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**HANDBOOK
OF VITAL STATISTICS
SYSTEMS AND METHODS**

Volume I:

Legal, organizational and technical aspects



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NOTE

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PREFACE

The United Nations *Principles and Recommendations for a Vital Statistics System* was adopted by the Statistical Commission at its sixteenth session in 1970, and subsequently published by the United Nations in 1973.¹ The present *Handbook of Vital Statistics Systems and Methods* has been prepared to provide guidance to Member States and other interested organizations and individuals in implementing the principles and recommendations.

Although a comprehensive national system of vital statistics may draw on data from a number of sources, the *Principles and Recommendations* gives priority to civil registration as a method of collecting information on vital events. For this reason, the present *Handbook*, while concerned with all aspects of a comprehensive system for the collection and compilation of vital statistics, strives to give special attention to civil registration of vital events, including the special problems of integrating the registration and the statistical aspects of a vital statistics system. As such, the *Handbook* is designed to assist those concerned with both the registration and the statistical aspects of vital statistics.

The *Handbook of Vital Statistics Systems and Methods* is being issued in two volumes. Volume I, the present publication, considers the historical evolution of civil registration and vital statistics systems, uses of vital records and statistics, the legal frame and administrative structures for civil registration and vital statistics, procedures for recording and reporting vital events, methods to evaluate coverage and quality of civil registration and vital statistics, strategies for improving coverage, timeliness and quality of civil registration and vital statistics, the linkage to the continuous population register and other data collection methods and techniques to estimate vital rates.

Volume II of the *Handbook*, published in 1984,² presents the results of a study of national practices on civil registration systems and vital statistics methods. Using data collected by the United Nations, it discusses the experiences for 105 countries and areas of the world in the recording and processing of vital events through the civil registration and other administrative systems such as health, judicial and related systems.

Volume I has been prepared over a period of years. Many people have been involved in its preparation and revisions. A first draft was discussed at an expert group meeting held in New

York from 5 to 9 December 1983 and comments and recommendations of the expert group have been incorporated in the revision of the draft. The present volume was completed by the Secretariat with valuable contributions from Anne Freedman (United States of America), Adolfo Gaete-Darbo (Chile), Jay Glasser (United States of America), Andras Klinger (Hungary), Iwao Moriyama (United States of America), and Sam Notzon (United States of America), some of whom participated in the expert group meeting.

The issuance of the *Handbook* is part of the continuous work of the Statistical Office of the United Nations Secretariat in implementing the United Nations World Programme for the Improvement of Vital Statistics, adopted by the Economic and Social Council in accordance with its resolution 1307 (XLIV) of 31 May 1968.³ The present *Handbook* supersedes the 1955 *Handbook of Vital Statistics Methods*,⁴ which analysed the national vital statistics systems of 66 countries and areas and which was prepared in connection with the 1953 *Principles for a Vital Statistics System*.⁵

Users of the present *Handbook* may wish to refer to one or more of the following United Nations publications dealing with related issues and subjects: *Handbook of Statistical Organization*,⁶ *Handbook of Household Surveys*,⁷ and *Principles and Recommendations for Population and Housing Censuses*.⁸

NOTES

¹ *Official Records of the Economic and Social Council, Fiftieth Session, Supplement No. 2 (E/4938)*, paras. 100-106; and *Principles and Recommendations for a Vital Statistics System* (United Nations publication, Sales No. E.73.XVII.9).

² *Handbook of Vital Statistics Systems and Methods*, vol. II, *Review of National Practices*, Studies in Methods, Series F, No. 35 (United Nations publication, Sales No. E.84.XVII.11).

³ *Official Records of the Economic and Social Council, Forty-fourth Session, Supplement No. 10 (E/4471)*, para. 134 and chap. XV.

⁴ United Nations publication, Sales No. 1955.XVII.1.

⁵ United Nations publication, Sales No. 1953.XVII.8.

⁶ United Nations publication, Sales No. E.79.XV.17.

⁷ United Nations publication, Sales No. E.83.XVII.13.

⁸ United Nations publication, Sales No. E.80.XVII.8.

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INTRODUCTION

1. Civil registration may be defined as the continuous, permanent, compulsory recording of the occurrence and characteristics of vital events, namely, live births, deaths, foetal deaths, marriages, divorces, as well as annulments, judicial separations, adoptions, legitimations and recognitions. It is provided through decree or regulation in accordance with the legal requirements in each country. Civil registration is carried out primarily for the value of the legal documents as provided by law. However, information collected through the registration process about vital events provides useful and important statistics. As such, civil registration is an individualized source of continuous vital statistics.

2. In 1955, to assist countries in the development and appraisal of their vital statistics, the United Nations published the *Handbook of Vital Statistics Methods*.¹ The purpose was to explore prevailing civil registration and vital statistics practices, to make available recommended statistical standards, and to present uniform concepts, definitions and procedures in order to enhance the development of national vital statistics and improve international comparability. In 1973, the United Nations published *Principles and Recommendations for a Vital Statistics System*,² which superseded an earlier publication on the subject issued in 1953.³ The 1973 publication incorporated much of the information in the *Handbook of Vital Statistics Methods* with respect to principles, definitions and recommended registration and vital statistics practices and procedures, including recommendations on the topics to be investigated and the vital statistics tabulations to be made.

3. The present *Handbook of Vital Statistics Systems and Methods*, which is published in two volumes, addresses many of the issues involved in running comprehensive civil registration and vital statistics systems. The *Handbook* also stresses the necessity of coordinating different programmes of data collection so that they complement each other regardless of the methods of data gathering. It recommends the use of standard concepts, definitions and classifications in all vital statistics sources and emphasizes the importance of close coordination between the population census and the civil registration system. The accuracy of census data may be evaluated if vital statistics generated from the civil registration system are reliable.

4. Volume II of the *Handbook* was published in 1985. It discusses national practices in recording vital events and compiling vital statistics through the civil registration system. It also discusses either recording and processing of vital events through administrative systems such as health, judicial and related systems if they are closely coordinated with the civil registration system, or in a broad sense, are considered part of it.

5. Volume I, the present publication, has eight chapters. Chapter I discusses briefly the historical development of civil registration and vital statistics systems. Chapter II illustrates the uses of registration records of vital events for various purposes, from the point of view of both individuals and society. The use of vital statistics in population estimates and projections, in social, epidemiological studies, in maternal and child care, in family planning and in other studies or programmes is then discussed.

6. Chapter III discusses guidelines for the organization, administration, day-to-day operation and legal foundation of the civil registration system. The system is conceived both as a source of continuous vital statistics and as a public institution that generates important legal records to assert that vital events have occurred and to state changes in the civil status of the population. The discussion covers personnel issues; the network of registration offices and their administration; office equipment,

supplies and other facilities; procedures for recording and reporting vital events; the handling and safekeeping of registration records.

7. Chapter IV introduces the vital statistics system as one that collects, analyses, evaluates, presents and disseminates vital statistics from both the civil registration system and the enumeration methods, such as sample surveys, population censuses and so forth. It features different types of organizational structures that might be used to process and evaluate the data and stresses the coordination efforts necessary among statistical and registration agencies. As the emphasis is laid on its relationship with the civil registration system, detailed and descriptive guidelines are given on the statistical reporting process, data flow, report formats, content and item definitions, the processing of the data by both manual or computerized methods, the annual vital statistics tabulation programme, the calculation of vital rates, and the publication of vital statistics data.

8. Chapter V focuses on the direct and indirect techniques available to assess both quantitative and qualitative accuracy of civil registration and vital statistics which are applicable mainly for births and deaths. Chapter VI discusses the strategy for improving defective civil registration and vital statistics systems. Cooperation and coordination with other government agencies along with training of civil registrars, health personnel and statisticians are viewed as major areas that can lead to effective strengthening of the systems. Chapter VII outlines basic features of the population register and its organization and puts emphasis mainly on its linkage with the civil registration and vital statistics systems. A practical insight to the operation of the population registers and the stage of their development is illustrated by means of country examples. Chapter VIII features the other methods of data collection, e.g., the population censuses and the household sample surveys to provide the data required for the estimate of the vital rates. It also presents a broad overview of the available indirect techniques for estimating vital statistics and vital rates.

9. There are many differences in national registration laws and regulations, in the way the registration and vital statistics systems are organized and administered, and in the practices and procedures for recording and reporting vital events. These subjects are discussed in Volume II. The differences stem from the historical development of registration and statistics systems, as well as from the socio-economic conditions prevailing in the country. In fact, cultural factors, the geographical distribution of the population, physical geography as it affects accessibility to local registration offices, and the availability of human and financial resources, are all factors that have an important bearing on organizing and maintaining a comprehensive civil registration system.

10. Because of the broad range of conditions and situations that exist, it is frequently difficult to propose a single unqualified solution to a problem in a country. In most cases, however, it is possible to find reasonably satisfactory solutions by studying the practices of a group of countries responding to particular conditions.

NOTES

¹ *Handbook of Vital Statistics Methods*, (United Nations publication, Sales No. 1955.XVII.1).

² *Principles and Recommendations for a Vital Statistics System*, Series M, No. 19, Rev.1 (United Nations publication, Sales No. E.73.XVII.9).

³ *Principles for a Vital Statistics System* (United Nations publication, Sales No. 1953.XVII.8).

I. HISTORICAL DEVELOPMENT OF CIVIL REGISTRATION AND VITAL STATISTICS SYSTEMS

A. INTRODUCTION

11. A civil registration system records the occurrence of the events of birth, death, marriage, divorce, annulment, separation, adoption, legitimation and recognition in accordance with the legal requirements of a country. These events are all related to an individual from life to death and all the changes in civil status which may occur during the individual's lifetime. The registered information can be compiled as vital statistics providing a description of the frequency and characteristics of the vital events. To place civil registration and vital statistics systems in their proper perspective, it is useful to have an understanding of the history of those systems, including the origin of registration records and vital statistics and the efforts of countries and of international organizations to improve the systems.

12. The registration of vital events appears to have been known in ancient Egypt for public administration purposes such as taxation, labour, military conscription. There are historical references suggesting that registration had been carried out by civil authorities for similar purposes in ancient China (c. 10 B.C.), Greece (c. 4-5 B.C.) and Rome (c. 2 B.C.) and later in Japan (twelfth century), Korea (A.D. 668-935) and Peru (by the Incas, A.D. 1200-1531). The recording of vital events became the concern of ecclesiastical authorities mainly in Europe and the Americas, which then as now had responsibilities for religious rites and ceremonies in connection with baptisms, weddings and burials.

13. In Europe, during the Middle Ages, baptism of every child was compulsory; likewise, in order to receive the sanction of the church, weddings and burials also came within the purview of the clergy. The participation of the clergy in ceremonies associated with any of these three events was usually accompanied by a payment of some sort. The recording of the payments, or the lack thereof, produced a limited register of baptisms, weddings and burials. The registers so produced were limited in quality and covered a small minority of the population. The deficiencies resulted from the fact that the ecclesiastical registers record payment for ceremonies rather than the occurrence of events. Furthermore, they were restricted to religious rites among a specified denomination of the parishes and were maintained solely at the discretion of the priest in charge. The historical development of the civil registration systems in a selected number of countries is given below. Not all the historical systems still exist. A description of the current national systems for civil registration and vital statistics in the world, including their dates of establishment, is given in chapter I, volume II, of this *Handbook*.

B. DEVELOPMENT OF CIVIL REGISTRATION AND VITAL STATISTICS SYSTEMS

14. The beginning of civil registration in Europe may be traced back to the fifteenth century in Spain, when Cardinal Ximenes, Archbishop of Toledo, provided for the introduction of registers which were to be maintained regularly by the parish priests. However, the systematic registration of births and deaths under secular administration was established only in 1871, modelled closely after the Belgian system. In turn, the Belgian system followed the general guidelines of the Napoleonic Code of France.¹

15. In 1538, the clergy of England were required to record

baptisms, marriages and burials by order of Thomas Cromwell, Vicar General under Henry VIII.² After many reforms in Britain, the modern registration of births and deaths and the solemnization of marriages developed after the enactment of two Acts: the Births and Deaths Registration Act of 1836 and the Marriage Act of the same year, both of which came into operation in 1837. Under these Acts, the post of Registrar General was created to supervise the work of local civil registrars in areas based in unions of parishes. But it was not until 1874 that civil registration became compulsory. Various reforms were brought about through the years to improve the system. At present, the Marriage Act of 1949, the Registration Service of 1953 and the Births and Deaths Registration of 1953 are the main statutory powers to register marriages, births, deaths and foetal deaths.

16. An important landmark in the history of vital statistics is the publication in London of the old Bills of Mortality. The earliest known Bill of Mortality is believed to have been published in 1532. The weekly bills listed the number of deaths from plague and other diseases in the various areas of London. For over 100 years, bills consisting of a list of baptisms, marriages and burials, were compiled by parish clerks before anyone conceived of the possibility of making an analytical study based on these observations. In 1662, John Graunt published a series of inductive observations under the title *Natural and Political Observations*, based upon the Bills of Mortality.³

17. In France, civil registration was introduced in the sixteenth century. In 1539, the Ordinance of Villers-Cotterets was promulgated by Francis I. This prescribed that the parish priests should maintain registers of baptisms and burials relating to persons residing within the limits of the parish. The Roman Catholic Council, which met at Trent, Italy, in 1563, ordered the extension of registration to marriages. Later, in England the ordinance of Henry VIII, in 1579, required the clergy to maintain registers of births, marriages and deaths. Statistical utilization of the registers of the parishes became possible with the declaration of 9 April 1736, which required curates, vicars, parish priests and other church officers to deposit with the bailiwick every year a duplicate of their registers of baptisms, weddings and burials and provided that records of deaths of persons not accorded ecclesiastical burial be kept by police officers.⁴ This was augmented in 1772 by a circular addressed by the Abbé Terray to the intendants, requesting them to prepare from the register each year, beginning in 1770, a summary of births, deaths and marriages which had occurred in their districts. Under the law of 1792, civil registration was secularized. The communal and municipal mayors were charged with the maintenance and safe custody of civil registers: "The mayor (or his deputy) was nominally responsible for all civil records of the population, and as such, was the sole authority in the area competent to receive declarations and to draw up the necessary acts of births and deaths as prescribed by law".⁵

18. A landmark was introduced in France in 1803 when civil registration became compulsory under French Civil Law⁶ (in 1807, the law was renamed the Napoleonic Code). The corresponding section of the Code reinforced the responsibility of the State for recording births, marriages and deaths. It set forth exact provisions for determining who should report the event, who should record it and what the record should contain. All of the provisions of this Civil Code were concerned with the legal or civil rights of an individual, because civil rights could be

granted only by the state and proof of one's claim to such rights was dependent on official registration. Therefore, the legal purpose for which civil registration of vital events was designed began to assume an importance which was to increase with the development of French society. It may be noted that the individual as the unit of civil registration was established firmly by the Code. In France, this system, with subsequent improvements over the years, has continued to the present day and is the source of complete vital statistics of births, deaths, late foetal deaths, marriages and divorces for which individual statistical reports are filled in at the time of registration.

19. From the history of vital events registration in the above and other European countries, all of the early developments in Europe took place in the Christian Church, governed by various orders and related essentially to the ceremonies of baptisms, weddings and burials, until the secularization introduced by France in 1792.

20. The influence of the general guidelines of the Napoleonic Code can be found in the organization of civil registration throughout Western Europe, parts of the Northern and Latin American countries and areas of the Middle East which came under the French rule.

21. In Northern Europe, by 1608, the first systematic parish register was established in Sweden, followed by similar registers in Finland (1628) and Denmark (1646). These were actually the earliest known population registers in Europe. However, the organization of vital statistics made great progress during the nineteenth century. The enumeration aimed at finding the population which *de jure* belonged to the parish and which was to be found in the parish registers, even if the persons were living elsewhere in the country or abroad. Clergies were responsible for registration of births, marriages, deaths and migrations.⁷ It is linked with the population register for updating of the population change. Of the modern returns, Sweden probably has the longest unbroken series of vital statistics, starting about 1750. By the third quarter of the present century, all European countries had attained complete and reliable vital statistics.

22. The Incas of Peru (1200-1527 A.D.) established a peculiar procedure for recording births, deaths and other events as a responsibility of government authorities. This culture in the Americas gets the credit for first recording vital events, although neither the basic purpose nor the methods employed bear much relation to the modern concept of civil registration. According to Garcilaso de la Vega⁸ born in 1539 in Cuzco of an Incan mother and a Spanish father, the Incas, who had no written characters, used intertwining of coloured strings and knots to record facts. These record-keeping mechanisms, known as *quipus*, were in charge of *Quipucamayus* who "noted, by means of the knots, all of the tribute that was given to the Inca every year, specifying each household and its peculiar mode of service. They also recorded the number of men who went to war, those who died in them, those who were born and those who died in each month". This system was disrupted by the arrival of the Spaniards in 1531. The *quipus* were replaced by parish registers during the three centuries of Spanish rule. In 1852, three decades after Peru became independent from Spain, civil registration was secularized. Municipal authorities were made responsible for recording vital events.

23. A systematic organization of civil registration in Northern America was introduced, by written regulations, in the British colonies of Massachusetts Bay and New Plymouth early in the seventeenth century (1639).⁹ Government clerks were made the record keepers and, even more important, births, marriages and deaths were recorded rather than baptisms, weddings and burials. Massachusetts was the first to record the actual events and their dates, rather than the date of the subsequent ecclesiastical ceremonies. However, civil registration was not established in the United States of America. Only in 1909 did the United States Census Office become responsible for the collec-

tion and compilation of national vital statistics and start the establishment of the death registration area. Some 15 years later, the birth registration area was established. With the passing of time, each state and territory of the country began to establish autonomous civil registration systems. There are 55 different systems administered either by the state statistical office or by the health services of each state and territory. All of them are compulsory and cover all areas and population of the country.¹⁰

24. In Canada, there was a strong influence of the original parochial registration organization of France in the maintenance of registers of baptisms, marriages and burials, introduced by the priests at the time of the early French settlements on Canadian soil at the beginning of the seventeenth century.¹¹ It is believed that such registers followed the pattern of those that were in common use in France from about the middle of the sixteenth century. Numerous regulations appeared at various times during the period of the French regime, designed for the improvement of compilation of such records as the establishment of registers of births and deaths in duplicate under the terms of the regulation of 1736, together with the adoption of standardized forms of the Acts of birth and death. Records by the parish clergy continued to be maintained from the beginning of the seventeenth century until towards the close of the second half of the nineteenth century. Those records, however, reflected defects which characterized such records maintained under an ecclesiastical administration in other European countries. Efficient official control was lacking. In 1847, the first legislative effort towards regularizing these and other statistics of the country was made by the creation of the Board of Registration and Statistics for the province of Canada. No national Government existed in Canada prior to 1867 and the local governments (now provinces) were autonomous in all matters. The Act of Confederation of the provinces passed in 1867, the British North American Act, in addition to establishing a national Government, also set out the division of legislative powers of the national, provincial and territorial governments. Under the terms of this Act, matters relating to health, including civil registration, were left to the jurisdiction of the provinces. Since then, there has been a growing improvement of civil registration in the whole country to the point it has attained full coverage.

25. In Canada, while provision was made almost since the origin of each province for the registration of vital events, no national system of vital statistics existed until 1918, when a cooperative arrangement between the national Government and provincial authorities came into effect under the Statistics Act of 1918 which provided for the creation of the Dominion Bureau of Statistics (later renamed Statistics Canada). Since then, uniform procedures for vital statistical reporting have been introduced and copies of registration records have been supplied to the central statistical agency. The national statistical service provides a coordinating, advisory and processing service for the provincial registration authorities, who are in turn responsible for all legal and administrative aspects of the system.

26. In Egypt, registration of births and deaths dates back to 1839, but it was not compulsory until the end of the century.¹² The decree promulgated in 1912 provided for the compulsory notification of births and deaths occurring in Egypt, and the health bureaus of the Ministry of Health were made responsible for the registration of births and deaths. In 1960, the Department of Civil Registration was established in the Ministry of Interior, to which was given custody of all vital records (birth, death, marriage and divorce).

27. The decree of 1965 made further modification in the registration system. The responsibility for registration of births was returned to the health bureau, centre or unit, or to the chief of the village in areas without a health office. Marriage and divorce records before 1962 were in the hands of the religious and judicial authorities concerned. They became compulsory in 1963 with the establishment of the Department of Civil Registration in the Ministry of Interior.

28. In China, a civil registration system was reported to have been established as early as in the Western Zhou Dynasty (1100-771 B.C.). According to the old book *Zhouli-Qiuguan-Xiaosikou*, local registration offices were set up in urban centres and rural areas. There was a national registration office, *Siming*, in charge of registration. At the subnational level, *Zhou*, registration was the responsibility of *Zhouli* or the Chief of *Zhou*. Under *Zhouli*, there were *Luishi* and *Zai*. It was the duty of *Zai* to report the name, birth date and sex of all newborns to *Luishi* within three months after the birth. *Luishi* registered these births and prepared two reports, one kept in his office and another forwarded to the Chief of *Zhou*, who reported the statistics to *Zhoube*, a higher official, who then reported all events to the national office, *Siming*. *Siming* compiled the reported figures for the population who had "grown teeth" and deleted all reported deaths. Once every three years, *Siming* reported the total population of the country to *Sikou* who, in the tenth month of the year, presented the figure to the emperor. That year was called the year of *Dabi*.

29. A more comprehensive registration system was developed in the fourteenth century. During the period 1381-1391, on the basis of an enumeration of the entire population, *Huang-ce*, the Yellow Register, was compiled. The information contained in the Yellow Register generally included the age, sex and occupation of each member of every household, as well as a summary of the land and other forms of property owned and the amount of taxes and labour services borne by the entire household.¹³

30. During the period 1741-1775, the registration system was overhauled and entrusted to the *Baojia* machinery, which comprised the administrative units below the lowest formal government apparatus. *Baojia* staff served as unpaid population registrars and local police. They performed a variety of duties that would otherwise have had to be carried out by government employees. Once every three months, *Baojia* staff, after recording in their books all revisions in accordance with actual changes in the population of their units, exchanged their copies with the unrevised books kept by the local government. County officials checked the results of records and from time to time carried out verification of the books. Information such as the number, age and sex of the occupants of the household, their occupation, property and amount of tax payment were recorded. The *Baojia* registration system was more or less faithfully executed during the period 1776-1885 although regional under-registrations were unavoidable in different parts of the country.¹⁴

31. In 1958, a National Household Registration System was established and gradually registration reached the whole population. Vital statistics such as population size, births and deaths, marriages and divorces have also become available although detailed characteristics of the vital events are not registered or compiled.

32. The modern civil registration system in Japan originated and developed as an integral part of the family registration system according to the provision of the Family Registration (*Koseki*) law. The first *Koseki* law of 1872 had been promulgated with the major purpose of registering the current address of the resident population.¹⁵ In 1898, the *Koseki* law was amended to certify the kinship between the head of the family and other family members. Further revisions of the *Koseki* law, enacted in 1948, changed the unit of registration of the system from "a family", in the sense of a large family, to "a couple" consisting of a husband, his wife and their unmarried children. The *Koseki* system has been a governmental responsibility ever since it was established. Until 1898, it functioned under the Ministry of Home Affairs and was then transferred to the Ministry of Justice. The heads of the local administrative offices in cities, wards, towns and villages performed these duties in accordance with the law and regulations that provided for compulsory registration.

33. In matters of vital statistics in Japan, the first series of

births and deaths was published in 1872. In 1873, the report forms were revised to include marriages and divorces. In 1876, the Public Health Bureau started the series of causes of death. The Second World War caused the disruption of the vital statistics series. The air raids between 1944 and 1946 destroyed the records in many areas of the country. After the war, in 1946, the function of vital statistics was assumed by the Bureau of Statistics, Imperial Cabinet, and subsequently transferred to the Ministry of Health and Welfare in 1947. The Ministry was made responsible for the compilation and dissemination of vital statistics based on information collected from the family registration system.¹⁶

34. Korea's registration system can be traced back to the United Silla Kingdom era (A.D. 668-935) when household records were maintained by some forms of civil registry. The system was reported to be updated once every three years and it appeared to have continued in the Koryo dynasty (A.D. 935-1362).¹⁷ There is evidence that the Yi dynasty (1392-1910) maintained comprehensive records, including vital events which served as population registers.¹⁸ In 1910, a civil registration law was enacted but ceased to function after the Second World War, when the political divisions changed.

35. In India, death registration began in the middle of the nineteenth century to collect information mainly for the control of pestilence and disease.¹⁹ Subsequently, registration of births was introduced gradually in different parts of the country. There was no uniformity for registration throughout the country, and in some regions registration was done on a voluntary basis. It was not until 1951 that the Office of the Registrar General and Census Commissioner was created. In 1960, vital statistics, which till then were the responsibility of the Director General of Health Services, were transferred to the Registrar General. The enactment of the Registration of Birth and Deaths Act of 1969 unified the registration system in India and made the reporting and registering of births and deaths compulsory. It also provided for a statutory authority at the centre and in each state and made the Health Services responsible for the registration of births and deaths. As the states are autonomous, the central Government works in cooperation with the state registration officials to promote standards in registration procedures and practices.

36. The population of Indonesia was subject to village registration for tax purposes during British colonial rule, between 1809 and 1816.²⁰ The village headmen were ordered to keep a register of all persons under their authority, containing the name, age, country, occupation, size and appearance of each individual, with any other remarks that may be deemed necessary. With the assistance of the village priests, they were also to form "a register of births, deaths and marriages which occur within their jurisdiction". After the departure of the British, the Dutch continued the village registration process with some alterations. The first colonial regulation on civil registration was promulgated in 1849 and related to the registration of births, deaths and marriages of a small group of the population, the Europeans. The Civil Medical Service was made responsible for this system. The coverage was expanded significantly in 1919 with the inclusion of the Chinese population. In 1924 the role of the health authorities was reaffirmed in the collection of vital statistics under the administration of the Public Health Service, whose main purpose was to improve health and sanitation conditions; hence efforts to obtain better counts of births and deaths were made. In 1933 the Law was revised to cover the Christian Indonesian population.

37. A new system was established in a demonstration unit initially for births (1933) and then for deaths (1934) and late foetal deaths (1938). The main features of this new system rested in the provision of new registration forms which vastly expanded the amount of data collected. Unlike the earlier summary reports, this system provided for individual records of each vital event completed in triplicate. The system was rapidly ex-

panded to other areas of the country covering virtually all of central Java and some of the residences in East and West Java until it was disrupted because of the Second World War in the early 1940s. In 1949, the Ministry of Health regained control of the vital statistics function and at the same time the old colonial village registration continued. Therefore, two systems were in operation: one a weekly summary report on gross changes in the village population and the other, the civil registration system that relied on individual registration records. Neither system had national coverage nor did they include the same areas of the country. Both covered all Java and Madoera, but outside of these areas, the coverage was spotty.

38. The registration of marriages and divorces among the Muslim population in Indonesia has been the responsibility of the Department of Religious Affairs since 1946 and owing to the involvement of the authorities in the rites it is believed that the coverage is fairly complete.

39. In accordance with the Presidential decree of 1977, the responsibility for the administration of the civil registration system came under the Department of Internal Affairs with the Justice Department retaining the responsibility for the preparation of legal matters.

40. Civil registration was introduced in the Philippines in 1889 by the Spanish colonists. It was based on the civil code of Spain.²¹ At about the same time a Central Office of Statistics was created. Under the new arrangement, parish priests were required to send to the Central Office of Statistics in Manila, a detailed statement of the births, marriages and deaths that had occurred in their respective parishes during the previous year.

C. PRESENT CIVIL REGISTRATION AND VITAL STATISTICS SYSTEMS IN THE WORLD

41. Some 150 countries or areas in the world have a system of civil registration and vital statistics and respond regularly to the United Nations annual inquiry for demographic statistics. More than half of those countries or areas have "complete" registration of births, deaths and marriages — that is, as estimated by each Government, at least 90 per cent of the events that occurred each year were registered and reported to the compiling office. The systems of the remaining countries or areas were less developed and required improvement.

42. There is no information on the completeness of civil registration for 40 countries or areas since they do not respond to the United Nations annual inquiry. Information on completeness of civil registration by vital event and by country is provided in volume II of the present *Handbook*, paragraphs 194-198, table 6.2 (completeness by major regions of the world) and in table A.10 (by individual country and by vital event).

