iii. The data collection system of the Health Department covers, at least in principle, all geographic sectors of the country whereas the PDS is a data collection system for the Rural Sector only.

iv. Last, but not least, the awareness of the importance of complete and accurate vital statistics is understandably much stronger in the Department of Health than among most persons involved in data collection through the PDS. There is much evidence of the willingness of the Health Department to improve the collection of vital events through the existing network of health facilities. An example of this is the attempt to improve cause-of-death statistics by involving staff at the lowest level, i.e., the APOs. It can not be expected that APOs will ever be trained adequately to diagnose all diseases and causes of death correctly. However, tests have shown that many APOs were able to diagnose the most common diseases after they had received some basic training.

The potential of the registration system of the Health Department as far as coverage is concerned, seems to be at least as good as the potential of PDS. However, as in the case of PDS, improvements in the registration of vital events through the Health Department will, to a large extent, depend on provincial activities in this field. So far these activities have varied widely. Some provinces like Manus and East New Britain have shown a lively interest in improving their system. Other provinces have hardly shown any interest at all. In the near future, coverage and accuracy of vital statistics in the provinces will probably be very highly correlated with the priority which the Provincial Health Officers attach to the improvement of vital registration. However, even if all medical records were to be filled in accurately, it would still need a well-trained medical record officer to translate the raw data into meaningful statistical information on vital events. As has been mentioned before, the situation, as far as the level of training of medical record officers is concerned, is very far from ideal. Gilfillan (1980) noted that "many of those who work as clerks in the medical record departments are still classified as casual labourers. Provision for this to be corrected exists and righting the situation should be given immediate attention". So far, the situation has not improved significantly. Most personnel working in the field of medical records are still very inadequately trained.

Finally, it should again be emphasized that a vital registration system by the Department of Health is basically a medical-statistical system which ultimately cannot replace the legal civil registration system.

## 4. Summary and conclusions

Nationwide vital statistics which are presently available in Papua New Guinea are very incomplete and deficient with the exception of those derived from census data. The vital statistics derived from this latter source, though by no means of a very good quality, are at least reasonably accurate. A number of possible reasons for the incompleteness and inaccuracy of vital statistics have been discussed. Finally, a number of avenues towards improvement of the situation have been explored.

Although it may be expected that Papua New Guinea will eventually establish a national civil registration system, there are at present no plans to do so in the immediate future. As has been shown, the use of the system in the Rural Village Sector is not feasible under the current circumstances.

The collection of data on vital events on a sample basis has been minimal so far in Papua New Guinea. Direct estimation of mortality indices from data collected from these sources has many disadvantages and limitations such as the very large sample needed in order to obtain vital statistics of sufficient detail and accuracy, very large administrative and identification problems, prohibitive costs, etc. Indirect estimation of vital statistics through these methods offers somewhat better prospects as can be seen from the results of the 1981 sample survey in the Rural Village Sector as part of the 1980 census operation.

The two existing nationwide collection systems of vital events, the PDS and the Health Department registration system have not been able to provide vital statistics of acceptable quality. However, the potential of both systems is much better than what one could judge from the results so far. The revised and computerized PDS should provide reasonably reliable basic population statistics in the most advanced provinces in the near future. Current plans in the Health Department to make optimal use of the existing health network to improve the registration of vital events will probably have some success given the awareness of the importance of complete and accurate vital statistics in this department.

It would, therefore, seem that for the time being the main thrust towards improvement in coverage and accuracy of vital statistics has to come through the combined efforts of the Health Department and the National Statistical Office, in close cooperation with the provincial authorities. The statistics collected by these two departments are, to some extent, complementary. The PDS does not cover vital events in the Urban Sector, whereas coverage of vital events by the Health Department is still particularly low in the Rural Village Sector. This means that probably for some time to come, PDS will be the main source for some of the most basic vital statistics in the Rural Village Sector (of course, apart from future censuses). Such a system of "walking on two legs" has many very obvious disadvantages and limitations, but it is probably the best that can be expected in the forseeable future.

Improvement of the completeness and accuracy of vital statistics is a must. Data from the PDS and the Department of Health which are available at present are insufficient for a meaningful assessment of health policy and optimal health planning in Papua New Guinea.

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