D. INTERNATIONAL AND REGIONAL ACTIVITIES IN THE PROMOTION OF THE SYSTEMS

43. Many international organizations and agencies have worked in the past to establish standards, definitions and classifications for civil registration and vital statistics in order to bring about greater uniformity of data so as to promote international comparison of vital statistics. In more recent years, international activities have also been directed towards the improvement of national vital statistics systems through technical assistance, project development, training, regional meetings and seminars. A list of these international organizations and a brief summary of their activities are given below.

1. International Statistical Institute (ISI)

44. Early recognition of the need for internationally comparable vital statistics found expression in the desire for a uniform classification of causes of death. This recognition, which predated the first international compendium of vital statistics by some 60 years, came about at the first International Statistical

Congress in Brussels in 1853, at which Dr. William Farr, Compiler of Abstracts in the General Register Office of England and Wales, was requested to prepare "a uniform list of causes of death applicable to all countries".

45. Revision of the resulting classifications in 1864, 1874, 1880 and 1886 provided the basis for the "International List of Causes of Death", the preparation of which became the responsibility of ISI in 1891. Subsequently, in 1928, a "Mixed Commission", representing ISI and the Health Organization of the League of Nations took over the responsibility for the list and in 1946 its development became a function of the World Health Organization.

46. In addition to its work on the International List of Causes of Death, ISI devoted part of each of its sessions to a consideration of demography in general. Recommendations on various procedures relating to population and vital statistics were adopted over the years, those of the first thirteen sessions were reprinted as a supplement to volume XIX of the *Bulletin of the International Statistical Institute*²² and the remainder in volumes XXI-XXIX. These recommendations dealt with almost every facet of the compilation of vital statistics, including basic tabulations and standards for tabular presentation.

47. In addition to its work of formulating standards and recommendations, ISI began to publish the *International Statistical Yearbook*, the first of which appeared in 1916.²³ Being fully aware that the data presented in the *Yearbook*²⁴ were not strictly comparable, ISI came to the conclusion that their value could be enhanced by a review of the organizational patterns and procedures which produced those data in various countries. Accordingly, a tabular review of procedures in 43 areas was appended as an annex to volumes I-V of the *Yearbook* of 1921 under the title *Information on the Current Organization of Vital Statistics in Various Countries*.²⁵ A revision of the 1921 review was subsequently issued by ISI in 1929 under the same title. Both tabulations sought to summarize the fundamental elements of the vital statistics systems and to present them in a simple reference table. They were eminently successful, and their current usefulness is limited only by changes in the national systems themselves.

2. League of Nations

48. The Health Organization of the League of Nations began to work to minimizing the problem of variations in the registration and compilation of vital statistics by studying in detail and at first hand the individual systems and procedures in selected countries. A comprehensive report on each country, including a section on vital statistics and sections on census and morbidity statistics, was published between 1924 and 1930.²⁶ These surveys still constitute the only intensive studies of this type available for ready reference relating to earlier periods.

49. Another important contribution of the League of Nations to improving vital statistics was the proposal in 1925 of international definitions of live birth and stillbirth. Supplementing this important step towards standardization was the work done in conjunction with ISI on revising the "International List of Causes of Death" and in developing a standard medical certificate with rules governing the choice of the cause of death to be tabulated when more than one was given. Furthermore, part one of the *Statistical Yearbook of the League of Nations*²⁷ was devoted to population and vital statistics and dealt with the non-comparable nature of the data through the use of extensive footnotes. General notes preceding each table served to indicate the principle source of non-comparability, but no attempt was made to analyse divergencies in terms of procedures or to recommend standard methods.

3. United Nations

50. With the advent of the United Nations in 1945, the development of international comparability of all kinds of statis-

tics became the responsibility of its Economic and Social Council and two of its technical commissions, the Statistical Commission and the Population Commission.

51. With regard to demographic statistics, the Council adopted two resolutions, in 1946 and 1947, which were aimed at improving the comparability of basic population statistics. In 1949, the Statistical Commission was specifically concerned with the development and improvement of national vital statistics and their comparability. As a first step, the United Nations conducted a study of the prevailing civil registration and vital statistics systems that included concepts, definitions, data classifications and tabulations and the evolution of the systems. At that time, the Statistical Commission agreed that comparability could be achieved only through the adoption and implementation by all countries of the same general concepts, definitions and classifications.

52. The survey, to which 58 countries responded, led to the preparation of international recommendations for the improvement and standardization of vital statistics, following the Statistical Commission's request in 1950. *Principles for a Vital Statistics System*²⁷ was published in 1953 with the endorsement of the United Nations Population Commission, the Statistical Commission and the Economic and Social Council.

53. However, the *Principles* did not cover all aspects of registration; it dealt only with those that had a bearing on statistical reports in terms of content or collection, and therefore with the comparability of vital statistics and not with the legal connotations, which were considered matters of mostly national concern.

54. The *Principles*, which incorporated the recommendations of the World Health Organization, was considered the first internationally recommended comprehensive guide to concepts, definitions, classifications, items to be collected and a minimum programme of tabulations. Later, the Economic and Social Council encouraged its adoption in all countries. These guidelines have resulted in more comparable and useful vital statistics throughout the world.

55. A second in-depth study was initiated in the early 1950s on the recommendation of the Statistical Commission. Countries were requested to describe their process of registration of live births, deaths, still births (late foetal deaths), marriages and divorces, as well as the process of statistical compilation. The findings of this study, to which more than 100 countries responded, were used for the preparation of the *Handbook of Vital Statistics Methods* published in 1955.²⁸ The *Handbook* comprises a world-wide cross-section of practices, procedures and methods of civil registration and vital statistics systems and has greatly assisted countries or areas in the development and implementation of their own systems. Special attention was given to recording and compiling vital statistics of live births, deaths, stillbirths, marriages and divorces.

56. At its fifteenth session in 1968, the Statistical Commission approved a World Programme for the Improvement of Vital Statistics which was subsequently endorsed by the Council in its resolution 1307 (XLIV). The major components of the Programme were guidelines for current and future work of the United Nations in this field.

57. In an effort to strengthen its work in the field of preparation of standards and recommendations, *Principles and Recommendations for a Vital Statistics System* was published in 1973, a revision of the 1953 *Principles for a Vital Statistics System*. *Principles and Recommendations* took account of a wide variety of background materials and activities at the international and regional levels, including the survey undertaken by the United Nations in 1964, which provided systematic and up-to-date information on vital statistics practices in 51 countries. The publication provides detailed and comprehensive information on the organization of civil registration and vital statistics systems as well as alternative methods for vital statistics collec-

tion. Recommendations drawn from regional seminars on civil registration and vital statistics contributed to the preparation of *Principles and Recommendations*, which has been distributed widely to all countries and areas of the world in four languages (English, French, Russian and Spanish).

58. One of the most recent United Nations activities in these fields includes the updating of the above-mentioned *Handbook of Vital Statistics Methods*, published in 1955. Results of this updating are contained in the present report.

59. In addition, an important and comprehensive work carried out regularly by the Statistical Office of the United Nations Secretariat in the field of compilation and dissemination of vital statistics world wide is the *Demographic Yearbook*, published since 1948. This publication is produced in close cooperation with about 190 national statistical offices that supply demographic data through the *Demographic Yearbook* questionnaires on an annual basis. International vital statistics are also disseminated in the *Population and Vital Statistical Report*, a quarterly publication of the Statistical Office and in its annual *Statistical Yearbook*.

60. Contributions of the United Nations regional commissions to the promotion of civil registration and vital statistics are discussed below under special international and regional activities (sect. D.5).

4. World Health Organization (WHO)

61. Under its constitution, the World Health Organization, which replaced the Health Organization of the League of Nations, is required to establish and revise, as necessary, international classification of diseases, and of public health practices. In 1948, in accordance with this responsibility, the First World Health Assembly adopted the Sixth Revision of the International List of Diseases and Causes of Death, known as the "International Statistical Classification of Diseases, Injuries, and Causes of Death" (ICD), which had been developed and approved by the Conference for the Sixth Revision of the International List of Diseases and Causes of Death, held in Paris that same year.

62. The Assembly also adopted a set of regulations known as World Health Organization Regulations No. 1 regarding nomenclature (including the compilation and publication of statistics) to ensure as far as possible the uniformity and comparability of statistics of diseases and causes of death. These Regulations, *inter alia*, cover instructions for the compilation and publication of mortality statistics by geographical area, age and causes of death; the format of the international medical certificate of cause of death and instructions for the selection of the main cause of death for tabulation. Under article 9 of the Regulations, countries are obligated to adopt a medical certificate of cause of death which conforms as far as possible to the International Form of Medical Certificate of Cause of Death. Countries are also required to classify causes of death according to the international rules for selection of causes of death for primary tabulations.

63. Since the adoption of the Sixth Revision of the International Classification of Diseases and Causes of Death in 1948 (ICD-6), this classification has undergone three revisions. The latest edition of the International Classification of Diseases is the Ninth Revision (ICD-9) adopted in 1975. Work is in progress to finalize the Tenth Revision (ICD-10) which is expected to be adopted by WHO in 1990.

64. The Conference for the Sixth Revision of the International Lists of Diseases and Causes of Death (Paris, 1948) also recommended the establishment of national committees on vital and health statistics. This recommendation was endorsed by the First World Health Assembly. The main purpose of national committees was to facilitate the exchange of information and views between the various national agencies responsible for the collection and analyses of vital and health statistics. These committees were viewed as means for coordinating the responsible

agencies and to assist in achieving essential uniformity in records, methods and tabulations for the production of a minimum core of comparable vital and health statistics needed for national or international purposes. WHO has continued to promote the operation of national committees and has issued, from time to time, reports on the activities of national committees in various countries. International Conferences of National Committees on Vital and Health Statistics were held in London in 1953²⁹ and in Copenhagen³⁰ in 1973.

65. In the area of standard definitions, the WHO Expert Committee on Health Statistics, through its Sub-Committee on Definitions of Late Foetal Deaths and Abortion, proposed standard definitions of live birth and foetal death and recommended minimum tabulations of live births and foetal deaths by gestation age. The Third World Health Assembly adopted the recommended definitions on 20 May 1950. Slight modifications in the definitions of live births and foetal deaths were introduced at the International Conference for Tenth Revision of the International Classification of Diseases, held in October 1989.

66. In the field of vital statistics dissemination, WHO publishes annually mortality data with special reference to cause-of-death. In addition, articles on special subjects are published in *World Health Statistics Quarterly*; such special subjects have included international patterns and trends of cancer mortality and of various cancer sites: infant, maternal and child mortality: and incidence of low birth weight.

5. Special international and regional activities

67. An important development contributing to the establishment and improvement of civil registration and vital statistics systems was the series of regional and international seminars, workshops and conferences organized since 1950 by the United Nations, the World Health Organization and other international and bilateral organizations in collaboration with host countries. Seminars and workshops were directed towards the training of

personnel in vital and health statistics, and did much to stimulate the interest of professionals in various regions. Conferences sponsored by the United Nations and other organizations which are listed in table 1.1 of this chapter focused on international and regional issues and problems in civil registration and vital statistics, and resulted in many recommendations for their improvement in member countries of the region.³¹

68. Notably, the World Population Plan of Action adopted by the World Population Conference held at Bucharest in 1974 urged countries to establish or improve their civil registration and vital statistics system as a long-term objective and to enact laws relevant to the improvement of vital statistics. Further, the International Conference on Population held at Mexico City in 1984 reiterated that Governments should strengthen their civil registration and vital statistics systems.

69. Since its foundation in 1902, the Pan American Sanitary Bureau was concerned with establishing among its member States uniformity and completeness of reporting, not only of morbidity but of vital events. Provisions of the Sanitary Code together with the resolutions on vital statistics were included among the early recommendations made in this field. The recommendations related to the adoption of the International List of Causes of Death, certification of causes of death, and the notification of births and deaths. The work of the Pan American Sanitary Bureau has been carried on by its successor agency, the Pan American Health Organization (PAHO), the regional office of the World Health Organization in the Americas. PAHO has been actively promoting the development and improvement of vital and health statistics through country and regional consultants and by sponsoring regional seminars on various aspects of vital and health statistics.

70. The first regional centre on disease classification, namely, the Latin American Center for Disease Classification was established in Venezuela by PAHO to provide training on the use of the International Classification of Diseases in the Latin

TABLE 1.1. REGIONAL AND INTERNATIONAL SEMINARS AND CONFERENCES
ON CIVIL REGISTRATION AND VITAL STATISTICS: 1950-1987

Meeting	City and host country	Date	Sponsors
Interamerican Seminar for Biostatistics	Santiago, Chile	25 Sept.- 15 Dec. 1950	Government of Chile; World Health Organization; Pan American Sanitary Bureau; Inter-American Statistical Institute; and National Office of Vital Statistics of the U.S. Public Health Service
International Training Centre on Vital Statistics for South-East Asia	Nuwara Eliya, Ceylon	19 Sept.- 11 Dec. 1951	Government of Ceylon; United Nations Statistical Office; United Nations Technical Assistance Administration; WHO Regional Office for South-east Asia.
The International Training Centre on Vital Statistics and Health for the Eastern Mediterranean	Cairo, Egypt	8 Oct.- 6 Dec. 1951	Government of Egypt; the United Nations Statistical Office; United Nations Technical Assistance Administration; WHO Regional Office for the Eastern Mediterranean
The Western Pacific Regional Seminar on Vital Statistics and Health Statistics	Tokyo, Japan	4 Aug.- 20 Sept. 1952	Government of Japan; United Nations
Training Centre on Vital and Health Statistics	Kabul, Afghanistan	13 Sept.- 24 Oct. 1954	Government of Afghanistan; World Health Organization

TABLE 1.1 (continued)

<i>Meeting</i>	<i>City and host country</i>	<i>Date</i>	<i>Sponsors</i>
First Interamerican Conference on Civil Registration	Santiago, Chile	29 Nov.- 11 Dec. 1954	Government of Chile; Statistical Office of the United Nations; United Nations Technical Assistance Administration; World Health Organization; Institute of Inter-American Affairs
African Seminar on Vital Statistics	Addis Ababa, Ethiopia	14-18 Dec. 1964	United Nations Economic Commission for Africa; Bureau of Technical Assistance Operations; Statistical Office of the United Nations
Second Inter-American Conference on Civil Registration	Lima, Peru	30 Nov.- 11 Dec. 1964	Government of Peru; United Nations Technical Assistance Operations; Statistical Office of the United Nations; United Nations Economic Commission for Latin America; Pan American Health Organization; Inter-American Statistical Institute; Inter-American Children's Institute; Inter-American Civil Registration Association
Seminar on Civil Registration and Vital Statistics for Asia and the Far East	Copenhagen, Denmark	22 July- 10 Aug. 1968	Government of Denmark; Economic Commission for Asia and the Far East; Statistical Office of the United Nations; United Nations Office of Technical Co-operation
Group of Experts for the improvement of sources of demographic data	Buenos Aires, Argentina	25-29 March 1974	United Nations Economic Commission for Latin America; United Nations Fund for Population Activities; Latin American Demographic Centre
Colloque sur l'observation permanente et l'état civil	Libreville, Gabon	12-18 Dec. 1974	Union douanière et économique de l'Afrique centrale (UDEAC)
United Nations Working Group on Current Demographic Statistics	Bangkok, Thailand	9-14 June 1975	United Nations Economic and Social Commission for Asia and the Pacific; Statistical Office of the United Nations
OCAM Seminar on Civil Registration	Lomé, Togo	25 Feb.- 3 March 1976	Organisation commune africaine et mauricienne (OCAM)
Sixth International POBLAB Conference on Civil Registration and Vital Statistics	The Hague, Netherlands	21-24 June 1976	University of North Carolina
Conference on Vital Statistics Practices in Asia	Honolulu, Hawaii	9-13 May 1977	East-West Population Institute; National Census and Statistics Office, Philippines; the U.S. National Center for Health Statistics
Meeting on Strategies for Improving Civil Registration	Montevideo, Uruguay	7-11 Nov. 1977	Inter-American Children's Institute; Pan American Health Organization; Statistical Office of the United Nations; U.S. National Center for Health Statistics; U.S. Agency for International Development
UDEAC <i>Ad Hoc</i> Commission on Civil Status	Libreville, Gabon	10-15 May 1978	Regional Center for Study of Population; Union douanière et économique de l'Afrique centrale (UDEAC)
UDEAC <i>Ad Hoc</i> Commission on Civil Status	Yaoundé, Cameroon	29 Oct.- 3 Nov. 1979	The Regional Center for Study of Population and UDEAC

TABLE 1.1 (continued)

Meeting	City and host country	Date	Sponsors
OCAM Seminar on the Improvement of Civil Registration	St. Louis, Mauritius	21-28 May 1979	Organisation commune africaine et mauricienne (OCAM); U.S. National Center for Health Statistics
OCAM Seminar on Organization of Organizers of Personnel Systems for Civil Registration	Cotonou, Benin	26 May-4 June 1980	Organization commune africaine et mauricienne (OCAM)
Meeting of the Working Group on Civil Registration Systems and Vital Statistics Collection in Africa	Nairobi, Kenya	21-25 July 1980	United Nations Population Fund; Economic Commission for Africa
Ibero-American Conference on Strategies for Improvement of Civil Registration and Vital Statistics Systems	Lima, Peru	9-18 Nov. 1980	National Statistics Institute of Peru; U.S. National Center for Health Statistics
The Pacific Seminar on Civil Registration and Statistics	Apia, Samoa	30 April-6 May 1985	Economic and Social Commission for Asia and the Pacific; United Nations Population Fund
Working Group on the Development of Civil Registration Systems and Vital Statistics Collection in Africa	Addis Ababa, Ethiopia	21-16 Oct. 1985	Economic Commission for Africa
Asian Seminar on Civil Registration and Statistics	Bangkok, Thailand	16-26 Dec. 1985	Economic and Social Commission for Asia and the Pacific; United Nations Population Fund
Workshop on Registration of Births and Deaths and Vital Statistics in the English Speaking Caribbean Countries	St. George, Grenada	13-15 Oct. 1987	Economic Commission for Latin America and the Caribbean; Pan American Health Organization
Workshop on Vital Registration and Vital Statistics Systems	Port of Spain, Trinidad and Tobago	6-9 June 1989	The Caribbean Community Secretariat; Pan American Health Organization

American countries, and to represent the needs of the region in the preparation of the decennial revisions of the International Classification of Diseases.

71. The other regional activities in vital statistics include the work carried out by the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), the United Nations Economic Commission for Africa (ECA) and the United Nations Economic Commission for Latin America and the Caribbean (ECLAC). ESCAP issues a quarterly bulletin, the *Asia-Pacific Population Journal*, which has broad coverage of country and regional activities relating to population problems, including vital statistics. ESCAP and ECA maintain a regional adviser in vital statistics to provide technical assistance to the countries in the region. Both regional organizations have been active in organizing seminars on civil registration and vital statistics. In 1985, ESCAP organized two subregional seminars,

one for Asia and the other for the Pacific. ECA organized a Working Group on the Development of Civil Registration and Vital Statistics Collection at Addis Ababa in October 1985. In October 1987, a workshop on Registration of Births and Deaths and Vital Statistics in the English-speaking Caribbean countries was held in Grenada, sponsored by ECLAC and PAHO.

72. In recognition of the special problems in developing vital statistics in the francophone countries of Africa, the Organisation commune africaine et mauricienne (OCAM) and the Union douanière et économique de l'Afrique centrale (UDEAC) have, in 1979 and 1980, conducted a series of seminars on civil registration. The former organization comprises nine countries, namely, Benin, Burkina Faso, the Central African Republic, Côte d'Ivoire, Mauritius, Niger, Rwanda, Senegal and Togo; the latter comprises Cameroon, the Central African Republic, the Congo and Gabon. OCAM had been engaged in

the preparation of a manual for the use of civil registry personnel in the francophone African countries.

6. Other national and non-governmental activities

73. The Inter-American Statistical Institute (IASI), founded in May 1940 at the Eighth American Scientific Congress in Washington, D.C., has maintained a continuing interest in furthering the development of national vital statistics. At the First Inter-American Statistical Congress in 1947, the Institute approved two resolutions of its Committee on the 1950 Census of the Americas³² which dealt with civil registration and statistics. These were resolution 13 on the reorganization of civil registers and resolution 14 on the test of the completeness of birth registration in the 1950 census. Since then, IASI, a specialized agency of the Organization of American States, has promoted the standardization of methods and definitions, as well as high standards in population statistics among the countries of the region. The work of IASI has been guided by the Inter-American Statistical Commission, renamed the Inter-American Statistical Conference, which comprises the directors of national statistical organizations of the region and remains fully active.

74. At the Second Inter-American Statistical Congress in 1950,³³ a number of resolutions were approved in the field of demography. Among them was resolution 16 on the improvement and development of vital and health statistics. The resolution included the recommendations of the World Health Organization on the establishment of national committees on health and vital statistics, the utilization of the International Statistical Classification of Diseases, Injuries and Causes of Death, and the adoption of international standards and forms for recording births, deaths, stillbirths, marriages and divorces.

75. Further, the Vital Statistics Improvement project (VISTIM) supported by the United States National Center for Health Statistics, has also focused on improving vital and health statistics in various countries and regions. Of particular interest are the following: methodological study of lay reporting of causes of death in Yugoslavia, the study of pregnancy outcomes in India following a cohort of women in the childbearing period, the study of civil registration organization and procedures in Peru and Thailand, and the establishment of data processing procedures in Jamaica to obtain vital statistics on a timely basis. The VISTIM programme has sponsored studies of the registration systems in five developing countries:³⁴ the OCAM Seminar on the Improvement of Civil Registration, held at St.

Louis, Mauritius, the Conference on Vital Statistics Practices in Asia, held at Manila and the Iberoamerican Conference on Strategies for the Improvement of Civil Registration and Vital Statistics Systems, held at Lima in 1980.

76. In 1974, the International Institute for Vital Registration and Statistics (IIVRS), a non-governmental organization, was established for promoting the improvement of civil registration and of the compilation of vital statistics. The purpose of the IIVRS is to provide an international professional forum for the exchange of administrative and technical information, as well as of experience gained by countries in civil registration and vital statistics activities. IIVRS publishes an annual directory of members based on information received from countries and agencies. It also publishes *Technical Papers* for the dissemination of technical information on different aspects of civil registration, vital statistics and population registration. The *Chronicle*, a newsletter of IIVRS for communication with the general membership, includes reports of national and regional meetings of civil registration officials, seminars, training sessions and reports of international meetings on vital statistics.

77. An important development in Latin America was the establishment in 1979 of a regional project in the Inter-American Children's Institute (IACI) for the improvement of civil registration and vital statistics services in the Latin American countries. The goals of the project were to contact the Governments of the Latin American States and to cooperate with them in planning and developing activities that would contribute to the improvement of civil registration and statistics; to train senior staff members of the civil registration systems; to strengthen the application of international principles and recommendations in this field and incorporate them in revised registration laws; and to promote the cooperation of the various organizations interested in the strengthening of the systems.

78. Two training courses were held under the project: an eight-week course took place at San José, Costa Rica, in 1980 and was attended by participants from the Dominican Republic, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama; and a nine-week course was held at Montevideo, Uruguay, in 1981, attended by participants from Argentina, Bolivia, Brazil, Chile, Paraguay and Uruguay.

79. A special survey was conducted under this project to compile information on the organization and operation of civil registration and vital statistics services in 18 countries in the Latin American region. The results were published in *Diagnostics of Civil Registration in Latin America*.³⁵

II. USES OF REGISTRATION RECORDS AND VITAL STATISTICS

80. Records of civil registration have important uses for both individuals and societies. For individuals, copies of registration records can be used as legal documents for evidentiary purposes. Registration records when compiled to become vital statistics are needed not only for administrative applications such as serving to design and implement public health programmes, but also for carrying out social and demographic research.

81. The present chapter reviews some of the known demands for individual records for use by individuals and by society for legal and other purposes. Problems of confidentiality in using individual vital records for research purposes are examined. It discusses the uses of continuous vital statistics for demographic studies, for medical research, public health programmes and other purposes. This discussion intends to be a suggested list for administrators, who are seeking the fullest utilization of vital records and statistics. It will also be of help to civil registrars, statisticians and training personnel directly concerned with these activities in developing countries.

A. USES OF VITAL RECORDS

82. Registration records of vital events are intended primarily as legal documents of direct interest to the person concerned. From those official records, evidentiary proof of the occurrence of a vital event and its characteristics can be made by a civil registrar or any other designated authority. Each certificate constitutes testimony of the particulars set forth therein in all courts of law and in public offices. There is a wide variety of circumstances, legal and administrative, for which a certified copy of the legal record of live birth, foetal death, death, marriage and divorce is usually required. Foetal deaths, however, are mostly recorded for statistical purposes rather than for legal purposes.

83. Individual records also serve as the starting point of a number of operational programmes, particularly in public health, family planning, medical research, maternal and child care programmes, historical demography, genetic studies and so forth.

84. The following discussion illustrates the usefulness of records and statistics related to live births, deaths, foetal deaths, marriages and divorces, records and statistics. However, certified copies of the records of other registrable events such as adoptions, legitimations recognitions and so forth, are not discussed but are useful in much the same way.

1. Uses to individuals

85. The records of birth, death, marriage and divorce are mainly designed for the protection of the individual's rights as a member of society.

86. The most common uses the individual makes of the vital records of live birth, death, marriage and divorce are given in table 2.1.

2. Uses to society

87. Birth and death registration records are useful in public policy and programmes which require reliable information. Social programmes can be designed, monitored and evaluated with the aid of reliable vital records and statistics. An important use is the identification of subgroups of the population in need of medical and health programmes, nutritional programmes,

TABLE 2.1. MAIN USES OF VITAL RECORDS TO INDIVIDUALS

<i>Vital record</i>	<i>Main uses</i>
A. Live birth	<i>Provides evidence of the fact of a person's birth and the facts related to birth:</i> - To establish: family relationship (parentage), ancestry, lineage, dependency, some elements of the person's identification - To register: marriages, divorces, adoptions, legitimations, naturalizations, change of name(s), additions or alterations to vital records - To establish rights to: inheritance, property, birth grants, maternity grants, child care, family allowances (for every child up to a certain age), maternity leave after confinement, protection against job dismissal during maternity leave, milk and food rations, bonuses to families based on a scale increasing with the number of children, allowance for disabled child. <i>Provides proof of the person's age or date of birth to establish rights contingent upon attainment of a certain age to:</i> enter school, obtain permission to work in certain industries, professions, and in government civil service, enter in the armed forces or the right to be excused from them, apply for identity cards, own property, apply for a license to operate a motor vehicle or carry firearms, establish inheritance rights, exercise voting rights and citizenship, apply for a marriage licence, apply for education allowance, qualify for social security pensions or early retirement. <i>Provides proof of the person's place of birth and place of registration to:</i> establish nationality, citizenship; provide basis for immigration and naturalization claims; apply for internal or external migration permits; apply for passports for foreign travel; obtain exemption for alien restrictions or if an alien, to obtain exemption from taxes or military service in the country of residence; apply for repatriation.
B. Death	<i>As evidence of death to be used by his/her heir to:</i> apply for burial or cremation permit; claim inheritance rights on the part of beneficiaries; make insurance claims; make claims for family allowances; establish the right to a second or subsequent marriage for the surviving partner; make notification to the correspondent authorities in case of doubtful or criminal cause of death.
C. Marriage	<i>Provides proof of the fact of occurrence of a marriage to:</i> establish the inviolability of the marriage as a social institution; confer legitimacy for family formation; prove ancestry and lineage; ensure legal responsibility for family support; establish rights to inheritance; apply for family allowances; make insurance claims if one of the partners dies; apply for marriage grant; settle tutorial rights on his/her children when the marriage breaks up; establish such facts in order to obtain passports for foreign travel; register adoptions, divorces, separations, annulments of marriage; prove legitimacy of children. <i>Within the support programme for family formation, wherever applicable, to:</i> apply for provision and allocation of governmental housing for married couples; apply for housing governmental subsidies; apply for guaranteed minimum monthly family

Table 2.1 (continued)

Vital record	Main uses
C. Marriage (continued)	income varying with the number of children; apply for low interest loans for purchasing and furnishing a home; apply for income tax reduction; apply for interest-free loans; apply for bonuses to families 3. <i>As evidence of the date and place of marriage to:</i> apply for low interest loans for newlywed couples; apply for interest-free loans for young couples under certain age within the support programme for family formation; apply for family allowances for young couples; establish the legality of the marriage itself; establish the legitimacy of their own children and register legitimacy of a child by subsequent marriage; apply for change of nationality.
D. Divorce	1. <i>Provides proof of the fact of divorce to:</i> establish the rights to alimony or family pensions; establish the right to remarry; obtain release from financial obligation incurred by the other party. 2. <i>Provides evidence of the date of divorce and the place where it was granted to:</i> establish paternity; establish the legality of a subsequent marriage; establish rights contingent upon marital status and age, and prove absence of responsibility of a financial nature; establish the legality of divorce in other jurisdictions; support a request for delayed registration of a birth; apply for income tax reductions; apply for guaranteed minimum monthly family income (varying with the number of children) within the support programme for family formation.

family planning services, maternal and child care programmes and other social services.

88. Vital records can also be used extensively in medical research and in epidemiological and genetic studies. For instance, the death record, in particular causes of death such as cancer or AIDS, plays a prominent role in scientific research studies. There are also potential uses in historical demography and genetic studies that use record linkage techniques for family reconstitution in order to learn about the mortality and fertility patterns of these family groupings.

89. The information in vital records can be increased by means of supplementary information in the corresponding statistical report, as well as through follow-up and follow-back or retrospective surveys. The latter are conducted on a sample of individuals related to the vital records. Vital records have the potential to be linked to other records collected through population census, specific surveys, health services or any other available routinely collected records. Pertinent information can be combined for those matched records, thus allowing more comprehensive studies to be made.

90. Disclosure of data contained in the vital records is inevitable when those records are used for scientific purposes. Thus the confidential nature of the information usually protected under the civil registration and statistical laws is broken. In the past, a number of countries have faced serious obstacles to using the information in vital records combined with data in population census documents and health records, as the latter are of strict confidential nature. However, concepts of confidentiality that do not preclude the transmission of information on individuals to responsible researchers have been accepted by the scientific community and the general public in many countries. Special provisions may be made within the corresponding laws to permit the use of vital records in scientific research.

91. Some countries have overcome this problem by giving a unique number to every person at birth, which can be repeated in all civil status and certain social records (e.g., social security, health records) related to the person. Thus anonymity can be guaranteed and linkage of records can be facilitated. The com-

puter makes possible the storage of detailed data for each individual as well as data on large numbers of individuals. It also facilitates the retrieving and linkage of diverse sources of information.

92. The common uses of specific vital records are as follows:

(a) *Uses of birth records*

(i) *Use in public health programmes in post-natal care of mother and child.* The starting point of the programme is the birth register and the listing of births of mothers living in a particular community. These lists, including certain particulars about the birth, serve as a basis for visits by public health nurses to instruct the mother on the care of the newborn, and on post-natal management, including nutrition of both the child and the mother. This is of particular importance for the first-born child, low-weight babies, and where there were any complications during the birth process, or congenital malformations.

(ii) *Use in other public health programmes to identify population at risk.* For example, children are vaccinated and immunized against the common child diseases; children born with congenital defects (cleft lip or palate, club foot) are identified so that medical assistance for them can be arranged to alleviate or cure those malformations; physically handicapped newborn children may be followed up to provide them with medical services and educational programmes; premature infants not attended by physicians can receive special care if weight is provided in the vital record; multiparous women can be eligible for family planning programmes and those primiparous can contribute to studies on high mortality risks.

(iii) *Use for social services and programmes.* Governmental offices concerned with the protection and well-being of children can use alphabetical listings of birth records for family allowance administration and for implementing and monitoring other social services and programmes.

(iv) *Use for research*

a. Genetic studies using family reproductive histories which can be derived from vital records. A birth registration record contains a number of details about both the father and the mother to enable it to be identified unambiguously with the marriage record of the parents if legally married. Similarly, a death record can be identified with the corresponding birth record and with the parents' marriage. A marriage record can, in turn, be identified with the births of the husband and wife, and also with the marriage of both sets of parents. Research in this field has also been done by cross-linking birth records to marriage registrations and health records to detect differential fertility (mortality) in families carrying hereditary defects.³⁶

b. Comprehensive studies of infant and child mortality and their socio-economic and biological correlates can be done by linking the birth records with the corresponding infant and child death records. This procedure allows for matched records, the combination with data on birth records, such as the health of the child at birth, weight at birth, congenital defects, delivery complications, age of mother, parity order and so on. There is also potential for valuable research studies by matching vital records with other independent sources of data as part of a test of birth registration completeness. Similarly, neonatal death records may be matched with the corresponding birth records as part of a test of birth registration completeness.

c. Follow-up survey using selected birth records as the basis. The base registration birth records can be supplemented with data from special surveys undertaken on a sample of those birth records.

(b) *Uses of foetal death records*

For research purposes, retrospective surveys may be conducted to find out the social and economic background of the parents of the foetus, the physical and mental health of the mothers, conditions of the foetus such as birth weight and

length³⁷ in order to ascertain the causes of foetal deaths, including both early and late foetal death. Foetal death records are also used in studies of registration of the outcome of pregnancy when combined with health and birth records.³⁸

(c) *Uses of death records*

(i) *Use in public health programmes to control infectious diseases.* Measures to find cases of tuberculosis, AIDS, and so forth within a family may be undertaken upon the registration of the death of a member from that disease. In areas where major epidemic diseases such as smallpox, yellow fever, malaria or plague have been eradicated, the appearance of a death from one of these causes will set in motion a chain of actions designed to confirm the diagnosis and to uncover all possible contacts which the deceased may have had for immunization or treatment during the period of illness.

(ii) *Use in programmes for public safety, accident prevention and crime eradication.* The death registration record also finds a use in clearing social security files, morbidity case registers, electoral lists, military service and tax registers.

(iii) *Use in health research.* Death records have been used in some countries in the prevention of maternal deaths. After special investigations of maternal death records have been carried out in selected areas to learn the causes of deaths, programmes of prevention may then be introduced. A similar approach has been taken with respect to infant deaths to determine the preventable factors of infant deaths.

(iv) *Use in epidemiological research.* Epidemiological approaches to studying the association between low-birth-weight children and infant mortality can be done by linking all live births weighing less than 1.5 kg (or any other lower limit) to the corresponding infant death records.^{39,40} Similar approaches can be taken to study neonatal mortality (infant deaths under four weeks of age) or post-neonatal mortality differentials (infant deaths above four weeks of age and up to one year). Other types of epidemiological research include the use of the records of two control groups to learn the effects of certain causes of death, either retrospectively or prospectively.

(v) *Use in the study of mortality differentials.* Mortality rates by age, sex, occupation, education, income, type of family, and urban and rural residence characteristics could be better studied by matching death records for persons who died after the date of the census to their census enumeration schedule. The information about the deceased reported on the death record is supplemented by any additional demographic and socioeconomic information required about the deceased and other persons reported in his or her household in the census schedule.

(vi) *Use in historical demography research.* Efforts to assess long-term trends in the past in infant mortality by cross-linking death, birth and marriage records at the micro community level have been made by scholars. Reconstitution of the past series of deaths from the registers of burial permits kept in parishes can be possible for this purpose.

(d) *Uses of marriage and divorce records*

(i) *Use in social and demographic studies.* Longitudinal studies of married couples and family patterns can be based on a sample of marriage records to assess the dynamics of the social and demographic process at the micro-level.⁴¹ Studies in family history focusing on local demographic patterns and family size variations over time can also be undertaken by reconstituting families based on the marriage records and matching them with the corresponding births and deaths records of their children and with their own death records.⁴²⁻⁴⁹

Divorce records may be the starting point in studies of trends in remarriage patterns or in studies to assess differentials in the probability of divorce by type of interfaith marriage or other relevant characteristics. The latter is made possible when complemented with sample survey data.⁵⁰

(ii) *Use in genealogical research.* Records of birth, adoption, legitimization, death, marriage and divorce can be used for

tracing the lineage of individuals interested in constructing the family tree.

(iii) *Use in administrative work.* Marriage listings can help in the administration of family allowance programmes or family food rations distribution programmes, wherever such programmes exist.

B. USES OF VITAL STATISTICS

93. The obtaining of detailed vital statistics has now become a major function of the civil registration system. The vital events and the related characteristics of the events provided at the time of registration also lend themselves readily for compilation of continuous series of vital statistics. In addition, vital statistics derived from the civil registration system (and the population registration system) can provide the flow statistics from the smallest civil divisions, a characteristic that no other data collection system can provide.

94. Among the demographic uses of vital statistics are the preparations of population estimates and projections, studies of mortality, fertility and nuptiality and the construction of life tables. Vital statistics are also invaluable for planning, monitoring and evaluating various programmes such as those dealing with primary health care, social security, family planning, maternal and child health, nutrition, education, public housing and so forth.

1. *Uses in population estimates and projections*

95. Data on births and deaths obtained through the civil registration system can be used with population census data to prepare population estimates and projections for different areas of a country. Depending on how detailed the vital statistics are, population by various subgroups such as age, sex and other characteristics may also be estimated.

96. The analyses of the trends of fertility, mortality, nuptiality and divorce obtained from vital statistics provide inputs for the formulation of population projections assumptions. Live birth order (i.e., the order of the present live birth in relation to all previous live births), a characteristic that is usually collected in the vital record (or in its statistical report) for each registered live birth, can be cross-tabulated with the age of the mother to allow a more refined analysis of fertility patterns and changes to be made and to prepare special fertility projections.

2. *Uses in cohort and period studies*

97. Vital statistics form the basis of cohort analysis. Statistics derived from the civil registration system can be used to study various characteristics of the population from either the period point of view or the cohort point of view. Estimation derived from registration data are direct estimates which do not depend, or depend very little, on assumptions. In particular, the estimation of the infant mortality rate can be made directly using registration data.

3. *Uses in constructing life tables*

98. An important tool in mortality analysis is the life table that summarizes the mortality experience of a population independent of its age composition. It has, in turn, a variety of uses in demography, public health and actuarial work. Both the standard life table, which deals only with the mortality experience of a population and the multiple decrement table, which describes the separate and combined effects of other factors in addition to mortality, can be calculated. The first calculation, of deaths by age and sex produced by the civil registration system, is straightforward. The second requires death statistics by age and sex and specific rates by other social variables, such as the labour force participation rate. For example, the attrition of the married population can be studied through divorce and mortality.

99. There are two kinds of life tables, the current or period life table and the generation or cohort life table. The current life table is based on the registered mortality data for a given period of time, usually one to three years, and on the population relating to the middle of the period. The generation life table is based on the mortality experience of a specific birth cohort, that is, persons born during a particular period of time.

100. The construction of life tables for smaller geographical areas must depend on vital statistics derived from the civil registration system as it is always difficult to use sample data to represent certain small areas.

4. *Uses in preparing health indicators*

101. Vital statistics are the basic data for the calculation of various indices of mortality. They also serve as an aid to public health programmes and research. For the purpose of international comparison, the World Health Organization has recommended that the infant mortality rate, the life expectancy at birth, the crude death rate and the proportionate mortality rate at ages 50 years and over be used to measure the levels of health.⁵¹

102. In addition to the infant mortality rate, the post-neonatal mortality rate has also been used as an index of public health to measure the effect of environmental influences on health. Data on post-neonatal and neonatal mortality can only be obtained from the registration data.

103. For an understanding of specific health problems, mortality statistics by cause of death are essential. They can be obtained mainly from the registration data.

5. *Uses in epidemiological studies*

104. Death records can be used as the starting point of retrospective epidemiological studies. Their use as the end point in prospective epidemiological studies has already been mentioned (see sect. A.2 (c)). These studies make possible the testing of hypotheses regarding disease causation. There is still another kind of epidemiological study which is descriptive in nature and where the differentials observed from mortality statistics by cause of death lead to hypotheses about the causative factors. These descriptive studies have played a useful role in showing the association between possible etiological factors and diseases.⁵²⁻⁵⁶

6. *Uses in public health programmes*

105. In the absence of morbidity data, public health programmes rely on mortality statistics to learn the magnitude and the distribution of major disease problems. Although certain infective and parasitic diseases may be reported, morbidity reports on communicable diseases are generally incomplete and they do not accomplish more than indicate the seasonality of diseases. Mortality records collected on a regular basis can serve as a useful source of data in dealing with problems of public health.

106. Statistics on deaths from drug use and poison have been instrumental in obtaining passage of legislation to protect the individual. In some countries, poison control centres have been established. Public health education programmes have been launched utilizing data on various kinds of poisons as the base mortality cause at different ages.

7. *Uses in maternal and child health services*

107. Maternal care and child health programmes can be carried out effectively by the availability of statistics on births, foetal deaths, maternal and infant deaths. These data, classified by place of occurrence (hospital, home and urban/rural places), birth weight, gestation age, parity, age of mother and the like, will provide useful information for planning, operating and evaluating services to prevent maternal and infant deaths.

108. The pregnancy wastage involving foetal and neonatal deaths is assuming great importance, particularly in low fertility societies. The matching of birth to infant death records will provide additional characteristics of the mother, such as age, marital status and socio-economic status, for intensive studies of pregnancy outcome.

8. *Uses in family planning services*

109. Family planning services require fertility data by age of mother and parity for the planning, implementation, monitoring and evaluation of family planning programmes. Marriage rates and age at first marriage are also useful data for an understanding of the dynamics of fertility. For example, it is known that the age at marriage has a close bearing on total fertility and is therefore a potential policy instrument to limit family size.

9. *Other uses of vital statistics*

110. Birth, death and marriage rates and data on family size and composition are important information in planning for public housing. The trends of the birth and marriage rates are indicators of the future house needs, size of school population and are essential in planning and providing school facilities, as well as in the training of teachers.

111. Vital statistics are useful in planning for future markets of consumer goods such as medicine, food, clothing and furniture. If the birth rate remains high, it may be expected that the demand for maternity clothing will remain high, that medicine, food, clothing, equipment and furniture will continue to be in demand and that housing and house furnishings will be at a premium price. Statistics on births and projections are useful for commercial firms and enterprises to plan for stocks of clothing, toys and play equipment and the like, for growing children.

112. The number of marriages has importance for the building industry and the trend in marriage rate will influence the business prospects of clothing and furniture manufacturers among others. These are some of the commercial uses of vital statistics that are available at local level.

III. LEGAL AND ORGANIZATIONAL ARRANGEMENTS FOR THE REGISTRATION SYSTEM

113. The civil registration system is discussed here as a source of data collection that provides vital statistics. Through civil registration, a certain legal status of the population is established and changed. Records and statistics of birth, death, foetal death, marriage and divorce are generated. These statistics are the basis for planning, implementation and monitoring of many policies and programmes that have a significant bearing on various aspects of the life of the people and on their rights and obligations as members of the society. Despite the significance of such a system at both national and societal levels, many countries have not made the necessary commitment to achieve a complete system. In some countries there is still a lack of appreciation of the need for such a system and for the statistics stemming from it.

114. Even in those countries where civil registration has been made mandatory, there is often a lack of trained personnel and an adequate administrative structure of its own. The registration of vital events is also affected because of the apathy of the general public and its reluctance to go to local civil registration offices, which may be distant, ill-equipped or poorly staffed.

115. It is acknowledged that in considering new and improved structures and forms of organization of the civil registration and vital statistics systems, the existing mechanisms must not be disregarded *a priori*. Notwithstanding the above, there have been times when their use has led to the adoption of inadequate structures and complex forms of organization, with a discouraging aftermath. For this reason, suggestions made in this *Handbook* should be regarded as possible goals to be attained.

A. CHARACTERISTICS OF THE CIVIL REGISTRATION SYSTEM

116. The civil registration system is in essence a public institution whose purpose is to record and store information on the occurrence of vital events and their characteristics and to retrieve the information when needed for legal, administrative, statistical and other uses. The work is accomplished through the registration method, which is defined as the "continuous, permanent, compulsory recording of occurrence and characteristics of vital events . . . in accordance with the legal requirements of each country".⁵⁷ Although civil registration is carried out primarily for the value of the legal documents as provided by law, the usefulness of these records as a source of statistics is universally recognized.

117. Other methods by which vital statistics can be collected include the enumeration method, which refers to the means of collecting data through population censuses and household surveys; and the administrative method, which refers to the means by which statistics are produced as a by-product of administrative controls. The present *Handbook* is concerned mainly with the registration method. It also discusses some of the other methods that would yield vital statistics (see chap. VIII).

118. The civil registration method is characterized by its continuity, permanence and compulsoriness. On continuity, civil registration as a public institution should be at the disposal of the public and must register all vital events as they occur. Further, the records are maintained in such a way that they can be retrieved at any time individually, as required. Hence, vital statistics generated from the civil registration records are statistics

that provide a picture of the occurrence of vital events within a specified period of time and on a current basis.

119. The permanence of the registration method entails the existence of an agency of sufficient administrative stability whose operation must not be limited by time. This characteristic is contingent upon the authority given to the civil registration administration through the enactment of a law. Permanence can only be consolidated when registration officials are professional people who have had specific training for the job.

120. Compulsoriness is essential for the smooth running and effectiveness of civil registration in a country. This characteristic implies the existence of provisions in the law that establish procedures for reporting vital events and penalties for failure to comply with the law. Without specific penalties, the compulsory aspect of civil registration becomes meaningless. Thus the legal frame for civil registration becomes fundamental for its sound operation as a system that is coherent, coordinated and technically sound.

121. When there are significant variations in the level of social and economic development in different parts of the country, it may be necessary to establish simple procedures for the registration of vital events. However, the continuity, permanency and compulsoriness of civil registration must be maintained regardless of the geographical location or socio-economic condition of population groups.

B. TYPES OF VITAL EVENTS TO BE REGISTERED

122. The juridical function of civil registration is to register the occurrence of acts and events that constitute the source of civil status. These events are called vital events. The vital events that most countries are concerned with include live births, deaths, marriages, judicial separations, divorces, annulments, adoptions, legitimations and recognitions. Section C below contains a definition of each of these events, as defined, for statistical purposes, in *Principles and Recommendations for a Vital Statistics System*.⁵⁸

123. In addition to the above events, another, foetal death, may be considered for registration. In this case, the registration is carried out for medical or statistical purposes only.

124. It is essential that vital events be recorded in authentic documents which can be used as proof of occurrence and of legal registration. These documents are the records of civil registration (vital event records).

125. Although it remains an ultimate goal, not every country records all vital events or publishes the statistics for registered events. Some countries do not yet have the need for registering all events. In other countries, the publishing capability of the existing civil registration and vital statistics systems is quite limited.

126. In order to facilitate the establishment or the improvement of a civil registration system, an order of registration priority should be assigned to these vital events. General priority should be given to live births, deaths, marriages and divorces. Top priority should be given to live births and deaths because they are basic to the assessment of population growth. Recording information on the frequency and characteristics of foetal deaths should have lower priority than live births, deaths, marriages and divorces although it is a desirable registration goal.⁵⁹

127. Arrangements for the registration of annulments, judicial separations, adoptions, legitimations and recognitions should have a lower priority than foetal deaths, although these too are an ultimate registration goal.⁶⁰

128. The present *Handbook* deals with the registration of live births, deaths, foetal deaths, marriages and divorces only. But the discussion is generally applicable to all the other vital events mentioned above, since the basic principles of registration, data processing and data dissemination are similar for all events.

C. DEFINITIONS OF VITAL EVENTS

129. In *Principles and Recommendations* . . . , statistical definitions for each vital event are recommended for international comparative purposes. Many countries have adopted the recommended definitions for national use. However, a significant number of countries still rely on their own national definitions, which may vary slightly from the recommended ones. Definitions in use by countries are reproduced in volume II, table A.9, of the present *Handbook*.

130. In the following sections, the recommended definitions of live birth, foetal death, death, marriage, divorce, annulment of marriage, judicial separation of marriage, adoption, legitimation and recognition are provided. In order to achieve international comparability of vital statistics, it is suggested that countries and areas take these definitions into consideration when their own definitions are revised.

1. Live birth

131. Live birth is the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of pregnancy, which, after such separation, breathes or shows any other evidence of life such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles, whether or not the umbilical cord has been cut or the placenta is attached; each product of such a birth is considered live-born. All live-born infants should be registered and counted as such irrespective of gestational age or whether alive or dead at time of registration, and if they die at any time following birth, they should also be registered and counted as a death.

132. In this recommended definition, the concept of vitality is implied. There are two prerequisites for the product of a delivery to be considered a live birth:

(a) That the product of conception is expulsed or extracted completely from its mother's body, including both the natural and artificial detachment of the product of conception. The detachment of the product of conception may take place at any time since the moment of conception, irrespective of the duration of pregnancy. However, in order that the body of the child may be considered completely separated from the mother it is necessary that the infant (head, trunk, extremities) be out of the womb. Whether or not the umbilical cord has been cut or whether or not the placenta is still attached is irrelevant;

(b) That after such separation, the product of conception breathes or shows any other evidence of life, even if for a short period of time. And any rational means of proof of being alive is accepted. This definition includes four examples of signs of life: breathing, beating of the heart, pulsation of the umbilical cord and definite movements of voluntary muscles. This is the prevailing concept in most legislation around the world.

133. A considerable number of countries, however, use the viability concept for civil registration. According to this concept, for a live birth registration to be made, in addition to the evidence of life, other criteria must be established including minimum height and weight, capacity to survive for at least a short period of time after birth, a given gestational period, human shape, or a combination of the above criteria.

134. In some countries, babies which have not survived for at least 24 hours are registered as "foetal deaths" and not as live births.

2. Foetal death

135. Foetal death is death prior to the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of pregnancy. The death is indicated by the fact that after such separation the foetus does not breathe or show any other evidence of life, such as beating of the heart, pulsation of the umbilical cord or definite movement of voluntary muscles.

136. Three major categories of foetal deaths are:

Early foetal death: death at less than 20 completed weeks of gestation;

Intermediate foetal death: death at 20 but less than 28 weeks of gestation;

Late foetal death: death at 28 completed weeks or more of gestation.

137. The term "still birth" should be used only if it is essential for national purposes, and it should be regarded as synonymous with late foetal death.

3. Death

138. Death is the permanent disappearance of all evidence of life at any time after live birth has taken place (post-natal cessation of vital functions without capability of resuscitation). This definition therefore excludes foetal death.

4. Marriage

139. Marriage is the act, ceremony or process by which the legal relationship of husband and wife is constituted. The legality of the union may be established by civil, religious or other means as recognized by the laws of each country.

5. Divorce

140. Divorce is a final dissolution of a marriage, that is, the separation of husband and wife which confers on the parties the right to remarriage under civil, religious and/or other provisions, according to the laws of each country.

6. Annulment

141. Annulment is the invalidation or voiding of a marriage by a competent authority, according to the laws of each country, which confers on the parties the status of never having been married to each other.

7. Judicial separation

142. Judicial separation is the disunion of married persons, according to the laws of each country, without conferring on the parties the right to remarry.

8. Adoption

143. Adoption is the legal and voluntary taking and treating of the child of other parents as one's own, in so far as provided by the laws of each country.

9. Legitimation

144. Legitimation is the formal investing of a person with the status and rights of legitimacy, according to the laws of each country.

10. Recognition

145. Recognition is the legal acknowledgement, either voluntarily or compulsorily, of the maternity or paternity of an illegitimate child.

D. ORGANIZATIONAL ARRANGEMENTS FOR CIVIL
REGISTRATION AT THE NATIONAL AND LOCAL LEVELS

146. Continuous, permanent recording of vital events can best be ensured by means of proper legislation and the establishment of mechanisms to enforce it nationwide. The civil registration law should promote close integration of people into the community and should give them clear guidelines on the type of organization adopted for the civil registration system in the country or area. It should also spell out the types of vital events that must be registered, their definitions, the designation of informants for each type of event, the time allowances for registering each type of vital event, procedures for late registration, the registrar's duties, the rights and obligations related to registration, the penalties for non-compliance and so forth.

1. *National level*

147. The administrative arrangement of civil registration work should be stated clearly and in detail in the civil registration legislation. Depending on the judicial, political and administrative structures of a country, as well as its tradition, the arrangement can be either centralized or decentralized.

(a) *Centralized administration of civil registration*

148. A centralized administration usually has a central agency with national scope for directing, coordinating and monitoring the nationwide civil registration work. An office with such duties can promote national standards and uniform registration of all vital events occurring within the country and among various groups of the population. Countries and areas having this type of administrative arrangement are provided in volume II of the present *Handbook* (chapter I, Legal Provisions and Organizational Structures of the Civil Registration System).

149. Under this type of central arrangement, the national registration agency plays not only an administrative role but also a technical one over the network of subnational and local civil registration offices. It establishes all local registration offices, provides written materials to local registrars to guide their daily work, coordinates the registration procedures throughout the system, and supervises and evaluates the registration work of the local offices.

150. The central office is responsible for coordinating with other governmental agencies that support the civil registration system, including the health services that certify the occurrence of vital events, the courts that deal with marriages and divorces and the statistical service that compiles the registration data and publishes vital statistics.

151. The advantages of having a central registration office to administer the system may be listed as follows:

(1) It makes possible the preparation and approval of a standard legal frame for the civil registration system, which will promote uniformity of procedures throughout the country and, in turn, will facilitate further changes in legislation whenever needed;

(2) It facilitates the interpretation and enforcement of norms and regulations;

(3) It permits the adoption of uniform procedures for recording and reporting vital events nationwide, including ways and means of certifying registered vital events, and for releasing vital records to the public;

(4) It promotes the maintenance of direct and effective control over the entire system, which in the end translates into a better service to the community;

(5) It facilitates the carrying out of research based on vital records kept under uniform archival techniques;

(6) It facilitates the development and channelling of advisory services and other forms of technical assistance to local civil registrars, such as periodical training courses to keep them abreast of any changes in the system and the provision of focal technical advice for solving a particular problem;

(7) It makes possible the operation and maintenance of a central archive for civil registration so that a back-up for the records is available away from the local registration offices. Vital records can therefore be accessed in at least two places: the local registration offices and the central archive.

(b) *Decentralized administration for civil registration*

152. In a decentralized system, civil registration can be administered at the level of the major civil divisions; for example, the state, province or department. At the capital city of each major division, a central civil registration office is established to direct and monitor the civil registration work of the major division. Many countries with a federated political system, a large territory or large population may adopt a decentralized administration for civil registration.

153. Not all countries having a decentralized administration for civil registration have adopted uniform legal provisions and procedures for civil registration. Many such countries have made provisions to outline a model law and its regulations, so that each major civil division may promulgate its own laws and regulations on the basis of the model. There may or may not be an agency at the national level to enforce or standardize the work of civil registration and vital statistics.

154. Examples of administrative structures of this kind are provided in volume II of this *Handbook*, chapter I (Legal Provisions and Organizational Structures of the Civil Registration System).

2. *Local level*

155. Regardless of the type of national administration set up at the national level, the work of civil registration is carried out by local civil registration offices. For purposes of supervision and administration, there may be subnational civil registration offices established between the national and the local offices. Closely associated with the local registration office are the primary and secondary registration areas/units. The concept of these registration areas/units is discussed below.

(a) *Primary registration unit*

156. A primary registration area is the part of the territory of a country that is entrusted to a local civil registrar for the recording of the vital events occurring therein. It may also be said that it is the jurisdictional territory of each local civil registrar. The size of the primary registration area or unit, in terms of both geographical area and population, should be such that the registrar in charge can give that area the required attention to produce complete registration. It should, therefore, be managed by one local registrar and easily accessible to the public it serves.

157. The proper determination of the number of local civil registration offices and the selection of their location are important considerations for the efficient operation of the whole civil registration system. The boundaries of the primary registration area should be made to coincide, as far as possible, with those of minor civil divisions of the country. However, as the needs of civil registration are not always the same as those of general administration, the adjustment of registration area boundaries must be viewed as an important step towards ensuring accessibility of local offices and promoting the completeness of registration. In this regard, the civil registration administration shall make necessary adjustments to the primary registration units by redefining their boundaries or by forming new units when needed.

(b) *Secondary registration unit*

158. In order to improve the registration of births, deaths and foetal deaths, some countries may set up additional civil registration offices in hospitals and other health facilities within a primary registration unit. This registration area is called the secondary registration unit. When such a registration office is established, a responsible registrar should be appointed and the

boundaries of the registration area, which may sometimes cover localities outside the hospital, should be clearly defined.

159. How many primary registration units a country should have and what their optimal sizes should be are closely related issues. If there are not enough registration offices, the geographical area that each unit is to cover will be larger than desirable. In addition to the inconvenience of travelling, accessibility to the office is more difficult and the registration completeness will suffer. On the other hand, too many local offices would hinder the supervision of registration work. Furthermore, the availability of local civil registrars with adequate qualifications is always limited.

160. Determination of the number of local offices, both primary and secondary, that a country may need should take into account the following factors: (1) population size in the area; (2) staff resources available to perform the registration work, including staff training; (3) material resources available to each office; (4) accessibility, including factors such as distance and topography, transportation facilities and climate; (5) literacy level of the population; (6) degree of simplicity of procedures; and (7) quality and adequacy of basic documents. Examples of the number, average area size and average population of civil registration units of certain countries or areas are provided in table A.3 of volume II of the present *Handbook*.

E. THE LOCAL CIVIL REGISTRAR

161. The local civil registrar is the official authorized by law to register the occurrence of vital events and to represent the legal authority of government in the field of civil registration. Since the registration work involves the general public on a daily basis, the local civil registrar is responsible for maintaining a good relationship with the community. The efficiency and completeness of registration is contingent upon the capability, attitude and expertise of the registrar in the fulfilment of his/her obligation. Owing to the important role he/she plays in the civil registration system, the civil registration authorities must be most careful in selecting and appointing the best suitable registrar and his/her deputies, within each local registration office, whether primary or secondary.

1. Duties and responsibilities of the local civil registrar

162. The duties and responsibilities of the registrar should be clearly stated in the civil registration law. They include the following as appropriate:

- (a) Recording specific information regarding vital events according to established methods and procedures;
- (b) Ensuring compliance with registration law;
- (c) Ensuring the accuracy and completeness of each record;
- (d) Adopting such measures as are required to inform the public of the necessity, procedures and requirements of registration, and the value of vital statistics;
- (e) Taking custody of records;
- (f) Completing a statistical report for each registered vital event and transmitting these reports on a regular time schedule to the compiling agency for data processing and dissemination;
- (g) Issuing certificates or copies of the vital records upon request.

163. In order to carry out these duties, the local civil registrar should either reside in or have a local office in the area of registration to which he/she is assigned. The registrar should attend the office on the days and the hours approved by the civil registration laws or regulations. Besides being familiar with these laws and regulations, the registrar should inform the public of their obligations so as to obtain complete and prompt registration. It is strongly suggested that, in order to improve the coverage of vital events registration, the local registrar play an active rather than passive role.

164. In many countries where the civil registration system has not been fully utilized or even recognized by the general public, the local civil registrars generally do not have enough registration activities to fully occupy their time. They are therefore assigned to additional administrative duties and their registration work is carried out along with the other responsibilities that they may have as mayors (head of municipal city or town), municipal secretaries, tax collectors, health service employees, policemen or justices of the peace. However, for a civil registration system to be successful and to serve the needs of the general public, local civil registrars must be full-time workers, enjoy the status and benefits of the civil service and be paid well. National practices on personnel matters are described in volume II of the present *Handbook* (chap. III).

2. Penalties for omission to register or loss or damage to the registers

165. The civil registrar must be liable to a penalty prescribed in the civil registration law if he/she:

- (a) Has been found guilty of violating the civil registration law;
- (b) Refuses to register a vital event or its characteristics reported by the informant;
- (c) Loses, damages or alters any registered records or permits such losses, damages or alterations to occur.

3. Improving the efficiency of registrars

166. It goes without saying that a civil registrar, whether local or national, must be familiar with the laws and regulations related to civil registration, as well as the methods and procedures of vital statistics data collection, reporting and compilation. Civil registrars must be given basic training in registration and statistical reporting before they are assigned to their duty stations. From time to time, they must also be given in-service training in order to keep them up-to-date in their work.

167. To assist the local registrars to carry out their work efficiently, written instructions are essential. A set of registration manuals containing detailed instructions must be prepared and made available to every registrar. Separate instructions must be prepared to guide their work in civil registration laws and related matters and in dealing with statistical issues. To keep the instruction manuals abreast of current developments, a loose-leaf type of publication may be adopted to which leaves may be added or from which they may be deleted, as the occasion arises. This method constitutes an effective coordination mechanism in that there will be a constant need for the central registration office to come into contact with the local unit. Inspection of local registration practices and guidance to registrars should also be provided by regular visits to local offices of experts from the headquarters.

168. The establishment of a nationwide professional association of civil registrars for the purpose of exchanging views on the administration of registration laws, outlining strategies for the improvement of registration, and the like, is another method by which the work of the registrar may be improved. The suggested approach is especially useful when the administration of civil registration in a country is decentralized. In such cases, means must be found to bring the registrars of the country into a single professional association.

F. THE INFORMANT

169. The informant is the individual who, as required by law, reports to the local registrar the occurrence of a vital event, its characteristics, the persons directly concerned with the event and their characteristics. In the absence of documentary evidence, the informant may serve as a witness to the occurrence of the event.

170. The importance of the informant lies in the fact that the registrar can legally record a vital event only on the basis of informant's declaration either verbally or in writing. The informant must be able not only to supply accurate information necessary for registration, e.g., for legal purposes, but also the particulars required for statistical purposes. In this connection, the appropriate informant and the suggested alternates, by order of preference, for every type of vital event are given below.

Live birth:

1. The mother
2. The father
3. The nearest relative of the mother

Foetal death:

1. The mother
2. The father
3. The nearest relative of the mother

Infant death:

1. The mother
2. The father
3. The nearest relative of the mother

Death of an adult person:

1. The nearest relative (e.g., the surviving spouse/partner, a brother, a sister, the father/mother of the decedent)

Marriage:

1. The bride and the bridegroom

Divorce:

1. Either one of the parties
2. The petitioner of divorce

171. The designation of an informant, for each type of vital event, should be made clearly and unequivocally in the civil registration law so that there will be one and only one person primarily responsible for providing the information needed for the registration. Notwithstanding the above, the law may designate alternative informants and establish the order in which each of them must assume his/her responsibility as such. Unless the informant is aware that he/she is required by law to report the vital event to the local registrar, and no one else shares his/her responsibility, he/she cannot be expected to comply. Registration authorities should make provisions to permanently publicize issues related to where, how and when registration should be done.

172. In connection with the registration of a birth, death or foetal death, it is important to note that the informant's function is one of declaration. This is not to be confused with the supplementary function of medical certification of live birth or of cause of death or foetal death. The declaration of the fact of birth or death should be obligatory or compulsory for a designated informant; but the certified cause of death or foetal death is not always a necessary part of the registration information although it is an essential statistical item in almost every country. Usually the responsibility for reporting the occurrence of a death falls on a nearest relative of the deceased, who is a lay person, while the responsibility for certifying the cause of death necessarily falls upon the attending physician or in his/her absence, upon the coroner who examined the body.

173. National practices on the main informant for each type of vital event are given in volume II of the present *Handbook* (chap. IV and table A.5)

G. THE CIVIL REGISTRATION PROCESS

174. In reporting the occurrence of a vital event, the informant contacts the local civil registrar's office, in most cases in person, to request the registration of a vital event within the time limit stipulated by law. The appropriate registration office to contact will depend upon whether the event is registered by place of occurrence or by place of residence in a country.

175. The civil registrar requests from the informant a document to prove his/her identity. Thereafter, a number of documents or witness(es) may be requested by the registrar to prove that the reported vital event has actually taken place. The registration record is then prepared. Whether it is done in one or two originals, using book registers, on a multi-copy form or on cards is a matter that countries should decide carefully. The registration record is checked for completeness and accuracy and then signed by both the registrar and the informant. Soon after, the statistical report is filled in and likewise checked for coherence and completeness. The latter is the usual procedure when the statistical report is a separate document from the registration record or the medical certificate (in case of births, foetal deaths and deaths). Finally, the informant may request a certificate of registration, which the registrar can issue upon payment of the stipulated fee, if any. Some countries may prefer to adopt a combined form for legal and statistical purposes, a procedure which saves the time of both registrar and informant.

176. The following sections deal in detail with each one of the steps that constitute the registration process.

1. Place of registration

177. There are two criteria for determining where the registration of a vital event should take place: the place of occurrence or the place of residence. A third criterion could be the acceptance of both or either of them. Whichever criterion is adopted, it is important that the civil registration law states clearly the place of registration for each type of event. The place of residence is the geographical location (or address) where the specified person usually resides. While there are no problems in determining the place of occurrence, there may be difficulties in determining the place of usual residence. For example, some persons have more than one usual residence, (businessmen, students living away from their parental home or members of the armed forces), some have no usual place of residence (vagrants who live as permanent transients), while some are seeking residence (refugees). The treatment of all such cases should be clearly stated in the registration law. Most countries have adopted the place of occurrence as a norm for the registration of births, deaths and foetal deaths. Detailed information on national practices on place of registration are given in volume II of the present *Handbook* (chap. V, paras. 169-182 and table A.8).

178. From the point of registration, the registration by place of occurrence facilitates and accelerates the process. However, the registration by place of residence gives a better picture than by place of occurrence about, among others, the demographic changes in the resident population. Fortunately, the two criteria are not exclusive of each other as most events generally occur in the place of residence itself. When the place of occurrence is used as the place of registration, the collection of information on the place of residence must also be included, and as a result, tabulations by both places can be produced.

179. For statistical purpose, it is recommended that, in the registration of the place of residence for each specified vital event, the place of residence of the following persons should be obtained:

<i>Vital event</i>	<i>Place of residence of</i>
Live birth	The mother
Foetal death	The mother
Infant death	The mother or the infant
Death	The decedent
Marriage	The bridegroom
Divorce	The husband

2. Time allowed for registration

180. The time allowed for registration is the period of time within which the informant must report to the registrar the occurrence of a vital event and its characteristics. Such a period

of time should be specified for each type of vital event in the civil registration law. It is axiomatic that the shorter the period of time allowed to elapse between the occurrence of an event and its registration, the more accurate the information obtained will be.

181. The time allowed for registration is linked to the compulsoriness of the registration method. If a vital event is not reported within the specified time period, the informant is taken as violating the law and should be subjected to penalty.

182. Because the nature of each vital event is not the same as the others, the time allowed for registration need not be the same for each of them. Most countries allow live births to be registered within one month after the child is born, deaths and foetal deaths within three days after the occurrence, marriages on the same day and divorces within seven days after divorce decree has been granted. The differences in the length of these periods among countries are also related to such factors as climate, communication, transportation, geography, customs and habits and so forth, which all affect the accessibility to the local registration offices.

183. As previously stated, a shorter period of time allowed for registration is preferable to a longer one. A principal reason for this preference is that the informant tends to ignore or to forget the reporting of the event when the period allowed is too long; this contributes to underreporting. Another reason is memory lapse, which, in the case of a longer period, contributes to some aspect of the event being misreported. For certain events, such as death and foetal death, registration should take place as soon as possible for sanitary reasons; countries should issue the burial or cremation permit only after the death registration is completed.

184. Some countries may apply different procedures and use different registration periods for urban and rural registration in order to facilitate registration. However, this arrangement may lead to difficulties in practice, because it is not always clear which criterion should be used in which areas and for which events. Therefore, the maximum period to be allowed between the occurrence and the obligatory registration of a vital event should be determined with respect to all the contributory factors operating in the country and should be as short as possible to facilitate the current and accurate registration of all necessary facts.

3. Provision for late registration

185. Even in the most perfect civil registration system, it is likely that late registration or delayed registration will occur. These are registrations carried out after the expiration of the time legally allowed for registration. Depending on the extent of the delay, late registration may also be counted as an omission when dealing with vital statistics; for example, when late registrations are made after two or more years of their date of occurrence.

186. The civil registration laws should make provisions on how to handle late registrations by the type of vital events and by the length of the period of delay. A scale of fees may also be established in accordance with the length of delay: the longer the delay, the larger the fee.

187. There are several concurrent causes that give rise to late registration; some of them are related to the civil registration office and others to the community itself. On the part of the registration office, proper and timely registration tends to be delayed if the registration proceedings are too intricate and/or the cost of registration is too high. On the community side, late registration is likely to occur when the general public is not aware of the requirement for or simply lacks interest in registration. The latter is associated with cultural factors which play an important role in the soundness of the system. Experience has shown that, in a large number of developing countries, registration is postponed by mere apathy, indifference or ignorance

about the benefits derived from civil registration both for the individual and for the society.

188. Efforts to reduce late registration must be made both by the civil registration organization and by the community at large. The improvement of the efficiency of the civil registration system is of primary importance in this regard. A direct increase in the severity of sanctions, particularly penal ones, is not advisable. Contrary to what might be expected, sanctions discourage registration and entail the risk of keeping important sectors of the population away from civil registration, or at least lead to false declarations of important data, namely, the date of occurrence. More effective results can be obtained from educational programmes as well as from the introduction of incentive measures aimed at raising the community's interest in the timely registration of vital events. In this connection, specific references to the importance of civil registration may be introduced in primary and secondary educational programmes. This is a useful and practical method of making the community aware of the need for fulfilling the laws concerning the registration of vital events, thus minimizing the risk of late registration or not registering at all.

4. Proof required for the registration of vital events

189. The registration process begins when the civil registrar receives proof of the occurrence of a vital event from the informant who requests that it be registered. Depending upon the type of event and the circumstances of the occurrence, the proof may be either legal documents, medical certificates, witnesses or all of the above.

190. Documentary evidence is in general more reliable than a witness. Therefore, the witness should always be accepted as supplementary proof of the event. However, documentary evidence is not always available in certain situations. For example, the medical certificate may not be available in some rural areas where births have occurred without medical attendance, so that no certificate was issued. In the absence of documentary evidence and when the local registrar is a trained official, it may be possible to empower him to determine when proof by a witness would be acceptable or when registration should be accepted solely on the basis of the information supplied by the informant.

191. In the registration of divorce, annulment of marriage and judicial separation, a transcript of the judicial pronouncement or decree granting the event is needed as proof before the event can be registered. Similar legal documents are also needed for the registration of recognition, legitimation and adoption. It should be borne in mind that this type of proof cannot be substituted by witness(es) or by the sole declaration of the informant. In the case of marriage registration, the marriage licence is generally required. The licence is issued after publication of the banns (notice of intended marriage) has taken place for a stipulated period of time and no objections have been made.

192. Documentary evidence presented to the civil registrar is generally prepared by different agencies for various purposes. Therefore, in the process of registration, the local civil registrar has to be familiar with all types of documents and their design and understand the purpose of each document, so as not to be deceived. Exceptions can be made in a few countries where, for certain types of vital events, the legal document, the medical certificate and the statistical report are combined in a single form. Thus the same form may be used as proof of the occurrence of a vital event, as a registration record and as a statistical report form. In other cases, the legal document and medical certificate may contain useful information but may not satisfy the need for registration and vital statistics purposes. It is therefore advisable for the civil registration administration to approach relevant agencies which issued the medical certificates or judicial documents to improve the design of the forms, bear-

ing in mind that the improved forms should be suitable for a variety of purposes. At the same time, it must be cautioned not to let the registration and statistical information become a burden to those who are responsible for preparing the document.

193. Requirements for the registration of vital events in general use by countries are provided in volume II of the present *Handbook* (chap. IV, paras. 138-151).

5. The vital registration record

194. In the process of registration, a local registrar, upon receiving proofs from the informant on the occurrence of a vital event, must, as a general rule, prepare two documents, a vital event registration record and the corresponding statistical report. The registration record becomes a part of the registration files and, owing to its many uses, should be properly and permanently preserved. The statistical report, once filled in and checked for accuracy and completeness, is forwarded to the agency responsible for processing vital statistics. These are the two most important documents in civil registration. The vital event registration record is discussed below. The statistical report is discussed in a later section.

195. Some countries may prefer, however, to use a combined form for both legal and statistical purposes, in which case the statistical report is a duplicate of the vital event record.

196. A vital event registration record registers the information on the occurrence of a vital event. It contains information on certain characteristics of the event and information concerning the persons related to the event.

197. The registration record can be useful for a variety of purposes, as discussed in chapter II above, if it satisfies the following criteria:

- (a) Each vital event is recorded on a separate form;
- (b) The forms are standardized throughout the country or at least within the major civil divisions of a country;
- (c) The content of the document is wide in scope and can be used for various purposes. In this case, it is advisable to divide the document into three main sections: one for legal content, another for complementary notations, a third for remarks;
- (d) Clear definitions for every item in the records are made available to local civil registrars;
- (e) Provisions are made for easy duplication.

198. In countries that prefer the registration document and the statistical report data to be combined in a single sheet, a clear division should be made between the legal and the statistical parts.

(a) *Ways and means of preparing and storing records of vital events*

199. Countries or areas may wish to adopt one of the following three ways of preparing registration records of vital events: the book register or the loose-leaf (single sheet) or the card register. The registration and storage of vital records on a magnetic medium is at present viewed as a convenient and efficient method of civil registration in the future. The following discussion is therefore confined to the three types that have been used widely.

(1) *Book register*

200. In a book register, a number of pre-printed registration forms are fastened together, usually pasted or sewn hingewise and enclosed in a hard cover, so that vital records are entered consecutively as they are reported. The vital event records are filed in the order in which they have been registered and not in the order in which they occurred. Despite its generally large size and handling difficulty, the book register keeps all records together, and the chance of losing or misplacing individual records is avoided. A duplicate of the vital event record must be immediately entered in a duplicate book register, once the original record is done. Both vital records need to be signed by the informant and the civil registrar to attest to the authenticity of the

information contained therein. Since the book register is already bound, it can only be filled in by hand, in which case, provision for using indelible ink should be made. When the book register is used to enter vital event records, the statistical report is necessarily a separate document. The latter is filled in soon after the vital record is completed.

(2) *Loose-leaf registers or cards*

201. The procedure of registration using either the loose-leaf register or the card are the same. They differ only in the way the records are stored. Each vital event is recorded on a single form. The civil registrar may use a typewriter or other mechanical or electronic means to fill in the records, thus improving their legibility. Duplicates of loose-leaf records can be prepared by using either carbon paper or photocopying facilities, depending upon the availability of resources at the local civil registrar's office. Duplicates of cards can be made by using typewriters, photocopyers or other mechanical or electronic copying equipment.

202. If properly designed, the loose-leaf and the card registers may satisfy the information needs for both civil registration and vital statistics, that is, the registration record may be used as the statistical report as well. In such a case, the workload of the local civil registrar becomes considerably reduced.

203. Loose-leaf records and card records can be filed according to different filing methods: numerical index, alphabetical index, chronological index etc. They can be retrieved more easily than can bound registers. Civil registration authorities should make provisions throughout the country to prevent vital records on single sheets from being displaced, lost or misplaced. For example, loose-leaf records are better taken care of in two- or three-ring binders; closed metal vaults or cabinets are preferable for vital records prepared on cards.

204. Specific provisions are needed in the civil registration regulations to indicate that a duplicate of the registration record has the same legal value as the original one.

205. It is recognized that the decision to adopt a specific type of registration document is a critical matter, since there are both advantages and disadvantages in each type of document. The design and the selection of the furniture where the documents will be kept must be taken into consideration simultaneously.

206. Some countries may use a different colour of paper to distinguish the registration form for each type of vital event. When coloured paper is used, the colour selected should be light enough to show clearly the information written on the paper and should not hamper photocopying of the document. Because vital records are permanent documents, paper of a high quality must be used, suitable for permanent storage in the archives.

207. The characteristics of the different types of registration documents in terms of four factors, space, safety, cost and handling flexibility are as follows:

(i) *Space and storage*

208. A loose-leaf type of document records a single vital event. The reverse side of the record is either used to print the instructions for completing it, the definitions of vital events, the legal provision in regard to registration and the like, or is simply left blank. The size of the loose-leaf type of document is generally about 8 1/2 x 11". The cards are usually half that size, and on the reverse side space is left for recording complementary notations. The page-size of a book register is either the same as the loose-leaf page or larger. In general, two vital events are recorded on each page: one on the facing page and another on the reverse. Some countries even record a series of vital events on both sides of the page, a method which is not advisable.

209. For vital records entered in books, margins should be usually larger than in the case of cards. Some pages may be provided for the opening and closing of the book (e.g., at the end of each calendar year). Furthermore, blank pages may be included at the end of each book for making alphabetical and

chronological indexes, if so desired. However, alphabetical indexes may also be made in a separate book.

210. On the other hand, filing, in the case of loose-leaf forms, requires the use of a two- or three-ring binder. This method is preferred to fastening or pasting the individual records together, as they can be easily removed for photocopying and certification purposes, whenever requested.

211. Book shelves are indispensable for storing book registers or loose-leaf records (kept in binders). For storing the card-type vital records, special storage cabinets with drawers, preferably with locks, are required. Unless there are pieces of furniture specially designed to that effect, cards will probably require more space than open shelves for book or binder storage.

(ii) *Safety*

212. There is little difference among the three types of registration documents when it comes to safekeeping of the records. All types may get lost or deteriorate over time. The storage of cards in metal cabinets, usually locked, is undoubtedly safer than storage of books or binders on open shelves. Safety refers not only to theft or misplacement but also to risk of fire. Furthermore, all types of documents may be altered. The possibility of records entered in a book being altered is greater at the local level than at the higher administrative level of the system since the book is kept at the local registration office until it has been filled.

213. Misplacement of vital event records will not occur in the book register, a possibility that is always present when individual loose-leaf sheets or cards are used. Moreover, there is always the risk that the loose-leaf records or cards might be substituted if no proper measures are adopted.

(iii) *Cost*

214. In principle, the card register is more costly than the book register or the loose-leaf form because a special type of paper is needed. Besides, safekeeping of the cards requires costly furniture. On the other hand, the book registers may require periodic book binding because of the deterioration caused by daily use. Books also require additional papers for the opening and closing of the books and for indexing. Furthermore, because the book is usually closed at the end of each calendar year, many pages may be left unused. For cards it is easy to arrange them according to some method of filing through periodical classification. Book registers and loose-leaf records kept in binders require additional indexes and considerable extra work and cost have to be invested in such indexing. In the long run, the cost of the card may actually be lower than that of the book or loose-leaf binder. However, the possibility of misplacement of cards often creates very difficult problems not shared by the book or the loose-leaf binders.

(iv) *Flexibility of handling*

215. The cards and the loose-leaf record can be stored and retrieved individually and thus can be handled more flexibly than the book. This flexibility is shown in the following manner: (a) there are no such procedures as the opening and the closing of books and the indexes for each book; (b) the card and the loose-leaf record may be filled in using typewriters or other mechanical means. This method accelerates the registration process and reduces or eliminates the serious problem of illegibility always associated with handwriting in the book register; (c) the cards and the loose-leaf forms may be photocopied easily to accelerate the process of issuing certificates; however, books do not permit photocopying individual records; and (d) depending on the type of paper being used, copies of registration records made in cards and in loose-leaf forms can be completed simultaneously (multicopy forms), whereas such a possibility does not exist in the book register.

(b) *Content of the vital event registration record*

216. The content of the vital event registration document can be determined in accordance with the requirements of reg-

istration laws. A general principle is to collect a minimal but sufficient information for legal purposes, stating the date and place of occurrence of a vital event that will stand as proof of such event. However, countries may wish that the content of the vital record be used not only for juridical but also statistical purposes. In this case, both statistical and legal data must be included in the layout of the record. A detailed list of the recommended items for statistical reporting purposes is given in the latter section of this report.

217. The following are three examples showing the topics that may be included in the vital records of live births, deaths and marriages. The reader may derive the topics of foetus death from those of live birth and death and the topics of divorce from those of marriage.

A. *LIVE BIRTH*

First Section: *Characteristics of registration record*

- Name of the local civil registration office and geographic code
- Number of the record
- Date of registration

Second Section: *Characteristics of the child*

- Name
- Sex
- Legitimacy status
- Weight
- Length
- Gestational age
- Assigned personal identification number

Third Section: *Characteristics of the event*

- Date of occurrence
- Place of occurrence
- Type of birth (i.e., single or multiple issue)
- Attendant at birth (i.e., the person who delivered the mother of a live birth)
- Hospitalization

Fourth Section: *Characteristics of the mother of the child*

- Name
- Personal identification number
- Age or date of birth
- Place of usual residence
- Nationality/ethnic group (or citizenship)
- Place of birth
- Literacy status
- Educational attainment
- Type of activity
- Occupation
- Children born alive during entire lifetime, including the present child
- Children born during entire lifetime and still living
- Foetal deaths during entire lifetime
- Interval since last previous live births
- Marital status
- Date of marriage

Fifth Section: *Characteristics of the father of the child*

- Name
- Personal identification number
- Age or date of birth
- Place of usual residence
- Nationality/ethnic group (or citizenship)
- Place of birth
- Literacy status
- Educational attainment
- Type of activity
- Occupation
- Marital status

Sixth Section: *Characteristics of the informant*

- Name
- Personal identification number (optional)
- Relationship to the child
- Place of residence

Seventh Section: *Documentation presented by the informant*

- Medical certificate issued by a physician or midwife
- In lieu of the above, witnesses (optional, according to local conditions: name and witnesses' individual identification code)

Eighth Section: *Remarks and signatures*

- Space should be provided for complementary notations and other remarks
- Space should be provided for signatures of the informant and of the local registrar and for stamps

B. DEATH

First Section: *Characteristics of registration record*

Name of the local civil registration office and geographic code
Number of the record
Date of registration

Second Section: *Characteristics of the decedent*

Name
Personal identification number
Sex
Date of death
Literacy status
Educational attainment
Nationality/ethnic group (citizenship)
Marital status
Type of activity
Occupation
Place of usual residence

Third Section: *Characteristics of the event*

Date of occurrence
Place of occurrence
Cause of death
Hospitalization

Fourth Section: *Characteristics of the informant*

Name
Personal identification number
Relationship to the decedent

Fifth Section: *Documentation presented by the informant*

Type of certification and certifier (the person who certifies the cause of death)
Witnesses

Sixth Section: *Remarks and signatures*

Space should be provided for complementary notations and other remarks
Space should be provided for signatures of the informant and of the local registrar and for stamps

C. MARRIAGE

First Section: *Characteristics of registration record*

Name of the local civil registration office and geographic code
Date of registration
Number of the record

Second Section: *Characteristics of bride and groom*

Name of bride and groom
Personal identification numbers
Marital status (previous)
Number of previous marriage
Nationality/ethnic group (citizenship)
Place of usual residence
Duration of residence
Place of birth (administrative division)
Literacy status
Educational attainment
Type of activity
Occupation

Third Section: *Characteristics of the event*

Date of occurrence
Place of occurrence
Type of marriage (e.g., civil, religious, civil/religious, customary)

Fourth Section: *Witnesses*

Names
Place of usual residence

Fifth Section: *Remarks and signatures*

Space should be provided for complementary notations, other remarks and signatures of the bride, groom, witness(es) and the local registrar

(c) *Numbering of the vital event records*

218. Registration records of each type may be numbered consecutively on an annual basis at each local registration office.

219. For countries that use the personal identification number system or plan to develop such a system, a unique personal identification number may be assigned to each individual, preferably at the time of live birth registration. This number is then used in all documents the individual acquires during his entire life. The number may consist of a series of codes derived from various characteristics that are unique to an individual includ-

ing, for instance, the geographical location of occurrence, the date of occurrence and the sequential number of the record in the register.

220. An example of how the personal identification number may be developed is given below. This number consists of 12 to 18 digits, depending on the needs of a country, particularly its population size. However, countries may wish to introduce other characteristics, so that more digits will be required:

STRUCTURE OF THE PERSONAL IDENTIFICATION NUMBER

Characteristics	Number of digits
(1) <i>Place of registration</i>	
Number of major civil division	0, 1 or 2
Number of the local registration area	2 or 3
(2) <i>Date of occurrence</i>	
Year	2
Month	2
Day	2
(3) <i>Sequential number of registration in the file</i>	3 or 4 (according to the size of the population handled by the office)
(4) <i>Sex</i>	1
(5) <i>Verification digit</i>	1 or 2

221. Countries having fewer major civil divisions or fewer registration areas and fewer annual births would need fewer digits for such a record numbering scheme than countries having large numbers of geographical divisions and more births. It is advisable that, before the numbering scheme is adopted, tests be made to examine whether the scheme is suitable and feasible for the society.

6. *The statistical report*

222. At the time of registration, the local registrar must prepare a statistical report for each vital event registered. The information for this report is to be provided by the informant or taken from the medical certificate and other documents presented to the registrar.

223. In some countries the statistical report form is also the registration form, that is, a form designed to suit both purposes. This is basically a time-saving method because the local registrar needs to deal with only one type of recording form in the registration process.

224. In other countries, the registration form and the statistical report are two separate documents. In these countries, legal provisions may forbid the collection of certain individual information, for example, race and legitimacy, for civil registration purpose. Furthermore, most countries now have statistical laws that guarantee the confidentiality of statistical information. When the registration and statistical forms are different documents, it is easier to collect statistical information and enforce the confidentiality provision.

225. Details of the content and layout of the statistical report in respect of each type of vital event are discussed in chapter IV below (The National Vital Statistics System). The recommended statistical topics given in chapter IV are more than recommended registration topics. The reader may wish to compare both series of topics to see their differences in scope.

7. *Complementary notations (additions) in vital event registration records*

226. A civil registration record should reflect the civil status of the registered person. If that status changes, the record should be changed accordingly.

227. Generally, divorces, annulments of marriage and judicial separations of marriage call for complementary notations in the marriage registration record upon presentation of the judicial pronouncement on such an event by the informant. There-

fore, such events may or may not create a registration record of their own, depending on the country. When the above-mentioned events occur at a place other than the place of marriage registration and events are to be registered by place of occurrence, provision should be made for notifying the original place of marriage registration about those changes so that complementary notations can be made in the marriage record.

228. Similarly, registration of recognitions, legitimations, adoptions, change of name(s) and surname(s), call for complementary notations in the corresponding birth registration record. Some countries therefore may choose not to prepare individual records for those events.

229. Any complementary notations to civil registration records must be authorized by the courts. This means that registration records revealing changes in the civil status of the persons concerned should do so only following a judicial resolution.

230. It should be emphasized that any additions or changes made to the registration records must be done in such a way that they do not alter any of the original entries. Therefore, it is of paramount importance that the layout of the registration record should allow ample space for entering those additions. Furthermore, it is important to make the changes in duplicate so that copies can be forwarded to the central and other archives.

8. *Amendments (corrections) to vital event registration records*

231. Civil registration records may need to be amended if they are found to contain errors, such as clerical errors, involuntary errors made at the time of registration and the like. Provision should be made in the corresponding registration laws and regulations on how these errors should be corrected and who should do so. Likewise, the laws must have provision for the protection of the legal value of the original registration record.

(a) *Administrative arrangements for making corrections*

232. There are three kinds of administrative arrangements by which corrections may be made:

First, the authority to make amendments to the records belongs to the court, especially when some of the corrections involve legal aspects of registration, namely dates of occurrence and the like. In this case, corrections must be made only upon the issuance of a judicial resolution. Generally, however, judicial proceedings are slow, complex and costly for most of the population. Under this type of arrangement, the correction of errors in registration records is a difficult process.

Secondly, the authority for making amendments rests with the civil registration administration itself. This type of arrangement makes the process of correcting errors simpler, shorter and less costly. The civil registration agency has a specific interest in the accuracy and authenticity of registration. This arrangement provides a further opportunity for the central agency to supervise the work of the local registrars.

Thirdly, a combination of the above two approaches, that is, the administrative procedure is used to correct apparent errors and the judicial proceeding is adopted when the legal aspects of registration are involved.

(b) *Methods of correction*

233. Civil registration records can generally be corrected in three different ways:

234. The first is to insert the correct information in the vital record soon after errors are found and leave no indication of what has been corrected.

235. The second is to write down the new information above the incorrect data. The correction may be made by striking through the original recorded information with a fine line so that the original information can still be read. Special care must

be taken when writing down the supplementary information so that the record does not become illegible.

236. Third, prepare a new vital event record with corrected or additional data. In this case, the original record is crossed out as void but should be kept in the registration file, as vital event records have sequential numbers and none should be missing. The advantage of the third method is that the vital record is neatly made, with no sign of amendments or additions. A disadvantage is that the workload of the civil registrar is increased.

237. Any correction made in a vital event record should be made in duplicate so that copies of the changes can be forwarded to the central and other archives.

H. *MANAGEMENT OF THE CIVIL REGISTRATION RECORDS*

1. *The need for a central archive*

238. The existence of a central archive for the civil registration system is of primary importance for maintaining the registration records safely and adequately. A central archive enables the central civil registry to obtain records and issue certificates of civil registration at both the local and higher administrative levels. It contributes to the preservation of records and increases the safety of documentation. Furthermore, it facilitates the monitoring of the work of local registrars, because the records are continuously reviewed for accuracy.

239. However, a central archive is costly and requires a large amount of space. The civil registration regulations should specify clearly which agency should be responsible for management and maintenance of the archive and how the documents should be filed, retrieved and preserved. The law should also specify that registration records must be prepared in duplicate at the local registration offices, so that the central registration archive is regularly fed with a copy and kept up-to-date and complete.

240. In countries with a centralized political system, fewer administrative or legal problems arise in the creation of a national archive. The national office responsible for administering or coordinating the civil registration system should also be responsible for the management of the central archive. Under these arrangements, a copy of each registration record should be kept in the local civil registration office while another should be sent to the central registration archive.

241. In countries with a decentralized political system, a central archive may be created at the capital city of each major civil division. However, for countries covering a vast territory and having a large population, the establishment of a national central archive would not be practical because of logistical, including transportation, difficulties, the need for growing space and so forth; instead, subnational central archives may be established.

2. *Filing methods and preservation of the registration records*

242. The management of civil registration records involves several different but interrelated operations including filing, retrieving and the preservation and storage of registration records. These operations are discussed below.

(a) *Filing methods*

243. In any well-organized filing system, documents should be arranged in such a way that they can be retrieved easily. The efficiency of a filing system may be judged by how quickly a document can be found. The filing method to be adopted by a civil registration system depends on the type of registration document in use. If registration is made in a book register—that is, records are fastened together (usually printed sheets sewn or pasted hingewise and enclosed in a cover)—entries are usually made according to the order in which vital events have been reported. This is the chronological method of filing. One original book and one duplicate book are to be made. Once the book

is completed, the original is placed in the local archive. Books should be labelled for easy identification. The duplicate book is sent to the central archive where it is properly classified, in open book shelves, by geographical order of registration, type of vital event and chronological order of registration.

244. If registration documents are loose-leaf forms or cards, the registration records of each calendar year may be arranged by geographical area, by chronological order of entries of vital events, by chronological order of occurrence, by alphabetical order, or by other methods. The loose-leaf forms can each be kept in a two- or three-ring binder or may be bound at the end of each quarter, half year or each calendar year. Cards however must be kept in specially designed drawers or shelves. Local registration offices should prepare the vital records in duplicate; one is kept at the local registration office and the other is sent to the central archive.

(b) *Preservation and storage of vital records*

245. Registration files will deteriorate or be destroyed for a number of reasons, the most important being the aging of the file itself, that is, the deterioration of the paper, ink and binding. Not every type of paper has the required quality for a permanent file. The other reasons include careless handling of files, fire, water, theft etc.

246. When registration is made in a book or in a loose-leaf form, attention should also be paid to the quality of the binding. Notwithstanding all the care bookkeepers may take of the records, daily handling and poor storage methods may accelerate the deterioration of the records to such an extent that their repair and replacement become necessary. As replacements and even losses of records are likely to occur, the civil registration regulations should specify who should carry out those repairs and recoveries and how they should be made.

247. Storing conditions of records are more important, in the long run, than the quality of paper, ink and binding. The storage of these permanent documents must include such measures as the grading of natural and artificial light and temperature and humidity, in order to avoid discolouration and early aging of the material. Periodic fumigations should be made in order to counteract the action of moss and other fungi as well as of insects and rodents. Furthermore, measures that would reduce the risks of fire, water and theft must be taken as an integral part of the work of file management: the use of vaults and closed shelves is advisable to prevent loss through fire, water and theft.

(c) *Filing and preservation of other related registration documents*

248. Documents that are required to support a claim based on occurrence of a vital event should also be filed and preserved at least for a specified period of time. These include, for example, judicial decrees on the dissolution of marriages, the authorization of legal separations of married couples, judicial pronouncements regarding annulments of marriages, legitimations of children, recognitions etc., medical certificates on causes of death and so forth.

249. Special filing is needed to keep such documents at the local registrar's office. Copies of the documents should be forwarded to the subnational and central archives of the country.

3. *Certificates on registered vital events*

250. A great deal of the work of local civil registrars consists in issuing registration certificates for various legal, administrative and other purposes. Owing to the evidentiary nature of certificates on registered events, civil registration legislation should include provisions stating the method of issuing them. For instance, it might be a requirement that certificates be issued using photocopying equipment; or that an excerpt from the vital record be made. Still other provisions may require the complete text of the vital record to be copied either by hand or typed on special stamped paper to prevent forgery.

251. Generally, the certificate may be either: (a) a duplicate of the information contained in the vital event record that is copied in a special form, either handwritten or typed; (b) an accurate reproduction of the original or of selected parts of it by means of some photocopying equipment; or (c) a print-out by mechanical or computerized equipment. When transcripts are made from the original records, care should be taken to avoid errors. This method is slower than making photocopies but may be the only one applicable when the necessary equipment is not available. Furthermore, transcription enables the improvement of the legibility of the original information when records are in such bad condition that photocopying becomes impossible. On the other hand, there is a possibility that this process may bring about a personal interpretation of illegible data.

252. It is important that in all cases the certificate should be authenticated by the signature of the civil registrar or other designated persons of the civil registration system.

IV. THE NATIONAL VITAL STATISTICS SYSTEM

253. A vital statistics system collects information by registration or enumeration on the frequency of occurrence of certain vital events, as well as relevant characteristics of the events themselves and of the person(s) concerned. It then compiles, analyses, evaluates, presents and disseminates these data. The information recorded in the civil registration system is the foundation of a vital statistics system. This chapter discusses how data on vital events collected through registration become vital statistics. It begins with a discussion of different types of organizational structures that might be used to process and evaluate the data, and of the coordination efforts necessary among statistical and registration agencies. The discussion is followed by a description of the statistical reporting process, including data flow, report formats, and item definitions. The processing of data at the vital statistical agency is considered from the perspective of both manual systems and the use of electronic data processing equipment. Finally, the chapter focuses on a suggested tabulation programme and the publication of vital statistical data.

254. Statistical reporting and processing systems vary from country to country; however, some elements are common to all. Figure I presents a diagram of a national vital statistics system, relying only on civil registration. Periodically, statistical reports on registered vital events are forwarded to the agency or agencies in charge of statistical processing. These reports should cover all vital events that have occurred in the registration area during the reporting period, and they provide the data required for the compilation of national statistics. The statistical agency processes and evaluates the data on these reports.

255. In this chapter, the term "production" of vital statistics is used to refer to all the necessary steps, starting with the collection of basic data and culminating in their dissemination. As such, the term includes collection, processing, evaluation and analysis.

A. ORGANIZATIONAL STRUCTURES OF A NATIONAL VITAL STATISTICS SYSTEM

256. Vital statistics can be produced by either the enumeration method or the registration method. When the enumeration (censuses and surveys) method is used, vital statistics can be collected and compiled by a national statistics agency, a civil registration agency or any other government agency responsible for population data collection and compilation. When the registration method is used, collection of data is carried out by the local registrar and transmitted to higher civil registration or statistical offices for compilation of vital statistics.

257. As stated earlier, the system may be centralized or decentralized. In a centralized civil registration system, there can be either a centralized or decentralized vital statistics system. Likewise, in a decentralized system, there can be either a centralized or a decentralized vital statistics system. The following section discusses the advantages and disadvantages of each.

1. Centralized and decentralized systems

(a) Centralized system

258. In the centralized vital statistics system, the local civil registration offices send, on a regular basis, statistical reports on all registered vital events to a national vital statistics office through established administrative channels. The national vital statistics office then compiles and publishes vital statistics for the country as a whole.

259. A centralized vital statistics system promotes various activities needed for the civil registration work to be standardized nationwide. These include the preparation of a national statistics law, the adoption of uniform definitions for vital events, the development of standard guidelines for data collection, classification and compilation and the use of standard formats for statistical reporting, data handling and processing and so on. Furthermore, when there is a need to redesign the statistical report forms or introduce changes to reflect new developments in society, the centralized system is in a position to introduce these changes in an efficient way. In addition, the central vital statistics agency is responsible for coordinating the work of subnational vital statistics offices and providing guidance for data handling and processing.

260. When a country's territory and the size of its population are relatively small, the vital statistics system can take advantage of adopting a centralized system for vital statistics processing.

(b) Decentralized system

261. In the decentralized vital statistics system, vital statistical offices or the registration offices at the subnational levels collect vital statistics reports from the local civil registration offices and compile, and often publish vital statistics for that subnational level. Afterwards, a national vital statistical office compiles the data received from the subnational offices and issues the national and, if necessary, subnational vital statistics.

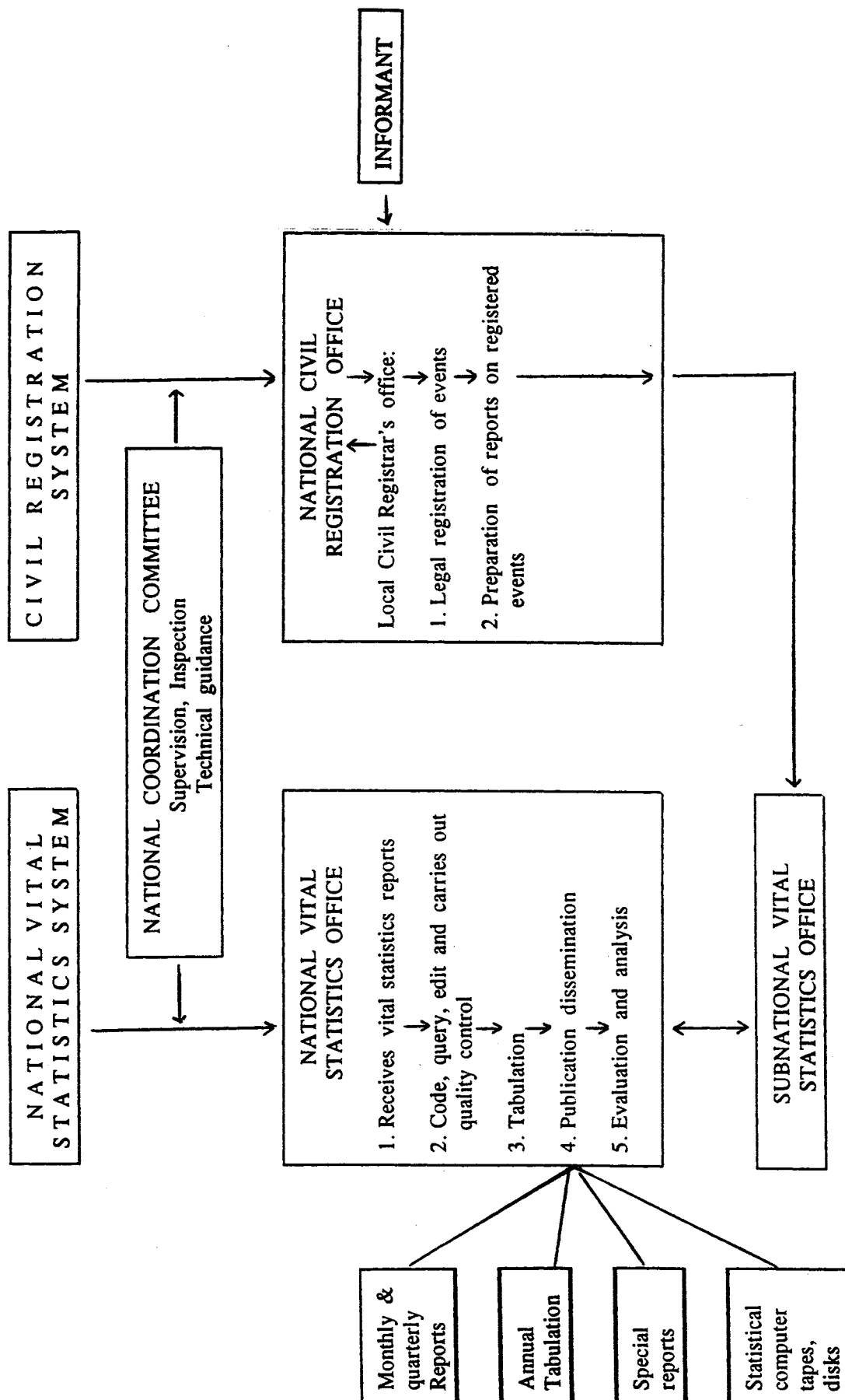
262. Under the decentralized system, it is important for the national vital statistics office to undertake careful quality control procedures, such as recoding a sample of vital records (or statistical reports, as the case may be) from each subnational office; develop and enforce uniform data collection standards; and provide training and technical manuals to the subnational offices to ensure the uniformity of data collection and compilation across the nation.

263. When a country adopts a decentralized administration for civil registration, its vital statistics system can be either a decentralized or a centralized one depending upon the national regulations for registration and statistical reporting. In general, countries with a federal political organization tend to adopt a decentralized vital statistics system. Similar provisions can be made in countries with large populations regardless of their political organization. However, when a country adopts a centralized administration for civil registration, it is more likely that the vital statistics system will be a centralized one too.

2. Type of agency administering vital statistics

264. Three alternatives may be considered in administering vital statistics programmes. The first alternative is to place the vital statistics administration under the national statistical service. In this case, the vital statistics programme is a part of the general statistics programme. The second alternative is to place the vital statistics administration within the civil registration administration. A third alternative is to designate one or more government agencies to carry out different vital statistics functions related to the work of these agencies. For example, the health service agency may collect and process data on births, deaths and foetal death, while the general statistical service or the court system may compile marriage and divorce statistics.

Figure I. Diagram of a national vital statistics system relying on civil registration system data only



(a) *Advantages and disadvantages of each type of administration*

265. Placing the vital statistics programme under the national statistical agency has the advantage of focusing attention on the statistical aspects of the vital statistics system. The collection of vital statistics data under such an arrangement may be more extensive and exhaustive than it would be under the civil registration or health ministry auspices. In addition, each type of vital event (i.e. live birth, death, foetal death, marriage and divorce) will receive the same treatment in the tabulation and dissemination programmes. Furthermore, in some countries, the resources necessary for long-range planning and programme development for vital statistics may be available only in a national statistics agency.

266. There are disadvantages to placing a vital statistics administration in a national statistical agency. First, the statistical agency may have no control over the basic collection process, which is carried out by local civil registrars. Therefore, data collection instructions issued by the statistical authorities to local registrars may be ignored, queries for omitted or incomplete data may not be carefully attended to, and reporting to the statistical agency may not be timely. Second, the statistical agency may not be aware of important legal problems and/or limitations that affect the interpretation of vital statistics data. Third, the vital statistics programme may not receive the priority attention it deserves, particularly during the population census time, if the national statistics office is also responsible for conducting population censuses and surveys and its resources are limited. Consequently, the series of vital statistics it produces may suffer in respect of timeliness and quality.

267. Placing specific vital statistics programmes under relevant government agencies will provide the attention the programmes need and therefore will produce quality data. For example, entrusting the production of health statistics to the health authorities can respond very well to changing needs in public health. However, such disadvantages, arising from lack of control over data collection, as are noted for the national statistics office may also apply to the health agency.

268. Placing the vital statistics administration under the civil registration administration has the advantage of direct control over the collection of, as well as full and ready access to, the original data. However, when the system is designed primarily to provide for the civil registration function, the statistical component of the programme may be neglected.

B. COORDINATION IN THE VITAL STATISTICS SYSTEM

269. There is a clear need for coordination among government agencies responsible for the production of vital statistics, among functional units within the same operating agency and between the vital statistics agency and the users of vital statistics data. Coordination is necessary to maintain uniformity in methods and procedures throughout the system, to avoid possible duplication in the production, evaluation and dissemination of vital statistics and to assure that the needs of the users are met. There must be a continuous exchange of views and experiences, particularly on issues that might affect the quality of data and results. Consultations are especially important when changes in registration regulations and procedures and in vital statistical reporting forms are introduced. Coordination may be accomplished through the means outlined below.

1. *Inter-agency coordination committee*

270. The establishment of a national inter-agency coordination committee consisting of departments dealing with population, health, civil registration, statistics, justice etc. is a useful means to address issues relating to the improvement and production of vital and health statistics. If the committee is to be effective, it should be established on a permanent basis. It should

have a legal status, mandated by law. As mentioned in chapter I, the idea of establishing a national committee on vital and health statistics was first proposed in 1948 by the International Conference for the Sixth Revision of the International Lists of Diseases and Causes of Death and was endorsed by the World Health Organization at its first session.⁶¹

2. *Uniform legislation and regulation*

271. In countries where a centralized civil registration and vital statistics system is established, the uniformity of the laws and regulations is assured. In federated states where a decentralized system is introduced, a uniformity in legislation should be promoted through the introduction of model law and regulations.

3. *Workshops and conferences*

272. Workshops and conferences on vital statistics can bring together people working in different sectors and locations of the vital statistics system to discuss issues concerning their work. These opportunities will help participants to exchange their experiences concerning registration and reporting procedures, definitions, methods of data recording and other issues of data compilation and dissemination, as well as problems of vital statistics systems.

4. *Newsletters*

273. Periodic bulletins to disseminate information on new methods, codes, procedures and other developments are effective means of information exchange.

5. *Field consultants*

274. Provision of travelling consultants to serve as liaison agents between the central vital statistical office and the field offices is an effective coordination method for both the centralized and the decentralized vital statistics systems. The consultants can also provide a link between the central statistical agency and the local civil registration offices, which may not be under the administrative control of the central vital statistics agency.

6. *Liaison with related statistical fields*

275. Close coordination in methods and procedures of collecting statistics and consultation with relevant organizations responsible for work on population matters, public health and social welfare are important. A technical consultative committee to coordinate procedures, definitions, concepts, classifications and tabulations is useful for this purpose.

C. STATISTICAL REPORTING

276. As mentioned in chapter III, the local civil registrar, in addition to recording information with respect to vital events for legal purposes, is responsible for the preparation of individual statistical reports for each vital event registered. The registrar also forwards the statistical report to the agency responsible for data production on a regular basis. The statistical report, aside from being prepared for each vital event, should be legible, complete and without errors. The method used by the registrar to prepare statistical reports has an important effect on the accuracy and completeness of the resulting data. For this reason, in the following section the types of statistical report forms are discussed with their advantages and disadvantages, as well as the design, content and process of reporting.

1. *Types of vital statistical reporting forms and content*

277. There are three basic types of statistical report forms:
Single event form: Individual reports containing information about a single event

Multi-event form: Lists containing all relevant information about a series of events of the same type (e.g., births, deaths, etc.)

Summary form: Summary reports which aggregate data about each type of event

278. The single event form or the individual report form has more space for recording detailed information of a vital event. Space is particularly important for some events, for example, deaths, because the detailed medical information should be recorded in both the registration and the statistical report. Furthermore, space is also needed for describing clearly certain characteristics of the person, the event, and other matters related to the person and the event. The individual report form has also space on the reverse side of the form to print instructions for filling in the form and definitions of items.

279. The individual statistical report can be either different from or the same document as the vital event registration form. In the first type, the information recorded on the registration form and on the statistical form include only those items needed for their respective purposes. This procedure tends to add extra workload to the local civil registrar. In the second type, the same form, but in duplicate, is used for legal and statistical purposes, thus reducing the workload of the local civil registrar.

280. Despite that it tends to increase the workload for the local civil registrar, different forms for registration and statistics are preferable because data requirements differ for legal and for statistical purposes. Statistical information is confidential in nature; the legal information in the vital record is, in general, public information. For example, in some countries, references concerning such information as race and legitimacy are forbidden in the vital event record but are permitted in the statistical report form. In such cases, a statistical report form different from the registration form makes it easy for the collection of vital statistics.

281. Figures II to XI are statistical report forms for a selected group of countries to show different designs. Figures II and III are multi-event birth/death reports. It is evident that a minimal amount of information about each birth/death can be collected in this type of document. Figures IV to VII are examples of individual birth/death statistical reports forms whose contents are different from those of the registration record. Selected data from the death/registration record and/or from the medical certificate are transcribed on to the statistical report. The forms presented in figures VIII to XI are combined registration forms and statistical reports. Information recorded on the forms is used for both statistical and legal purposes.

2. Design of statistical reporting forms

282. A well designed statistical form is essential for data collection and transmission. Therefore, the size, shape and general layout of the form should be carefully considered in the design. Using different colours of paper to distinguish one type of vital event from another can facilitate the work of registration and data compilation. In addition, the forms should be printed in such a way that it is aesthetically pleasing as well as clear and easy to read and fill in.

283. The manner in which items are arranged on the forms is important for both ease of filling as well as of interpreting, coding and data entry. It is best to limit the form to one side of the paper to facilitate insertion of the information and subsequent coding. In arranging items on the form, related items should be grouped together. The logical order of the items should be established in relation to their source.

284. Sufficient space should be provided to write the response for each item. In countries where the language is written horizontally, items should be arranged in horizontal positions rather than in vertical position since this would yield more adequate space for the insertion of data. The space for each item should be clearly delimited by lines. It is also desirable to iden-

tify each item by a serial number running horizontally, line by line, to facilitate coding (see figures VIII to XI).

285. The necessity for using simple language on the form, with clear instructions for filling it, is self-evident. It may be desirable in some cases to include the definition of some of the items on the statistical report form. In any event, the registrar should be provided with complete instructions on how the forms should be filled.

286. Forms should be pre-tested before being introduced. Particular attention should be paid to the wording of items to assure that they are specific and non-ambiguous.

3. Content of the statistical report

287. What items should be included in the statistical reports depends primarily on the need for national vital statistics requirements. Another major consideration in the selection is the desirability of achieving regional and world-wide comparability. Furthermore, the topics to be collected must be those upon which the respondents will be willing and able to provide adequate information. Complicated and difficult questions should be avoided. The items recommended by the United Nations for statistical reporting forms of live births, deaths, foetal deaths, marriages and divorces, given in the *Principles and Recommendations* (para. 71), are listed below. An asterisk (*) indicates a priority item that should constitute an immediate goal in vital statistics collection.

(a) Items in the live birth statistical report form

(i) Characteristics of the event

- *Attendant at birth
- *Date of occurrence
- *Date of registration
- Hospitalization
- *Place of occurrence
- *Type of birth (i.e., single or multiple issue)

(ii) Characteristics of the child

- Gestational age
- *Legitimacy status
- *Sex
- *Weight at birth

(iii) Characteristics of the parents

- Age (or date of birth) of father
- *Age (or date of birth) of mother
- Citizenship (or nationality) of mother, father
- *Date (or duration) of marriage (for legitimate births)
- Duration of residence in usual (present) residence for mother, father
- Educational attainment of mother, father
- Ethnic (or national) group of mother, father
- Interval since last previous live birth for this mother
- Literacy status of mother, father
- *Number of children born alive to this mother
- Number of children of this mother still living
- Number of foetal deaths to this mother
- Occupation of mother, father
- Place of birth of mother, father
- Place of residence at a specified past date; mother, father
- *Place of usual residence of mother
- Place of usual residence of father
- Type of activity of mother, father

(b) Items in the death statistical report form

(i) Characteristics of the event

- Attendant at birth (for deaths under one year of age)
- *Cause of death
- *Certifier
- *Date of occurrence
- *Date of registration
- Hospitalization
- *Place of occurrence

(ii) Characteristics of the deceased

- *Age (or date of birth)
- Age of surviving spouse (for married)
- Citizenship (or nationality)
- Duration (or date of marriage)

- Educational attainment
- Ethnic (or national) group
- Legitimacy status (for deceased under one year of age)
- Literacy status
- *Marital status
- Number of children born alive (for females of child-bearing age or older)
- Number of children still living (for females of child-bearing age or older)
- Occupation
- Place of birth
- Place of residence at a specific past date
- *Place of usual residence
- *Sex
- Type of activity
- Was birth registered? (for deaths under one year of age)
- (c) Items in the foetal death statistical report form
 - (i) Characteristics of the event
 - Attendant at birth
 - Cause of foetal death
 - Certifier
 - *Date of occurrence (of foetal delivery)
 - *Date of registration
 - Hospitalization
 - *Place of occurrence
 - *Type of birth (single or multiple issue)
 - (ii) Characteristics of the foetus
 - *Gestational age
 - *Legitimacy
 - *Sex
 - Weight at delivery
 - (iii) Characteristics of the parents
 - Age (or date of birth) of father
 - *Age (or date of birth) of mother
 - Citizenship (or nationality) of mother, father
 - *Duration of (or date) of marriage (for legitimate pregnancies)
 - Educational attainment of mother, father
 - Ethnic (and/or national) group of mother, father
 - Literacy status of mother, father
 - Occupation of mother, father
 - *Number of children born alive to this mother
 - Number of children of this mother still living
 - *Number of previous foetal deaths to this mother
 - Place of birth of mother, father
 - Place of usual residence of mother, father
 - Type of activity of mother, father
- (d) Items in the marriage statistical report form
 - (i) Characteristics of the event
 - *Date of occurrence
 - *Date of registration
 - *Place of occurrence
 - *Type of marriage (civil, religious, etc.)
 - (ii) Characteristics of the bride and groom
 - *Age (or date of birth)
 - Citizenship (or nationality)
 - Duration of residence in usual (present) place
 - Educational attainment
 - Ethnic (and/or national) group
 - Literacy status
 - *Marital status
 - Number of previous marriages
 - Occupation
 - Place of birth
 - Place of residence at a specific past date
 - *Place of usual residence
 - Type of activity
 - Place of previous residence
- (e) Items in the divorce statistical report form
 - (i) Characteristics of the event
 - *Date of occurrence
 - *Date of registration
 - *Place of occurrence
 - (ii) Characteristics of the divorcees
 - *Age (or date of birth)
 - Citizenship (or nationality)
 - *Date (or duration of marriage)
 - Educational attainment
 - Ethnic (or national group)

- Literacy status
- Mode of dissolution of previous marriage
- Number of children born alive to this marriage
- *Number of dependent children of divorcee
- Number of previous marriages
- Occupation
- Place of birth
- Place of previous residence
- Place of residence at a specific past time
- *Place of usual residence
- Type of activity
- Type of marriage being dissolved
- Duration of residence in usual (present) place
- Place of occurrence of marriage being dissolved

288. There are 12 priority items for live births, 9 for deaths, 11 for foetal deaths, and 7 each for marriages and divorces. When these data are collected, a minimum set of tabulations can be prepared that will be useful for both demographic research and public health service purposes. The remaining items provide materials for an in-depth understanding of the occurrence of a vital event. Cross-tabulations of them will generate a rich body of information for learning various social and economic determinants on different aspects of some changes. Country experiences on characteristics of vital events investigated by the civil registration method are given in detail in volume II of the *Handbook* (paras. 209-236 and in the tables A.12-A.16). The *Principles and Recommendations* (pages 75-153) presents the definitions of the recommended items to be included on statistical report forms and their tabulation schemes.

4. The statistical reporting process

(a) Principles of statistical reporting

289. Statistical reporting must be complete and timely in order to meet the requirements for adequate vital statistics. Completeness may be viewed from both the quantitative and qualitative aspects.⁶²

290. Quantitatively, completeness refers to the need to obtain a report for every registered event, for every geographical area and for every population group. This is regardless of whether registration takes place within the period prescribed in the registration regulation or is delayed, and regardless of the extent of registration coverage in each geographical area and in each population group. This is to meet the need for vital statistics, tabulated for every geographical area, for use in connection with plans and programmes of social and economic developments and for the improvement of vital statistics. It would be desirable, if feasible, that each geographical reporting area provided to the compiling office qualitative and quantitative indicators of the degree of completeness of the registration. The availability of these indicators would stimulate those local offices where registration is less than complete to improve their coverage.

291. Qualitatively, completeness is related to the availability of information to be collected, its reliability and validity and the timeliness of reporting. The local civil registrar is responsible for supplying the information on all the items in the statistical report forms as accurately and completely as possible. The timely nature of statistical reporting is closely related to the dynamics of vital statistics, as those statistics are expected to be available soon after vital events are registered. To meet this requirement, the scheduling of vital statistical reporting is an extremely important aspect of the vital statistics system.

(b) Channels and means of transmitting statistical reports to the central office

292. Vital statistics reports may be transmitted to the central office for processing in several ways, including:

- Original vital statistics reports
- Paper copies (photocopies, handwritten or carbon copies)
- Microfilm/microfiche

SECRETARIA DE PLANEJAMENTO E COORDENAÇÃO DA PRESIDÊNCIA DA REPÚBLICA
FUNDAÇÃO INSTITUTO BRASILEIRO DE GEOGRAFIA E ESTATÍSTICA — IBGE

REGISTRO CIVIL

PARA USO DO IBGE						
MOD.	TRIM.	UF	MUNICÍPIO — C7	DISTR.	CART.	SEQUENCIAL
1						

REGISTRO CIVIL		IDENTIFICAÇÃO		1	
6)	----- trimestre de 190	1) Unidade da Federação	3) Distrito (via sede)	4) Fonecelo, localidade, bairro, etc.	8) N.º do quest. por livro
7)	Livro n.º	2) Município		5) Endereço (logradouro — rua, avenida, etc. e n.º)	

INSTRUÇÕES: Preencher o questionário de forma legível, de acordo com as instruções, com esferográfica azul ou preta. Destinar-se este questionário aos arrolamentos dos Nascidos Vivos registrados no Cartório durante o trimestre considerado. Os arrolamentos deverão ser feitos em questionários distintos para cada livro. Não arrolar registro que pertença a mês não abrangido pelo trimestre considerado. Não há necessidade de mudar de questionário para separar cada livro do trimestre. Quando houver registro anulado, o nº DO REGISTRO NO LIVRO (coluna 2) deverá ser anotado, e, se seguir, na mesma linha, escrever: Anulado pelo Cartório. Não usar espaços para qualquer tipo de registro. Qualquer observação ou informação complementar deverá ser feita no verso deste modelo.

[illegible]

O Cantório deverá preencher o questionário em uma só via.

Figure III. Sample of a multi-event statistical report of deaths

ÓBITOS — RC. 3

1 IDENTIFICAÇÃO				6) trimestre de 198.....			
2) Município				7) Livro n.º			
3) Distrito (vila, sede)				8) N.º do quest. por livro			
4) Povoado, localidade, bairro, etc.				5) Endereço (logradouro — rua, avenida, etc. e n.º)			

INSTRUÇÕES. Preencher o questionário de forma legível, de acordo com as instruções, com asterográfica azul ou preta. Destina-se este questionário aos arrolamentos dos Óbitos registrados no Cartório durante o trimestre considerado. Os arrolamentos deverão ser feitos em questionários distintos para cada livro. Não arrolar registro que pertença a mês não abrangido pelo trimestre considerado. Não há necessidade de mudar de questionário para separar cada mês do trimestre. Quando houver registro anulado, o N.º DO REGISTRO NO LIVRO (coluna 2) deverá ser anotado, e a seguir, na mesma linha, escrever: Anulado pelo Cartório. Não usar aspas para qualquer tipo de registro. Qualquer observação ou informação complementar deverá ser feita no verso deste modelo.

PREENCHIMENTO: Colunas 3 e 5: Registrar o dia: 01, 02, ... 31. Colunas 4 e 6: Registrar com 2 algarismos o mês: jan. = 01, fev. = 02, ... dez. = 12. Coluna 7: Registrar com 2 algarismos o ano: 1979 = 79, 1978 = 78, etc. Colunas 8, 14 e 17: Registrar com 1 algarismo, conforme o disposto no Regulamento do Registro Civil, a Unidade da Federação: Domicílio = 1; Hospital, Casa de Saúde, Maternidade, etc. = 2; Outro (residência particular, etc.) = 3. Coluna 10: Registrar a sigla da Unidade da Federação. Coluna 12: Registrar o nome do Município ou País, observando de tal forma que torne impossível sua identificação. Colunas 15 e 16: Registrar com 2 algarismos a idade do falecido em anos completos (coluna 15). Para as pessoas falecidas com 100 anos ou mais, registre 00. Registrar com 1 algarismo conforme o ingresso na Coluna 18, observando o relacionamento existente com a Coluna 15. Coluna 18: Registrar o nome da Unidade da Federação, quando se tratar de brasileiro nato, ou do País de nascimento, se forem estrangeiros ou naturalizados. Colunas 11, 13 e 19: Para uso do usuário.

CARACTERÍSTICAS DO REGISTRO										CARACTERÍSTICAS INDIVIDUAIS DO FALECIDO												
N.º DE CENSO DO ARRO- LA- MEN- TO	N.º DO REGISTRO NO LIVRO	DATA DO REGISTRO		DATA DO ÓBITO		NATU- REZA DO ÓBITO	LOCAL DO ÓBITO	Sigla da UF	LUGAR DE DOMICÍLIO RESIDÊNCIA		IDADE				ESTADO CIVIL				NATURALIDADE	Código LA- MEN- TO	N.º DE CENSO DO ARRO- LA- MEN- TO	
		Dia	Mês	Dia	Mês	Ano	Domi- cílio = 1 Hospi- tal = 2 Outro = 3		Município ou País	Idade	Nome	Fem. = 2	Masculi- no = 1	Min. = 0 Horas = 1 Dias = 2 Seman- as = 3 Meses = 4 Anos = 5	Solteiro = 1 Casado = 2 Vivo = 3 Sep. Jud. = 4 Desquitado = 5 Divorciado = 6 Ignorado = 7	Unidade da Federação ou País						
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14																				15		
15																				2		
2		2	2	2	2	2	2	1	1	2	5	1	2	1	1					2		

31 CARACTERÍSTICAS INDIVIDUAIS DO FALECIDO

N.º DE ORDEM DO ARRO- LA- MENTO	N.º DO REGISTRO NO LIVRO	DATA DO REGISTRO			DATA DO OBITO			NATU- REZA DO OBITO	LOCAL DO OBITO	LUGAR DE DOMICILIO OU RESIDENCIA			SEXO	TEMPO DE VIDA				ESTADO CIVIL	NATURALIDADE		N.º DE ORDEM DO ARRO- LA- MENTO
		Dia		Mês	Dia		Mês			Ano	Município ou País	Código		Masc. 1 Fem. 2	Idade 1 Nume- ros Inter- ra	Min. 0 Horas 1 Dias 2 Meses 3 Anos 4	Solteiro 1 Casado 2 Viúvo 3 Solteiro 4 Desquitado 5 Divorciado 6 Ignorado 9		Unidade da Federação ou País	Código	
		3	4	5	6	7	8														
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35																			35		
2		2	2	2	2	2	1	1	2	5	1	2	1	1	2	2	2	2	2		

OBSERVAÇÕES

Declaro que o questionário foi preenchido de acordo com as "Instruções".

Data/...../198...

Assinatura do Oficial do Registro Civil

VENEZUELA

Figure IV. Sample of a single-event statistical report for a live birth

NOMBRES Y APELLIDOS DEL NIÑO: Lugar de ocurrencia		1ER. APELLIDO	2O. APELLIDO	1ER. NOMBRE	2O. NOMBRE
ENTIDAD FEDERAL:				NACIMIENTO OCURRIDO EN:	
DISTRITO O DPTO.:				HOSPITAL ☐ 1	CLINICA PARTICULAR ☐ 2
MUNICIPIO O PARROQUIA:				CASA PARTICULAR ☐ 3	OTROS ☐ 4
CENTRO POBLADO:		CIUDAD, PUEBLO, CASERIO, ETC.			

SEXO		FILIACION		PARTO		FECHA DE NACIMIENTO		FECHA DE REGISTRO		NUMERO DE LA PARTIDA	
VARON ☐ 1	HEMBRA ☐ 2	LEGITIMO ☐ 1	RECONOCIDO ☐ 2	ILEGITIMO ☐ 3	SENCILLO ☐ 1	DOBLE ☐ 2	TRIPLE ☐ 3	DIA	MES	AÑO	

EDAD EN AÑOS CUMPLIDOS:		DURACION DEL EMBARAZO: MESES CUMPLIDOS	
NACIONALIDAD: { ORIGINARIA	ADQUIRIDA	ASISTENTE DEL PARTO:	
PROFESION U OCUPACION HABITUAL:		MEDICO ☐ 1	CONADRONA ☐ 2
AÑOS DE MATRIMONIO	O DE UNION	INSTRUCCION: ALFABETA ☐ 1	
NUMERO DE HIJOS QUE HA TENIDO		ANALFABETA ☐ 2	
{ QUE HAN NACIDO VIVOS INCLUIDO EL PRESENTE		RESIDENCIA HABITUAL	
{ QUE ESTAN VIVOS ACTUALMENTE		ENTIDAD FEDERAL:	
{ QUE HAN NACIDO VIVOS PERO HAN MUERTO		DISTRITO O DPTO.:	
NUMERO DE MUERTES FETALES		MUNICIPIO O PARROQUIA:	
		CENTRO POBLADO: CIUDAD, PUEBLO, CASERIO, ETC.	

DATOS RELATIVOS AL PADRE AL NACER EL NIÑO		DATOS RELATIVOS AL PADRE AL NACER EL NIÑO	
EDAD EN AÑOS CUMPLIDOS:		EDAD EN AÑOS CUMPLIDOS:	
NACIONALIDAD: { ORIGINARIA	ADQUIRIDA	NACIONALIDAD: { ORIGINARIA	ADQUIRIDA
PROFESION U OCUPACION HABITUAL:		PROFESION U OCUPACION HABITUAL:	
INSTRUCCION: ALFABETO ☐ 1	ANALFABETO ☐ 2	INSTRUCCION: ALFABETO ☐ 1	ANALFABETO ☐ 2
OBSERVACIONES		OBSERVACIONES	

Figure V. Sample of a single-event statistical report for a birth

Form 101,

Central Statistics Office.

BIRTHS

CONFIDENTIAL.—This form is required for statistical purposes only and will be treated as strictly confidential. It should be filled in by the person requiring the birth to be registered and handed to the Registrar in accordance with the Vital Statistics Regulations, 1954 and the Vital Statistics (Amendment) Regulations, 1957.

Registrar's Stamp 1—4		(To be filled in by Registrar) Entry No. or Nos. in Register 5—7	
Date of birth.....day of..... 19.....		8—12	For Office use only.
Place of birth (i.e. full address)		13	
Name or names (if any)			
Sex		14	
Name, surname and dwelling place of father		15—18	
Name, surname and maiden surname of mother			
Occupation of father (in full detail)*		19	
Date of birth of mother.....day of....., 19.....		20—24	
Dwelling place of mother before the birth (normal residence)			
Year of present marriage of mother 19.....		25—26	
Number of previous children of mother by her present husband or any previous husband, excluding birth(s) now registered		27—28	
(a) still living..... (b) born alive, but now dead.....		29—30	
Signature of informant.....		31	
Qualification of informant..... (i.e., whether mother, father, midwife, etc.).			
Address of informant.....			
Date of registration		32—34	Signature of Registrar.....

*For example:—Farmer; farm labourer; farmer's relative assisting on farm; foreman in hosiery factory; textile machinist; bricklayer; road worker; garage mechanic; radio mechanic; civil engineer; bank clerk; insurance clerk; solicitor's clerk; clerical officer—Civil Service.
 If retired, state "Retired" and give previous occupation.

(7478)114396. 30,000. 1-77. F.P.—G28.
 (7484)117573. 110,000. 2-77. F.P.—G28.

Figure VI. Sample of a single-event statistical report for a death

**CERTIFICADO MEDICO
 DE DEFUNCION**

Form. EV3

a) Provincia: Cantón		c) Acta de Inscripción No.	
b) Oficina de Registro Civil de		d) Fecha: de 19....	

DATOS DEL FALLECIDO	e) Apellido Paterno Materno Nombres										
	f) FECHA DE NACIMIENTO			g) EDAD AL FALLECER		h) SEXO		i) FECHA DE LA MUERTE			
	Día	Mes	Año	Edad en: ☐ Horas ☐ Días ☐ Meses ☐ Años		Masculino ☐ 1 Femenino ☐ 2		Día	Mes	Año	
	j) ESTADO CIVIL										
	Menores de 12 años ☐ 1 Soltero ☐ 2 Casado ☐ 3 Viudo ☐ 4 Divorciado ☐ 5 Otros ☐ 6										
k) LUGAR DEL FALLECIMIENTO Y UBICACION											
Fallecido en: Establecimiento de Salud ☐ 1 Domicilio ☐ 2 Otros ☐ 3										Localidad o Ciudad	
Parroquia				Cantón			Provincia				
l) RESIDENCIA HABITUAL DEL FALLECIDO											
Localidad o Ciudad				Parroquia			PARA USO EXCLUSIVO DE LA OFICINA DEL I.N.E.C. Residente ☐ 1 No Residente ☐ 2				
Cantón		Provincia			ZONA: Urbana ☐ 1 Rural ☐ 2 Periférica ☐ 3						

m) CAUSAS DE DEFUNCION	I Enfermedad o estado patológico que produjo la muerte directamente * CAUSAS ANTECEDENTES Causas antecedentes o estados morbosos, si existiera alguno, que produjeron la causa anterior consignada, mencionándose en último lugar la causa básica o fundamental.		Tiempo aproximado entre el comienzo de cada causa o estado morbo y la muerte.
	a) Debid a (o como consecuencia de) b) Debid a (o como consecuencia de) c)		
	II OTROS ESTADOS PATOLOGICOS SIGNIFICATIVOS Que contribuyeron a la muerte pero no relacionados con la enfermedad o estado morbo que la produjo		
	* No quiere decirse con esto, la manera o modo de morir. Ej: debilidad cardíaca, estenias, etc.; significa propiamente la enfermedad, lesión o complicación que causó el fallecimiento.		

n) EN CASO DE MUERTE VIOLENTA O ACCIDENTE	TIPO Accidente ☐ 1 Suicidio ☐ 2 Homicidio ☐ 3 Indeterminado ☐ 4		Indique el lugar exacto donde ocurrió el accidente: Ej.: casa, calle, lugar de trabajo, oficina, etc.	
	En caso de accidente de tránsito especifique el tipo:		o) Se realizó autopsia ? Si ☐ 1 No ☐ 2	
	Ej.: Choque, volcamiento, arrollamiento, etc.			

p) DATOS DEL MEDICO	Firma del médico certificante		Registro médico	Dirección	q) Permiso de inhumación No
			No		

Figure VII. Sample of a single-event statistical report for a death

Form 102.

Central Statistics Office.

DEATHS

CONFIDENTIAL.—This form is required for statistical purposes only and will be treated as strictly confidential. It should be filled in by the person requiring the death to be registered and handed to the Registrar in accordance with the Vital Statistics Regulations, 1954.

Registrar's Stamp 1—4	(To be filled in by Registrar) Entry No. in Register 5—7
8—12	
Date on which death occurred.....day of..... 19.....	
For Office use only.	
Place at which death occurred (full address)	13
Name, surname and home address of deceased	14—17
Sex of deceased	18
Marital condition of deceased (i.e., whether married, widowed or single)	19
Age of deceased (in hours, if under one day; in completed days, if under one month; in completed months, if under one year; otherwise in completed years last birthday).	20
	21—22
	23—24
	25
Occupation of deceased (in full detail). If deceased was a child under 14 years give occupation of parent or guardian. If deceased was retired, state "Retired" and give previous occupation.	26—27
If deceased was a married or widowed woman, give occupation of her husband (in full detail)*	
THIS PORTION TO BE FILLED IN BY REGISTRAR	
28—35	
Cause of death	Duration of illness
1. (a)	
(b)	
(c)	
2.	
.....	
	36
State whether certified or uncertified, inquest or post-mortem	
Complete in accordance with Article 8 in instructions	
Signature of informant.....	
Qualification of informant..... (i.e., whether widower, widow, son, daughter, etc.).	
Address of informant.....	
.....	
Date of registration	37—39
	Signature of Registrar.....

*For example:—Farmer; farm labourer; farmer's relative assisting on farm; foreman in hosiery factory; textile machinist; bricklayer; road worker; garage mechanic; radio mechanic; civil engineer; bank clerk; insurance clerk; solicitor's clerk; clerical officer—Civil Service.

(7477)114397. 70,000. 11-76. F.P.—G28.

Figure VIII. Sample of a combined legal-statistical form to register and report a live birth

Form 4.

PROVINCE OF
BRITISH COLUMBIA (Canada)
DEPARTMENT OF HEALTH SERVICES
AND HOSPITAL INSURANCE
Division of Vital Statistics

REGISTRATION OF
LIVE BIRTH

Registration No.
(Department use only)

THIS IS A PERMANENT LEGAL RECORD
TYPE OR WRITE PLAINLY AND COMPLETE ALL ITEMS

(See reverse for instructions and legal requirements under the Vital Statistics Act)

NAME OF CHILD	1. Surname of child (print or type)		
	All given names in full (print or type)		
DATE OF BIRTH	3. Month (by name), day, year of birth		2. SEX OF CHILD
	4. KIND OF BIRTH - State whether single, twin, triplet		5. If twin, triplet, state whether this child was born 1st, 2nd, 3rd
PLACE OF BIRTH	6. Name of hospital (If not in hospital give exact location where birth occurred)		
	City, town or other place (by name)		Inside municipal limits? (State Yes or No)
USUAL RESIDENCE OF MOTHER	7. Complete street address. If rural give exact location, not Post Office or Rural Route address		
	City, town or other place (by name)		Province (or country)
OTHER BIRTH PARTICULARS	8. Duration of pregnancy (in completed weeks)	9. Children ever born to this mother (including this birth)	Number Liveborn : Number Stillborn (after 20 weeks pregnancy)
	10. Weight of child at birth	11. Are the parents married to each other? (State Yes or No)	12. If the parents are not married to each other state whether mother is single, married, widowed, or divorced
	lb. oz. (OR) grams		
PARENTS	FATHER		MOTHER
NAME	13. Surname of child's father (print or type)		17. Maiden surname of child's mother (print or type)
	All given names in full		All given names in full
BIRTHPLACE	14. City, town or other place of birth (by name)		18. City, town or other place of birth (by name)
	Province (or country if outside Canada)		Province (or country if outside Canada)
BIRTHDATE	15. Month (by name), day, year of birth	16. AGE (at time of this birth)	19. Month (by name), day, year of birth
	20. AGE (at time of this birth)		
ATTENDANT	21. Name and address of attending physician (or other attendant)		
MAILING ADDRESS OF MOTHER	22. Complete mailing address (if different from item 7) If rural give Post Office or Rural Route address		
CERTIFICATION OF PARENT	23. I certify the foregoing to be true and correct to the best of my knowledge and belief: X		24. Date signed - Month (by name), day, year
	Signature of parent		

DO NOT WRITE BELOW THIS LINE - OFFICE USE ONLY

Notations:	
CERTIFICATION OF DISTRICT REGISTRAR	I certify this return was accepted by me on this date at -
	District Registration No.
Date: Month (by name), day, year	
Signature of District Registrar	

4-2302-2.12: 19-6-73

Figure IX. Sample of a combined legal-statistical form to register and report a live birth

FORM APPROVED
BUDGET BUREAU NO. 68-81900

U.S. STANDARD
CERTIFICATE OF LIVE BIRTH

TYPE OR PRINT IN
PERMANENT INK
SEE HANDBOOK FOR
INSTRUCTIONS

1968 REVISION

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE—PUBLIC HEALTH SERVICE NATIONAL CENTER FOR HEALTH STATISTICS

1-796—REV. 1-68

MULTIPLE BIRTHS
ENTER STATE FILE
NUMBER FOR
MATRIX

LIVE BIRTH(S)

TOTAL DEATH(S)

DEATH
UNDER ONE YEAR
OF AGE
ENTER STATE FILE
NUMBER OF DEATH
CERTIFICATE FOR
THIS CHILD.

1. CHILD—NAME
FIRST MIDDLE LAST
2. SEX
3. DATE OF BIRTH—BORN FIRST, SECOND, THIRD, ETC. (SPECIFY)
4. IF NOT SINGLE BIRTH—BORN FIRST, SECOND, THIRD, ETC. (SPECIFY)
5. COUNTY OF BIRTH
6. DATE OF BIRTH (MONTH, DAY, YEAR)
7. HOUR
8. BIRTH NUMBER

9. CHILD—TOWN OR LOCATION OF BIRTH
10. INSIDE CITY LIMITS (SPECIFY YES OR NO)
11. HOSPITAL—NAME
12. IF NOT IN HOSPITAL, GIVE STREET AND NUMBER

13. MOTHER—MAIDEN NAME
14. FIRST MIDDLE LAST
15. AGE (AT TIME OF THIS BIRTH)
16. STATE OF BIRTH (IF NOT IN U.S.A., NAME COUNTRY)

17. RESIDENCE—STATE
18. COUNTY
19. CITY, TOWN, OR LOCATION
20. INSIDE CITY LIMITS (SPECIFY YES OR NO)
21. STREET AND NUMBER

22. FATHER—NAME
23. FIRST MIDDLE LAST
24. AGE (AT TIME OF THIS BIRTH)
25. STATE OF BIRTH (IF NOT IN U.S.A., NAME COUNTRY)

26. INFORMANT
27. NAME
28. RELATION TO CHILD

29. CERTIFY THAT THE ABOVE NAMED CHILD WAS BORN ALIVE AT THE PLACE AND TIME AND ON THE DATE STATED ABOVE.
30. SIGNATURE
31. CERTIFIER—NAME
32. (TYPE OR PRINT)
33. MAILING ADDRESS
34. (STREET OR R.F.D. NO., CITY OR TOWN, STATE, ZIP)

35. REGISTRAR—SIGNATURE
36. DATE RECEIVED BY LOCAL REGISTRAR
37. MONTH DAY YEAR

38. PREVIOUS DELIVERIES—HOW MANY OTHER CHILDREN
39. WERE BORN ALIVE
40. ARE NOW LIVING
41. WERE BORN DEAD
42. AFTER CONCEPTION
43. DATE OF LAST LIVE BIRTH
44. MONTH DAY YEAR
45. DATE OF LAST FETAL DEATH
46. MONTH DAY YEAR

47. PRENATAL VISITS TOTAL NUMBER
48. (IF NONE, SO STATE)
49. MONTH OF PREGNANCY PRENATAL CARE BEGAN
50. FIRST, SECOND, THIRD, ETC. (SPECIFY)
51. COMPLICATIONS RELATED TO PREGNANCY
52. (DESCRIBE OR WRITE "NONE")
53. BIRTH INJURIES TO CHILD
54. (DESCRIBE OR WRITE "NONE")
55. CONGENITAL MALFORMATIONS OR ANOMALIES OF CHILD
56. (DESCRIBE OR WRITE "NONE")
57. COMPLICATIONS OF LABOR
58. (DESCRIBE OR WRITE "NONE")

TYPE, OR PRINT IN
PERMANENT INK
SEE HANDBOOK FOR
INSTRUCTIONS

(MEDICAL EXAMINER OR CORONER)
U.S. STANDARD

CERTIFICATE OF DEATH

DECEASED—NAME		LOCAL FILE NUMBER		FIRST		MIDDLE		LAST		SEX		STATE FILE NUMBER	
1. FACE WHITE, NEGRO, AMERICAN INDIAN, ETC. (SPECIFY)		3. AGE—LAST BIRTHDAY (YEARS)		4. UNDER 1 YEAR		5. UNDER 1 DAY		6. DATE OF BIRTH (MONTH, DAY, YEAR)		7. DATE OF DEATH (MONTH, DAY, YEAR)		8. COUNTY OF DEATH	
9. CITY, TOWN, OR LOCATION OF DEATH		10. INSIDE CITY LIMITS (SPECIFY YES OR NO)		11. HOSPITAL OR OTHER INSTITUTION—NAME (IF NOT IN BIRTH, GIVE STREET AND NUMBER)		12. SURVIVING SPOUSE (IF WIFE, GIVE MAIDEN NAME)		13. MARRIED, NEVER MARRIED, WIDOWED, DIVORCED (SPECIFY)		14. KIND OF BUSINESS OR INDUSTRY		15. STREET AND NUMBER	
16. STATE OF BIRTH (IF NOT IN U.S.A., NAME COUNTRY)		17. CITIZEN OF WHAT COUNTRY		18. USUAL OCCUPATION (GIVE KIND OF WORK DONE DURING MOST OF WORKING LIFE, EVEN IF RETIRED)		19. RESIDENCE—STATE		20. CITY, TOWN, OR LOCATION		21. RESIDE CITY LIMITS (SPECIFY YES OR NO)		22. STREET AND NUMBER	
23. FATHER—NAME		24. FIRST		25. MIDDLE		26. LAST		27. MOTHER—MAIDEN NAME		28. FIRST		29. MIDDLE	
30. FATHER—NAME		31. FIRST		32. MIDDLE		33. LAST		34. MOTHER—MAIDEN NAME		35. FIRST		36. MIDDLE	
37. INFORMANT—NAME		38. FIRST		39. MIDDLE		40. LAST		41. MAILING ADDRESS		42. STREET OR R.F.D. NO., CITY OR TOWN, STATE, ZIP		43. DEGREE OF TITLE	
44. DEATH WAS CAUSED BY:		45. IMMEDIATE CAUSE		46. INTERMEDIATE CAUSE		47. DEATH INTERVAL		48. BETWEEN ONSET AND DEATH		49. IF YES, WERE FINDINGS CON- FIRMED BY AUTOPSY (YES OR NO)		50. IF YES, WERE FINDINGS CON- FIRMED BY AUTOPSY (YES OR NO)	
51. CONDITIONS, IF ANY, WHICH GAVE RISE TO IMMEDIATE CAUSE (GIVE SPECIFIC CAUSE LAST)		52. DUE TO, OR AS A CONSEQUENCE OF:		53. DUE TO, OR AS A CONSEQUENCE OF:		54. DUE TO, OR AS A CONSEQUENCE OF:		55. OTHER SIGNIFICANT CONDITIONS: CONDITIONS CONTRIBUTING TO DEATH BUT NOT RELATED TO CAUSE GIVEN IN PART I (G)		56. HOW INJURY OCCURRED (ENTER NATURE OF INJURY IN PART I OR PART II, ITEM 18)		57. IF YES, WERE FINDINGS CON- FIRMED BY AUTOPSY (YES OR NO)	
58. ACCIDENT, SUICIDE, HOMICIDE, OR UNDETERMINED (SPECIFY)		59. DATE OF INJURY (MONTH, DAY, YEAR)		60. HOUR		61. LOCATION		62. PLACE OF INJURY AT HOME, FARM, STREET, FACTORY, OFFICE BLDG., ETC. (SPECIFY)		63. STREET OR R.F.D. NO., CITY OR TOWN, STATE		64. IF YES, WERE FINDINGS CON- FIRMED BY AUTOPSY (YES OR NO)	
65. INJURY AT WORK (SPECIFY YES OR NO)		66. PLACE OF INJURY AT HOME, FARM, STREET, FACTORY, OFFICE BLDG., ETC. (SPECIFY)		67. LOCATION		68. STREET OR R.F.D. NO., CITY OR TOWN, STATE		69. CERTIFICATION—MEDICAL EXAMINER OR CORONER— ON THE BASIS OF THE EXAMINATION OF THE BODY AND/OR OF THE INVESTIGATION, IN MY OPINION, DEATH OCCURRED ON THE DATE AND DUE TO THE CAUSE(S) STATED.		70. DATE SIGNED (MONTH, DAY, YEAR)		71. DEGREE OF TITLE	
72. CERTIFIER—NAME (TYPE OR PRINT)		73. M. 21b		74. DAY		75. YEAR		76. SIGNATURE		77. M. 21c		78. DEGREE OF TITLE	
79. MAILING ADDRESS—CERTIFIER		80. STREET OR R.F.D. NO.		81. CITY OR TOWN		82. STATE		83. ZIP		84. CITY OR TOWN		85. STATE	
86. BURIAL, CREMATION, REMOVAL (SPECIFY)		87. CEMETERY OR CREMATORY—NAME		88. LOCATION		89. CITY OR TOWN		90. STATE		91. DATE (MONTH, DAY, YEAR)		92. FUNERAL HOME—NAME AND ADDRESS (STREET OR R.F.D. NO., CITY OR TOWN, STATE, ZIP)	
93. DATE (MONTH, DAY, YEAR)		94. FUNERAL HOME—NAME AND ADDRESS (STREET OR R.F.D. NO., CITY OR TOWN, STATE, ZIP)		95. REGISTRAR—SIGNATURE		96. DATE RECEIVED BY LOCAL REGISTRAR		97. SIGNATURE		98. DATE RECEIVED BY LOCAL REGISTRAR		99. SIGNATURE	

Figure XI. Sample of a combined legal-statistical form to register and report a death

ORM 6

PROVINCE OF
BRITISH COLUMBIA (Canada)
DEPARTMENT OF HEALTH
Division of Vital Statistics

REGISTRATION OF
DEATH

Registration No.
(Department use only)

NAME OF DECEASED	1. Surname of deceased (print or type)		2. SEX
	All given names in full (print or type)		
PLACE OF DEATH	3. Name of hospital or institution (otherwise give exact location where death occurred)		
	City, town or other place (by name)		Inside municipal limits? (State Yes or No)
USUAL RESIDENCE	4. Complete street address: If rural give exact location (not Post Office or Rural Route address)		
	City, town or other place (by name)	Inside municipal limits? (State Yes or No)	Province (or country)
MARITAL STATUS	5. Single, married, widowed, or divorced (Specify)		
	6. If married, widowed, or divorced, give full name of husband or full maiden name of wife		
OCCUPATION	7. Kind of work done during most of working life		
	8. Kind of business or industry in which worked		
BIRTHDATE	9. Month (by name), day, year of birth		10. AGE (years) (Months) (Days) (Hours) (Minutes)
			If under 1 year
BIRTHPLACE	11. City or place Province (or country) of birth		12. Native Indian? Yes No If "yes" state name of band
FATHER	13. Surname and given names of father (print or type)		14. BIRTHPLACE - City or place, Province (or country)
MOTHER	15. Maiden surname and given names of mother (print or type)		16. BIRTHPLACE - City or place, Province (or country)
INFORMANT	17. Signature of informant		18. Relationship to deceased
	19. Address of informant		20. Date signed - Month, day, year
DISPOSITION	21. Burial, cremation or other disposition (specify)		22. Date of burial or disposition (month, day, year)
	23. Name and address of cemetery, crematorium or place of disposition		
FUNERAL DIRECTOR	24. Name and address of funeral director (or person in charge of remains) (print or type)		

MEDICAL CERTIFICATE OF DEATH

DATE OF DEATH	25. Month (by name), day, year of death		Approx. interval between onset & death
CAUSE OF DEATH	26. Part I Immediate cause of death (a) due to, or as a consequence of		
	Antecedent causes, if any, giving rise to the immediate cause (a) above, stating the underlying cause last (b) due to, or as a consequence of		
	Part II Other significant conditions contributing to the death but not causally related to the immediate cause (a) above (c)		
AUTOPSY PARTICULARS	27. Autopsy being held? Yes No	28. Does the cause of death stated above take account of autopsy findings? Yes No	29. May further information relating to the cause of death be available later? Yes No
ACCIDENT OR VIOLENCE (If applicable)	30. If accident, suicide, homicide or undetermined (specify)	31. Place of injury (e.g. home, farm, highway, etc.)	32. Date of injury (Month (by name), day, year)
	33. How did injury occur? (describe circumstances)		
SURGICAL OPERATION	34. If there was a recent surgical operation give date of operation		35. State operative findings
CERTIFICATION (attending physician, coroner, etc.)	36. I certify that to the best of my knowledge and belief the above-named person died on the date and from the causes stated herein: X		Attending physician examining body after death
	37. Name of physician or coroner (print or type)		Address Date: Month, day, year

DO NOT WRITE BELOW THIS LINE - OFFICE USE ONLY

Notations:

CERTIFICATION OF DISTRICT REGISTRAR	I certify this return was accepted by me on this date at -		B.C.
	District Registration No.	Date: Month (by name), day, year	Signature of District Registrar

Magnetic media (tape, diskette, etc.) or punch cards
Electronic transmissions

293. A few countries can now transmit individual statistical information from the local or subnational registration offices to the national statistical compiling centre through the computer on-line system. This method of statistical reporting is quick and efficient. However, such a computer network should be established as a part of the general statistical processing network, and most countries may not be able to introduce such systems in the near future. Information on national practices and the methods of statistical reporting is provided in volume II of this *Handbook* (table 2.3 and paras. 79-81).

D. STATISTICAL PROCESSING

294. This section provides a description of the procedures carried out in the central statistics office to process vital statistics reports received from the local civil registration offices. The discussion also applies to countries having a decentralized vital statistics system.

1. Advance planning

295. Advance planning is crucial to the success of any statistical programme. The vital data and the form that records the data determine the kind of statistics that can be processed. Regardless of the method of processing, the statistics compiled and tabulated cannot be more accurate and complete than the data from which they are derived.

296. The statistical processing plan should address several issues. The first is to ensure that the information needed by major data users will be collected. The second is to ascertain what tabulations are needed by the users. As it is impossible to meet all user needs, it is essential to set users' priorities and to attempt to meet those deemed most important. Third, long-range programming is needed because the execution of the statistical programme for a given year is usually made a few years previously. Therefore, a three- or four-year plan for the collection, editing, querying, coding, sorting and tabulation of the data and the analysis, evaluation, interpretation and the dissemination of the results is critical to ensure the success of these programmes.

2. Control of receipt of statistical reports

297. The first step in developing controls is to establish a strict reporting schedule. Once established, the receiving office must diligently control the receipt of reports, addressing both promptness and completeness of reporting. The control method used should allow the national office to ascertain whether or not reports are received on time, as well as whether returns are received from every geographical reporting area. In addition, the control method must reveal whether the frequencies reported are consistent with those reported during preceding equivalent reporting periods.

298. An approach to controlling the receipt of statistical forms is the use of a control chart. On the chart, the following information for each reporting area is entered: sequence number of the previous report, expected and actual date of receipt and quantity of reports received. This method makes it easy to determine the reporting status of each reporting area and to identify those that have not reported beyond the reporting deadline. The next step is to contact those absent areas to obtain the data. It is much easier to obtain the needed data when the expected date of receipt has just passed than when the data were long overdue.

3. Editing

299. Editing is a procedure to ensure that the statistical reports received by the central office are complete and accurate and the errors are minimized. After reports are received in the central office and their aggregate number compared with former

receipts for control, a critical examination of each report is made to detect items that are missing, inconsistent, inappropriate and obscure. Corrections are made and the local civil registration office responsible for the errors may be contacted if necessary.

300. It is also possible to use computers to edit the reports and to impute questionable entries. In this case, manual editing should be limited to reviewing the processability of each report. This procedure will be discussed later.

4. Querying

301. Items on the report with missing, inconsistent or inappropriate responses should be questioned or "queried". This querying process should be adopted as an integral part of the vital statistics system in order that the resulting statistics may be improved.

302. It is important that the appropriate reporting office or the person responsible for filling out the item in question be queried. If a direct query to this individual (for example the physician, the midwife etc.) is not possible from the national office, it may be necessary to contact the local registrars and request that they contact the appropriate source.

303. Once data have been queried, the corrected data must be transmitted to the central office (or subnational office if that is the case). How this is accomplished will vary from country to country. In some areas of the country, the local registrar may forward a corrected report. In others, the corrected information may be obtained over the telephone or other means. In either case, if the item is of legal as well as statistical concern (e.g. place of occurrence or date of death), it is important that the correction be made on the legal record in addition to the statistical report. A mechanism must be established in the local civil registration office to ensure that this happens.

5. Coding

304. Coding is the translation of an item of information into numerical terms for data processing. Some items of information, such as age, birth weight, date of occurrence, are reported as numbers and therefore are already "coded". For some other items, (for example, sex, marital status, literacy status and type of birth), the possible choices of answers are limited and it is preferable to print pre-coded answers on the form. The coding of these items is straightforward and no interpretation is required.

305. However, many items, for example, cause of death, place of occurrence, place of registration, place of residence, and occupation, need to be coded according to instructions. Therefore, clearly written instructions, including the classifications to be used and definitions involved, should be developed. Preservation of written instructions and the decisions made in applying these instructions from year to year is important for appropriate analysis and interpretation of the data.

6. Imputation of missing or inconsistent data items

306. In some instances the query process will not result in a corrected data item. In those cases, it may be possible to "impute" the data required. Imputation is the process of assigning the most probable value to an item whose exact value is unknown. For example, it may be possible to impute a child's legitimacy status from the surnames and civil status of his/her parents. Another example would be the assignment of the "race" code item to the most common racial group of the respondent's geographical area of residence. This method of imputation is commonly known as the "cold deck" imputation method. When imputation is carried out using the same value as the previous person having the similar personal characteristics, the method is called the "hot deck" imputation method. In all cases, imputation should not be undertaken unless (a) vigorous querying efforts have failed and (b) there is a high probability that the imputed value will represent the true value of the item in question.

7. *Manual and mechanical systems of tabulation*

307. Once the data are coded, the process of tabulation can begin. Tabulation can be carried out manually, mechanically or by the use of electronic computers. This section describes techniques for processing data using either a manual or mechanical system. Tabulations using computers will be discussed in the next section.

(a) *Transcription*

308. If the statistical report form cannot be used directly for tabulation, such as when data are reported on lists rather than as individual reports, it will be necessary to transcribe the data to a tabulation form or a sorting card. On these forms or cards the coded data are entered in a predetermined order and can then be sorted by hand into different classes or categories.

309. If a mechanical sorting and tabulation system (e.g. punch cards and sorters) is used, the transcription process may consist in using a machine to perforate a card by punching a hole whose predetermined position on the card identifies the characteristic involved. This process is called "keypunching".

310. Whether the manual or mechanical means of transcription is used, the arrangement of data on the sorting form, or punch card, must be in the same order as the corresponding data on the statistical report from which it is taken. Correspondence in the order of the items will aid in correct and rapid transcription or punching.

(b) *Sorting*

311. Sorting is the systematic arrangement of units into the established mutually exclusive categories or classes. It is the first step in putting a mass of observations into a systematic order that is more easily dealt with.

312. The structure of the sorting scheme for any characteristic must be decided upon during the planning process. There are some basic rules for sorting that deserve mention:

- (a) All sorted categories should be mutually exclusive;
- (b) All possible responses should be addressed by the sorting scheme. This means that it is important to include a category for "don't know" or "no response";
- (c) Whenever possible, standard categories should be used. For example, age is classified in 5- or 10-year age groups, (e.g., 5-9, 5-14, etc.). Similarly, causes of death should be coded according to established rules and classified according to standard international classification schemes. Recommended codes and classifications should be followed whenever possible.

313. The best method of tabulating data manually is to record information about each event on sorting cards, as described above, and then to sort these cards according to a sorting scheme. Once the cards are sorted, the number of cards in each group can be counted and the tally recorded on to a tabulation sheet. There are several advantages to this system. First, the classification can be easily reviewed to verify that each group consists only of items in the defined category. Second, any number of cross-classifications can be made by simply sorting the cards into subclasses. Finally, this procedure can be easily repeated for verification.

314. The information on the tabulation sheet should be verified before proceeding to the next step. Verification and reconciliation can be accomplished by repeating the tabulation process, or by ascertaining that the tabulation sheets add up to expected totals in each category. However it is accomplished, this is an important step in assuring accurate statistics.

315. If mechanical sorting equipment is available, the punch cards are fed into a sorting machine which sorts and counts the cards according to given characteristics. Again, it is important to verify the results by repeating the process independently.

(c) *Posting*

316. When the sorting has been completed, the next step in the process is the posting of the data from the tabulation sheets

to table forms. This step is necessary for several reasons. First, the most efficient tabulation programme often results in complicated cross-classifications which are not appropriate for publication as tables. Second, limits on publication size and content often preclude the use of all tabulations which are prepared.

317. To ensure efficient and accurate posting, the arrangement of data in the final table form should correspond, in so far as possible, with the arrangement in the tabulation sheets from which the data are to be copied. It is obvious that if a clerk must first locate each separate figure before he or she can post it, there is a larger chance of a transcription error than if he or she can merely copy a column of figures that is already arranged in order. Therefore, the format of the final tables should be reflected in the tabulation sheets.

318. It is important that each person who posts data be required to record the nature of the work done on each table together with the date completed and his or her name. This information provides control over both the production and the time schedule. It also provides a source for any additional information that may be needed about the posting.

319. Some mechanical sorters can also print the results of the sorting. In these cases, manual posting may not be necessary. However, there are some sorting equipments that require transcription of the results of the sort. In these cases, the procedure is similar to that described for a manual system.

8. *Data entry and tabulation using electronic equipment*

320. Vital statistics can be processed and tabulated by the use of computer. The following section describes the steps used for data entry and for tabulations

(a) *Data entry*

321. There are two steps in processing data using a computer: first, the data are punched or "keyed" on to a storage media (e.g., cards, diskettes, cassettes, tapes etc.) and then they are processed, i.e. edited, imputed and tabulated and the results printed.

322. The work of data entry can be carried out either at the national data processing centres or at local or subnational processing centres. The centralized data entry scheme permits a better control of the processing work to be carried out in a uniform manner. The data entry work is done centrally. The decentralized arrangement reduces the burden of transportation of statistical report forms from the local office to the central office and can process the data more quickly. However, the centralized system is the only choice for those countries where the computer equipment and the processing capabilities are limited. For countries with large territories and large population sizes, a decentralized system should be introduced. To enter data in local areas and forward them to the central processing office through a network of data transmission is a possible method of processing in the future when the data processing network is highly developed.

(b) *Tabulation*

323. In an automated system, the process of tabulating and posting the data are combined into one step by the computer as it is programmed to produce the desired tables. Owing to the high speed of processing and the large storage memory, many cross-classified tabulations, which cannot be done manually or mechanically, can be processed by computers. However, efficient use of computer processing depends upon the availability of adequate computer programs (software) for data entry, editing, verification and tabulation.

324. On tabulation, few computer program packages for vital statistics processing have been developed. Countries may have to develop their own programs to suit their specific tabulation needs. However, some ready-to-use softwares, designed for tabulating data obtained from population censuses and de-

mographic surveys can be easily adapted to process vital statistics. A few of these software packages are, for example, CENTS-IV and V,⁶³ COXTALLY and PC-COXTALLY⁶⁴ and Table Producing Language (TPL).⁶⁵

325. The above-mentioned packages have the additional advantage of producing tables ready to print, thus eliminating the time and cost of typesetting that the regular procedures require. It also will eliminate the risk of introducing errors during the typing and printing processes.

9. Quality control

326. In addition to errors introduced in the original statistical reports, mistakes are added during coding, punching, sorting, posting and tabulation. They should be detected and corrected before the statistics are published.

327. Coding errors can be checked by repeating independently a sample of the data recorded on the statistical reporting forms. This process must be performed by a person other than the one who did the original coding. Whether it is sufficient to verify the coding on a sample or on all of the reporting forms depends on the level of error revealed. Tolerance limits should be set and the coding work should be redone if the limit is exceeded.

328. The next step is to control the transcription of the data. If mechanical and manual transcription is used, a 100 per cent verification is needed by an independent group of verifiers.

329. If computer data processing is selected, quality control can be applied in one of the following three ways. The first and preferred choice is the verification of the entire process. The second choice is the use of sampling, if the resource for total verification is not available. A third possibility is to use the computer to do the quality control. In this case, a more sophisticated and extensive checking can be achieved through a computerized edit program to produce a list of all records which are outside the acceptable range, or are inconsistent with related data. This list is useful for checking both coding and data entry errors. There are a few computer software packages developed for the editing and imputation of population census and demographic data that can also be used for checking vital statistics. These include, for examples, CONCOR,⁶³ UNEDIT 2, PC-EDIT.⁶⁴

330. Despite the availability of these software packages, the measures to correct errors should be carefully considered. In many cases, consultations with the original statistical reports are required.

331. In manual or mechanical systems, data in posted tables can be verified by proofreading the tables. In this method, one person reads from the original tables while another scans the posted data. A second method of detecting errors in posted data is through "internal checks". These may include the summation of marginal subtotals to the table total and checking the consistency among several tables. A final step in controlling errors in mechanical or manual tables is the technical review of tabulations for credibility, consistency and plausibility.

332. If the automated system is used, it is important that the tables produced be critically inspected for credibility and consistency. It is possible that errors are introduced because of programming mistakes. Therefore, it is most critical that all tabulations be inspected by both statisticians as well as data processing personnel in order to detect and correct as many errors as possible.

E. TABULATION PRINCIPLES AND RECOMMENDED ANNUAL TABULATIONS

333. The goal of a vital statistics tabulation programme is to publish regularly such as monthly or quarterly, summary counts of vital events, by type of event for administrative and other uses, and on an annual basis, detailed tabulations required for planning, operating and evaluating public health and other

programmes, as well as for scientific research. The tabulations should cover each major and minor division of a country.

1. Tabulation principles

334. The effectiveness of a national vital statistics programme can be measured by the following four criteria: first, the coverage of the statistics it produces; second, the quality of those statistics in terms of accuracy and completeness; third, whether the tabulations are of sufficient detail to reveal important relationships; and fourth, the timeliness of its availability including publications. In order that all criteria may be met, the tabulation programme should be constructed in accordance with the basic principles discussed below:

(a) Coverage

335. One of the basic premises of the vital statistics system is that every vital event occurring among the population of the geographical area must be registered for legal purposes, and that every event registered should be reported for statistical purposes. Therefore, the tabulation coverage should be 100 per cent of both geographical areas and population groups. Even in the most advanced societies, a small percentage of births, deaths and other events may fail to be registered on time. Thus, the completeness of tabulation coverage may fall somewhat short of 100 per cent.

336. The practice of limiting detailed tabulations to areas of known completeness of coverage may be helpful in establishing and maintaining standards of quality, so long as it is an interim arrangement. The end must be complete geographical coverage of the entire population. Vital statistics derived from selected areas or groups of population are not representative of the whole. Therefore, countries with less than complete geographical coverage should consider methods to reduce the bias introduced by the selection process. Such methods may include the statistical adjustment of data for underreporting or the collection of complementary data from sample areas or field surveys.

(b) Time reference

337. In relating vital statistics to a time period, two possible time reference points are used: (a) the date on which the event occurred; and (b) the date on which it was registered. While both of these dates are meaningful, the date of occurrence is the objective, being unaffected by extraneous factors such as climate, season and transport facilities.

338. Although tabulation by date of registration is easier, final tabulations for any calendar period should be based on events that actually occurred, and not of those merely registered during that period. Should it be administratively necessary to tabulate final figures by *date of registration* rather than *date of occurrence*, evaluation studies should be made to determine the degree to which the one type of tabulation approximates the other. It is, of course, desirable that the analyses of this relationship be published.

339. To obtain monthly, or quarterly summaries, which must be compiled rapidly, counts referring to date of registration may be used; but in this case it should be cautioned to what degree analyses based on events that are registered during a period can be interpreted in terms of those that actually occurred during that period.⁶⁶

340. Thus, final annual tabulations by date of registration are appropriate only for those countries where it is evident that these statistics are interchangeable with those tabulated by date of occurrence. Unless registration is complete and timely, the substitution of date of registration tabulations for those by date of occurrence will introduce distortions into the statistics.

341. The selection of the date of occurrence as the basis for tabulation requires the determination of a terminal date after which final tabulations can be made. Since varying periods of time are allowed during which an event can be registered, and since the count is to consist of the events which occurred during a calendar period, it is clear that complete registration and

statistical reporting of those events which occurred near the end of the calendar period cannot be expected until some time during the following year. Therefore, final annual tabulations should be made on the basis of statistical reports received before a specified date known as the "cut-off date".

342. The factors to be considered in determining the national cut-off date include the legal length of time allowed for registration by type of vital event. The decision should also consider the number of offices through which the report must travel to reach the statistical authorities, the efficiency of communications, and any other relevant factors.⁶⁷

343. Reports received after the cut-off date should be tabulated separately by date of occurrence to provide for the analysis of the problems of delayed registration and delayed reporting. Unless the volume is very large, extensive detailed national tabulations would not ordinarily be made on these reports.

(c) *Geographical references*

344. The identification of statistics with a geographical area is fundamental to tabulation. This involves locating each observation within the boundaries of a specific geographical area and relating the event to the population group which produced it.

345. There are two geographical references pertinent to vital statistics: the place where the event occurred, and the place of residence of the individual to whom the event occurred.

346. Final tabulations for any subnational geographical areas should be made according to place of usual residence. For specific administrative or other purposes, tabulations according to place of occurrence for subnational areas should be made.⁶⁸

347. For most countries the difference in total population size between those present at any time in the country (*de facto* size) and those usually residing in the same area (*de jure* size) is relatively small. Therefore, it is customary to consider the vital events occurring within the national boundaries as a good approximation to those occurring among residents of the country.

2. *Recommended annual tabulations*

348. The tabulation programme of the national vital statistics system should provide annual data in those classifications required for the study of the frequency distributions of vital events, time trends and geographical differentials for the most important characteristics of vital events. The programme should be designed to maximize the utilization of the data, with priority given to those tables that will provide the most needed information. The known or presumed quality of the data must also be considered. An extensive tabulation programme should be undertaken only when the completeness of registration exceeds 90 per cent. Where this standard is not achieved, tabulation should be limited to simple tables until more complete registration is obtained.

349. The United Nations recommended annual tabulations for a basic tabulation programme of vital events are listed in annex I. Definitions of items commonly included in the vital statistical report forms, specifications of items included in recommended tabulations and tabulations layout are given in *Principles and Recommendations* (pp. 75-153).

3. *Presentation of results*

350. "Presentation" means making available the statistics and/or rates through publication or other means of dissemination. This is the culmination of the long series of operations described in this chapter. Low standards of editing, coding, transcribing, sorting, tabulating etc. will be revealed when data are prepared for presentation. Presentation can never overcome the inherent deficiencies in the data themselves or in their handling. Conversely, poor presentation can destroy the effects of all the good work that went before.

351. Because of the fundamental importance of good presentation, the publication programme for vital statistics should receive careful consideration. Clearly printed reports of a pleasing format should be a goal. The content of the publication is also important. It is not sufficient to present statistical tables alone. Each set of tables should be accompanied by a clear explanatory text and, if possible, analysis. Without annotations to explain the limitations and qualifications, the data lose much of their usefulness as source material. An analysis of the meaning of the data is also very desirable as is the use of figures or graphs to bring out important points.

352. Publications of vital statistics should conform to a plan, that is, they should be part of a series designed to meet specific user needs. Each series should be identifiable to facilitate filing and reference in libraries. Publications should also be released on a regular and timely schedule. This is essential if the vital statistics office is to fulfil the service function for which it was established.

353. Once reliable vital statistics have been published in a pleasing and readily usable form, the next step is to make them available to the users. The vital statistical office should try to identify its users and to maintain appropriate mailing lists to ensure that its publications and releases are promptly available to them. Published vital statistics represent the primary product of the vital statistics system and, unless this product is made available to the public, their willingness to support the system cannot be expected. Therefore, the provision of means for dissemination of vital statistics should be a fundamental concern of the vital statistics system.

354. The public should be informed that more data are available in tabulation form or computer media (tapes, diskettes, disks) than those appearing in the publications. Many vital statistics offices have unpublished tabulations as well as data on file that are available for general use. In some countries it is possible for data users to purchase copies of "public use data tapes or disks". These are computer tapes/disks containing records of the statistical data from vital statistical report forms with the identifying information removed. It is important that the vital statistics agency publicize the availability of these types of information in order to provide the best service to the users of its data.

355. Another service that can be offered by the vital statistics office is the production of special tabulations for users upon request. This service can be especially valuable if it is combined with analytic consulting to provide recommendations on how to best use and interpret vital statistics data. By making these types of service available to its users, the vital statistics programme can help to assure that its data will be appropriately used by those who need vital statistics information.

V. EVALUATION OF THE QUALITY AND COMPLETENESS OF CIVIL REGISTRATION AND VITAL STATISTICS

356. This chapter focuses on methods of evaluation of the reliability of civil registration and vital statistics systems. Two aspects of the systems are examined: (a) the quantitative accuracy or registration coverage of the system, that is, the degree of completeness of civil registration and statistical reporting of vital events; and (b) the qualitative accuracy of the system, that is, the accuracy of the characteristics of the events reported by the informant and recorded by the registrar. Content errors of registration and statistics are the quality issues of systems.

357. A variety of methods and techniques to assess both quantitative and qualitative accuracy will be discussed in this chapter. Since various evaluation techniques can be demonstrated most effectively in respect of live births and deaths, the methods described below will mainly focus on these two events. These methods can also be used to evaluate the quality of foetal death records. However, the evaluation of marriage and divorce registration is not included herein because only legal unions and dissolutions are recorded in civil registers, whereas common law unions and their subsequent dissolutions may form a large part of all marriages and divorces in a number of countries.

A. COMPLETENESS OF CIVIL REGISTRATION

358. Registration coverages should be examined by the central and subnational registration offices on a regular basis to detect whether all local registration areas have carried out the registration work and sent the reports to a higher-level office according to established procedures. When local offices have not reported their registration work, some serious problems may have developed. The central registration office must have a clear idea of the performance of each of the local offices in order to learn the coverage of registration. It should be noted that even if all registration offices have carried out their work according to established procedures, that is, if the geographical coverage is complete, there are other quantitative and qualitative issues of registration that should be evaluated.

359. The evaluation techniques used to assess both quantitative and qualitative accuracy of civil registration can be divided into two general categories, namely, the direct methods and the indirect methods.

1. Direct methods of evaluation

(a) Types of direct methods

360. The direct method for evaluation of the completeness of civil registration involves the examination of the registration records as well as the direct matching of these records with those from an independent source. The most important contribution of this method is that it can provide useful information on the sources of underreporting, particularly if the test is carefully designed. It can improve registration by identifying unregistered vital events.

361. A number of independent data sources may be used for making the direct evaluation. Some sources will obviously provide more complete information on vital events than others. In practice, any relatively unbiased list of vital events can be employed, keeping in mind the possibility of selection in the list and making allowances for this potential bias in evaluating the completeness by matching and comparison. For example, matching

registered deaths with a list of burials in cemeteries may not provide a good estimate of unregistered deaths, as those deaths that are less likely to be registered are also unlikely to be buried in cemeteries, including those deaths occurring in isolated parts of the country.

362. The sources discussed below include population and civil registration records, health, school and other administrative records, population census and survey records, dual record systems etc.

(i) Civil registration records

363. One readily available source of records for the evaluation of birth registration is the register of deaths. Use of this source is mainly limited to verifying the birth registration of all infant deaths. While, in principle, it is possible to verify the birth registration of all deaths, regardless of the person's age at death, the mobility of the population makes the matching of birth records against death records of adults, and particularly of older persons, extremely difficult to do. Although this check is limited to only a portion of all births, it is a particularly useful measure, providing information on events that are highly likely to remain unregistered because of the very short life span of infants. It should be kept in mind that the list of infant deaths is itself a selective list, and the deaths that are less likely to be registered (infants dying shortly after birth, infants dying in isolated areas) are also unlikely to have been registered as live births.

364. The matching of infant death records can be carried out on a routine basis at the local registration offices. In some civil registration systems, the two lists may be routinely matched, and when matching is found, the birth records may be marked "Deceased" to prevent the use of the birth certificate of the decedent to obtain fraudulent identification documents.

(ii) Administrative and social records

365. Birth and death records can be matched against a variety of other lists, such as school enrolments, hospital records, baptism and burial records. While none of these sources can be considered as complete lists of all births or deaths, each set of records can be useful in detecting underreporting of certain types of vital events. Because of their selectivity, however, matching based on any one of these lists should not be used to estimate the overall level of registration completeness.

366. This kind of matching should be carried out at higher levels of the civil registration office administering the system in cooperation with the local level office and related agencies. Because this operation involves a number of other organizations, including the vital statistics system it would be difficult to carry it out on a routine basis.

367. For example, in Cuba, information from a variety of administrative lists was combined to construct the most complete list of death records possible. The sources included the file of death certificates maintained by the Ministry of Health, the civil registries of the Ministry of Justice, the list of burials recorded by the administration of cemeteries, lists maintained by the National Registries for Food Rationing, the Defence Agency and the National Association of Small Farms. The combined list was then matched against deaths recorded in the civil register of deaths to determine the completeness of death registration. The test showed that, in 1974, 96 per cent of all deaths and 93 per cent of infant deaths were registered for the country as a

whole. The completeness of registration varied substantially by province, particularly for infant deaths.⁶⁹

(iii) *Lists obtained from population censuses and surveys*

368. Data from both population censuses and surveys can be used to compile lists of live births or deaths in order to obtain estimates of registration completeness. The independent lists, when matched against vital events registers, can provide indications of errors in registration and can lead to estimations of underregistration. The matching of census and survey records with those of civil registration may be carried out on a sample basis either at the national or the local level. A few examples follow.

CANADA

369. One of the early studies based on this technique was the nationwide study of birth registration completeness carried out in Canada in 1931 using a representative sample of census infant population only, owing to the prohibitive amount of labour required to match birth registration to individual census data schedules. Because of errors and biases inherent in sample surveys and matching procedures, it was thought reasonable "to put the deficiency of birth registration at not over half the percentage unmatched" or at about 6 per cent.⁷⁰ A similar study was carried out in 1941 in those districts with the lowest levels of completeness in 1931. The established procedure called for a comparison of census schedules for the infant population with the national, provincial and local birth registers for the selected districts. In the event that the parents of a registered birth were found in the census, but not the child, the death registers were checked also. Multiple checks were carried out to ensure the accuracy of the estimates, including a separate check of the census records by an independent worker. The study also compared the accuracy of certain statistical items recorded on both the birth registers and others. In all, about 8,000 entries were included in the study. Final results estimated underregistration at about 2 per cent in the districts studied.

UNITED STATES OF AMERICA

370. National birth registration tests similar to the Canadian studies were carried out in the United States in 1940 and 1950.⁷¹ The 1950 study covered infants born during the period January to March 1950, comparing birth records on file with infant cards from the 1950 census. Census enumerators completed infant cards for all children enumerated in the census who were born during the first three months of 1950. The two sets of records were first matched mechanically, according to previously selected matching criteria. Copies of the original birth records were used to verify uncertain matches. Using this procedure, about 94 per cent of the 780,000 infant cards were matched. Additional matches were obtained through a mail survey of parents, and, in some cases, of welfare organizations and hospitals, as well as in state and territorial registers. Final results estimated birth registration completeness at 98 per cent.

SRI LANKA

371. A sample survey to determine the extent of underregistration of births and deaths in Sri Lanka was conducted in June 1967. The interviewers inquired whether any person in the selected household gave birth during the period 1 January to 31 March 1967, and whether any member of the household had died during the same reference period. If any such event had taken place, particulars of births and deaths were obtained and registered on special forms. On completion of household enumeration, the events were matched against birth and death official records. The results showed the completeness of birth registration at 98.7 per cent and that of deaths at about 94.5 per cent.

HONDURAS

372. During the period 1970 to 1973, under the project on improvement of vital statistics, birth and death underregistration was estimated by matching official registers with information collected under a national demographic survey.⁷² The matching

study estimated the completeness of birth registration at 89 per cent, death registration at 56 per cent and infant death registration at 31 per cent. The completeness of death registration for infants dying within one day of birth was less than 3 per cent.

(iv) *Dual record system*

373. An extension of the direct matching technique, known as the dual record system, uses two independent procedures to collect information on vital events: one procedure is the civil registration system and the other is a survey. Information from the two sources is matched, resulting in three classes of events: those recorded in both systems (matched events); those recorded in source 1 but not in source 2; and those recorded in source 2 but not in source 1. Assuming true independence between the two data sources, and applying the Chandrasekaran-Deming formula,⁷³ allows the estimation of a fourth class of events, that is, those not recorded by either procedure. The sum of the four types of events provides an estimate of the total number of events.

374. The application of this technique to the evaluation of the registration coverage is readily apparent. Making the civil registration system one of the data sources and using a multi-round retrospective field survey as the other this technique can provide a more accurate estimate of the degree of registration completeness than is possible using other methods. The survey of population change in Thailand used the existing registers along with a population survey to collect information on vital events in sample areas.⁷⁴ However, the low level of registration completeness in many developing countries makes it difficult to apply this technique.

375. In some countries that had used this technique, procedural problems were the main reason for the failure. A significant source of delay in some studies using this technique was the inability of local registrars to submit registration records to their district office on a regular basis. Moreover, when true independence between the two sources of data cannot be established nor high quality assured, the validity of the study is in doubt. There are a number of important difficulties and disadvantages associated with the dual-record system technique. Some of these problems are common to all of the direct methods, while others relate to the application of the Chandrasekaran-Deming formula.

INDIA

376. India uses the dual-record system not only for the evaluation of its national civil registration system but also for gathering vital statistics at the state and national levels on a continuous basis. The sample registration scheme (SRS) was introduced on a pilot basis in 1964/65. It has been conducted on a national basis since 1970 and is one of the largest continuous surveys in the world. It is a successful illustration of the use of a dual approach. The first source of vital events is not the civil registration system itself but rather a continuous registration of births, deaths and late foetal deaths occurring in the sample areas, conducted by part-time enumerators in rural areas who use the local informant network to come to know about them, and by full-time enumerators in urban areas who are regularly required to visit every sample member's household. The other source is a semi-annual independent survey conducted by supervisors to detect births, deaths and foetal deaths that had occurred in the previous six months in the same sample areas.

377. Data recorded through the two sources are cross-checked and can result in matched, unmatched and partially matched events. Unmatched and partially matched events are verified in the field. Thereafter, counts of births, deaths and foetal deaths are obtained, from which statistics and vital rates are derived.⁷⁵ No Chandrasekaran-Deming adjustment for numbers of events missing by both systems is undertaken, largely on the ground that there is no total independence between the two systems and that such an adjustment would make little difference to the demographic parameter derived from the data.

378. The dual-record system was introduced in selected areas of Indonesia between 1974 and 1977 to evaluate the quality and completeness of civil registration.⁷⁶ Among the objectives of the study were to find out the reasons for non-reporting of vital events and to focus on the development of improved methods of registration and the estimation of fertility, mortality and population growth rates.

379. Registration data on births and deaths were obtained either from the existing national civil registration system or from an experimental registration system. The other source of information was the semi-annual retrospective surveys which recorded the number of births and deaths occurring in the previous six months.

380. At the completion of each round of the surveys, a matching of live births and deaths was carried out manually by comparing the name, sex, date of occurrence and place of occurrence of each event. Doubtful or questionable matches were verified in the field. The experience of Indonesia showed that rigid matching rules posed problems too, and it was found better to attach tolerance limits to the matching criteria. It was found, for example, that in parts of the country the actual date of birth, according to the Western calendar, simply did not have any great meaning, and that there was a tendency to use short nicknames for newborn babies that often changed; hence, the use of these criteria for matching purposes was suitably adapted.

381. An interesting finding of the evaluation was that registration completeness was 80 per cent for births and 82 per cent for deaths in rural areas but was only 42 per cent for births and 58 per cent for deaths in urban areas. Also, death registration was in general superior to birth registration, with 64 and 55 per cent completeness respectively.

382. A number of other countries, namely, Iraq (1973-1975), the Republic of Korea (1971-1973), Pakistan (1962-1963), Ghana (1977-1978) and the Philippines (1971-1974), have also adopted this approach for evaluating the completeness of the registration system.

(b) *Advantages of direct methods*

383. The direct methods of evaluation are generally considered to produce an accurate estimate of registration completeness if both independence and quality of the two sources are guaranteed. They measure the completeness of registration by directly comparing registration records with those of another source and may locate the sources of underregistration or overregistration.

384. The direct method can be applied at either the national level or the lowest level of the local registration unit. The local registration offices, at their own initiative or in collaboration with higher registration and/or vital statistics offices, can conduct various types of evaluation to improve the quality of registration and statistical reporting.

(c) *Limitations of direct methods*

385. Despite the greater accuracy of the direct methods in evaluating registration completeness, they do have a number of limitations. The choice of an independent source of records can affect the accuracy of the estimate. In the case of the dual record system, the requirement of complete independence between the two data sources, necessary for the successful application of the formula, may never be achieved in practice. If administrative lists are used, it is most likely that they are incomplete. A comparison of this data with the civil registration data will therefore likely produce an overestimate of registration completeness because the missing vital events are likely to be missed in both sources. Lists constructed from census or survey data, believed to be more complete than administrative lists, are also known to under-report events because of recall error. This is particularly important in the study of deaths, where the disappearance or disintegration of the family as a result of death or emigration eliminates the source of information for the event.

386. In the direct comparison, the matching procedures of records from two sources often presents particularly serious problems. The matching process is slow and laborious and the selection of matching criteria is never easy. Overly strict matching rules will reduce the number of matches, and with it the estimate of completeness; too generous matching rules will falsely inflate the number of matches and the estimate of completeness.

387. In countries where children are not named immediately after birth or where name changes or multiple names are common, matching problems may be almost insoluble. For example, a comparison of census and vital records from several West Indian populations estimated completeness of birth registration by comparing the total number of births recorded by each system, rather than by directly matching the two sets of records, precisely because of these naming practices and difficulties in matching them. High levels of internal migration also will make matching extremely difficult to carry out.

388. Although the introduction of computer matching has greatly reduced the work previously done manually, the selection of matching rules required a long period of development based on the early period of data collection. For studies using several rounds of data collection, changes in the quality of data collected over time will require manual verification and possibly modification of the matching rules for subsequent rounds of data collection.

389. Another problem associated with the direct methods is their expense. An important part of the total expense of any direct method is the matching of records from the two sources. Manual matching of records will require a considerable amount of clerical time; automated matching requires extensive preparation and verification through manual matching of a sample of records.

390. If the independent list of records is to be compiled through a census or survey, the considerable expense of field data collection must be added to the total cost of the matching study. In order to compensate for the matching problems previously described, additional field expenses commonly include field verification of all unmatched events and doubtful matches, as well as the cost of developing highly accurate maps and field identification systems to ensure that the same population is covered by the two systems.

391. To these limitations one can add the timeliness problem. The duration of the study will vary, generally depending on the source of the independent list of records. If an administrative or other already existing list is used, the delay will be no more than the time required for matching. If data collection is necessary, the usual interval for field operations must be added to the time allowed for matching. Finally, evaluation studies using census returns can be carried out at the time of a national census, that is, once in every 10 years in most cases.

392. A recent study evaluating a variety of data collection methods concluded that a particular bias of dual systems is a tendency to overestimate the number of events, which can occur because of errors in matching or coverage errors in space or in time.⁷⁷

2. *Indirect methods of evaluation*

393. Indirect methods discussed in this chapter examine the quality of vital statistics generated from civil registration, which in turn provides various indications of the reliability and validity of the registration system. Therefore, these methods are discussed below in assessing the completeness of statistical reporting and the quality of vital statistics.

B. COMPLETENESS OF STATISTICAL REPORTING AND QUALITY OF VITAL STATISTICS DATA

1. *Assessing the completeness of statistical reporting*

394. The step between the registration of a vital event and the compilation of vital statistics is known as statistical report-

ing. This step involves the transfer of information from the civil register to the statistical service by microfilm, photocopy, transfer of a carbon copy of the vital record or a portion thereof, preparation of a statistical report, or by other means. Hence, incompleteness of vital statistics can be due to incomplete statistical reporting as well as underregistration. It is even possible to have overreporting of events, as duplicates of statistical reports can inadvertently be made and transferred to the statistical service.

395. Careful monitoring of periodical statistical returns from the local registrars is one means of locating the source of the problem. The complete absence of reports for a certain period (week, month etc.) is indicative of a breakdown in the reporting system. An elaborate system of checks to ensure the complete preparation of statistical reports and their transmittal through the administrative channels should be introduced in the vital statistics system. The process has proved useful in various countries in preventing the loss of statistical reports or their erroneous duplication as they move through the system.

2. Assessing the quality of vital statistics data

396. Several potential sources of error can affect the accuracy of vital statistics data. Erroneous responses, whether due to recall error, refusal to respond, misunderstanding of a question or failure of the registrar to record the response accurately, can have a significant impact on data quality. The accuracy of vital statistics data is also affected by errors in editing and coding responses as well as by errors in the various stages of data processing.

397. Both direct and indirect techniques can be used to evaluate the quality of vital statistics data. In general, direct methods can be used to assess the level of data quality and the sources of the problem, while indirect methods are more useful in indicating that data quality problems exist.

(a) Direct assessment

398. Direct evaluation of response error in vital statistics data can be achieved by matching a sample of vital statistical reports with an independent set of records. For example, age at death for about 10,000 deaths registered in 1951 in the United Kingdom was compared with statements of age for the same individuals recorded in the 1951 population census. The results showed that death registration data by age were highly reliable.⁷⁸

399. Cause-of-death data can be directly evaluated by comparing a sample of death statistical reports with autopsy reports. For deaths due to accidents, suicide and homicide, official records can be used as the independent source of information. Both of these techniques were used to evaluate cause-of-death data in a study conducted by the Pan American Health Organization in 10 cities in the Americas.⁷⁹

400. Incorrect editing, coding and processing of vital statistics data can be another important source of error. The detection of coding errors can be carried out by having two different groups of coders code the same set of statistical reports. At the international level, a study of this sort was carried out by the World Health Organization in 1961.⁸⁰ In the study, nosologists from the Canadian Dominion Bureau of Statistics (now Statistics Canada), the United Kingdom General Register Office and the United States National Office of Vital Statistics coded the cause of death for three random samples of 2,000 death statistical reports each. Out of the 6,000 reports, coding was not matched in 390 cases. In about half of the cases, the difference was due to disagreement about which condition should be considered as the underlying cause of death.

401. Statistics Canada evaluated the quality of vital statistics data processing using a sample of 1976 birth and death statistical reports.⁸¹ The sample reports were independently processed and compared with the results of routine data processing procedures to determine the amount of error introduced by the coding, data entry and computer editing of these reports.

(b) Indirect assessment

402. A variety of techniques are available for the evaluation of vital statistics data that involve examination of the internal consistency of the data. For example, comparing the number of early infant deaths with the number of late foetal deaths may indicate a misunderstanding of the definition of a live birth, as discussed earlier in this chapter. Reported ages can be analysed for age heaping (preference for ages ending in 0 or 5, or in even digits), using techniques such as Myers' blended method.⁸² Seasonal patterns in births and deaths can be compared with data from previous years to detect divergencies. Similarly, the level of any vital statistical measure can be compared with historical trends in that measure; wide divergence from the established trend may indicate deterioration in data quality. A large proportion of "unknowns" in any distribution indicates that the distribution should not be considered reliable.

(i) Comparison of trends

403. The total number of births or deaths registered in any given period (month, quarter or year) can be compared with the number registered in a previous time period of similar duration. In most cases, the total number of births and deaths occurring in a population will not vary greatly from one time period to another. The method is easy to apply, and can be used by the local registrars to assess their own work, or at the national level to assess national/subnational totals or to query local registrars on any discrepancies that appear significant. Problems may arise with the application of this technique if the population is undergoing rapid change in size or characteristics, such as the result of mass migration, wars or epidemics. Seasonal variations in births and deaths may limit the comparability of totals for periods under one year. In general, the method assesses the correctness of total events registered only within broad limits. Therefore, the number of unregistered events will remain unknown.

(ii) Delayed registrations

404. Regular monitoring of the interval between the date of occurrence and the date of registration of events can provide useful information for assessing the completeness of statistical reporting. The proportion of total registrations that are delayed provides a rough but easily obtainable estimate of underreporting in previous time periods. Depending on the length of the delay and the cut-off date for inclusion of vital statistical reports in statistical tabulations, delayed registrations can have a substantial impact on the completeness of vital statistics. Through continuous measurement of the delay between occurrence and registration, it is possible to infer whether the system is improving or deteriorating.

405. Similarly, delays in the transmission of vital statistical reports to the central office may affect the completeness of annual statistics. In large countries with important communication problems, this factor may significantly affect the completeness of reporting. Information on this aspect of the system is obtained from the regular monitoring of the flow of information from the local registrar to the central office (see chap. VI).

406. Table 5.1 shows the number of local registration offices in each department of Peru which submitted vital statistical reports to the central statistical office in 1974, according to the number of months reported.⁸³ The information on the location of the local registrar provides an excellent indication of the geographic areas of the country in need of assistance in this aspect of the vital statistics system.

407. Information on delays in registration or in the transmission of information can provide insight into other aspects of the vital statistics system as well. For example, for those systems relying on health personnel for the notification of events or for the actual registration of events, a table showing registration or transmission delay by type of place of birth or death (type of health facility/not in a health facility) may provide some infor-

mation on the degree of cooperation of health personnel in the registration and reporting process.

(iii) *Patterns in the sex ratios at birth*

408. A close examination of the sex ratios at birth by year of birth and by larger geographical division may be used to assess the completeness of birth registration. A sex ratio of 105-106 boys per 100 girls suggests a reasonable level of registration completeness, or otherwise, in a broad sense, an error equally affecting males and females. To some extent, a sex ratio at birth below the expected one can be explained by the under-registration of males who have died shortly after birth. Conversely, a sex ratio at birth above the expected value might indicate a relative underregistration of females. One must be cautioned that in local registration areas where the number of annual births may be small, the norm of 105-106 may not be applicable. Furthermore, there are societies in which the sex ratio at birth is less than 105.

(iv) *Comparison with census data*

409. The "balancing equation" can be used to compare intercensal population growth (the difference between two successive censuses) with intercensal births, deaths and net migration. If censuses as well as vital and migration records are considered reliable, intercensal growth should equal the sum of intercensal births and number of immigrants minus intercensal deaths and number of emigrants. Assuming that census and migration data are accurate, differences between this sum and intercensal growth will be due to the underregistration of vital events.⁸⁴

410. In the developing countries, these assumptions are often not met, because of deficiencies in migration statistics. On the other hand, in those countries where migration is negligible, the method may yield reasonable results. The technique will only provide an approximate measure of error, and one in which it will not be possible to separate the degree of underregistration of births and deaths. The fact that the method is easily understood may make it useful in promoting efforts to improve registration completeness.

411. Comparing the results of a single census with registered births provides another means of evaluating the completeness of birth registration. In this approach, the number of children under one year of age enumerated in the census is compared with the number of live births registered in the 12 months preceding the census, allowing for the number of deaths of these children during those months. The technique provides only a rough measure of underregistration, as the difference between the two data sources may be due to incomplete registration of births and deaths, or to errors in age estimation or in census enumeration of infants. The problems of infant under-enumeration and age misstatement, particularly important in developing countries, greatly limit the applicability of this method.

(v) *Comparisons of rates observed in similar populations or in previous periods*

412. Crude rates of birth and death can be compared with rates from similar populations known to have good registration coverage. Important differences between the two may indicate that one or both sets of data may not be reliable. Using data from only a single country and strong annual fluctuations in rates may also indicate problems with the level of completeness. Both of these tests provide only a general measure of underreporting.

413. Similarly, age-specific fertility or mortality rates can be compared with the same rates observed in a similar population or in a previous period. In this case, however, differences can be due to problems in both the numerator (registered births or deaths by age) or the denominator (age-specific census count or population estimate).

(vi) *Incomplete data methods*

414. An increasing need for basic demographic measures, combined with the poor quality of civil registration and vital sta-

tistics systems in developing countries, has led to the development, over the past three decades, of indirect techniques for the estimation of these measures from incomplete or deficient data. The results of these methods can also be used to evaluate registration coverage in various ways: (a) birth or death rates estimated through incomplete data methods can be compared with vital rates obtained from civil registration data; (b) demographic relationships used in incomplete methods may be adapted to assess the quality of civil registration and vital statistics data; and (c) incomplete data methods can be applied to estimate directly the level of underregistration of vital events. A detailed treatment of the techniques can be found in two publications issued by the United Nations.⁸⁵ A few of the applications of indirect methods are discussed below.

415. An assessment of the determinants of fertility in Cuba provides a good example of the first way in which incomplete methods can be used to evaluate registration coverage.⁸⁶ In assessing the quality of Cuban vital statistics data, infant mortality rates based on registered infant deaths were compared with the rates estimated through incomplete data methods. This approach confirmed the official estimates of infant mortality from the late 1950s to the mid-1970s, but did not support the sharp drop from the mid-1970s to 1980. The author concluded that the official estimates for recent years will require confirmation from surveys in the early 1980s.

416. The Cuban study also provides an example of how demographic relationships used in incomplete data methods can be applied to the study of registration completeness. The relationship is between the reported current fertility (cumulated by successive age groups) and reported lifetime fertility (or parity) of women, both usually obtained from a census or survey. However, current fertility data tend to underestimate fertility levels because of reference period errors, and parity data tend to be underestimated because of underreporting at older ages owing to recall error.

417. Another example of this approach is contained in an evaluation of the quality of a fertility survey conducted in Trinidad and Tobago.⁸⁷ The estimates of infant mortality taken from the survey were compared with infant mortality rates based on vital statistics for the years 1951 to 1975. The results show close agreement between the two up to 1964. After that time, the vital statistics-based rate declines much more rapidly, and by 1975 is considerably lower than the survey-based rate.

418. A technique that utilizes the strong points of current and lifetime fertility to calculate a more accurate estimate of the level of age-specific current fertility rates⁸⁸ is based on the ratios known as P/F (parity/fertility). This technique assumes that fertility in the recent past has been constant, the age pattern of the current rates is correct and the average parities of the younger women reflect the correct level of fertility. With the foregoing assumptions, the same ratios can be used to evaluate the quality of birth registration data. Since complete birth registration data will provide an accurate measure of current fertility, the ratio of age-specific parity data in respect to age-specific current fertility rates from vital registration data should approach unity at younger ages, assuming constant fertility. Deviations of this ratio from unity would be due to incomplete birth registration.

419. Because fertility has been declining in Cuba, an extension of this technique, designed for conditions of changing fertility, can be applied.⁸⁹ The technique estimates parity levels based on information on cohort parity changes between surveys. Comparing these parity measures with birth registration data provides P/F ratios very close to unity, ranging from 1.01 to 1.05 for the five-year age groups from 20-49. The level and consistency of these ratios confirm the accuracy of age-specific fertility rates based on registration data. This and other tests carried out on Cuban registration data suggest that birth registration has been complete, or nearly complete, since the 1950s.

420. Two simpler applications of demographic relationships can be used to assess the completeness of infant death reg-

TABLE 5.1. LOCAL REGISTRATION OFFICES IN PERU REPORTING MONTHLY BIRTH REGISTRATION INFORMATION TO THE CENTRAL OFFICE, BY DEPARTMENT: 1974*

Department	Total	Number of months reported for 1974			
		12	6-11	1-5	None
Peru	1 676	664	453	150	409
	(100.0%)	(39.6%)	(27.0%)	(0.0%)	(24.4%)
Amazonas	77	20	35	7	15
Ancash	154	69	39	14	32
Apurimac	69	28	16	8	17
Arequipa	105	35	33	7	30
Ayacucho	102	44	31	6	21
Cajamarca	110	83	7	4	16
Callao	6	2	2	2	0
Cuzco	101	21	17	14	49
Huancavelica	90	36	28	12	14
Huánuco	68	21	22	5	20
Ica	39	24	11	2	2
Junin	120	47	20	7	46
La Libertad	72	33	22	5	12
Lambayeque	32	14	9	2	7
Lima	165	78	42	7	38
Loreto	52	14	11	6	21
Madre de Dios	9	0	4	3	2
Moquegua	19	5	9	3	2
Pasco	27	11	6	2	8
Piura	61	47	10	2	2
Puno	95	0	32	26	37
San Martin	69	14	34	6	15
Tacna	23	11	10	0	2
Tumbes	11	7	3	0	1

Source: Peru, Instituto Nacional de Estadística, "Mejoramiento de estadísticas vitales", Plan final del proyecto (Lima, 1978).

* These include all vital statistical reports transmitted, including those delayed until 1977.

istration. It is well known that a large proportion of infant deaths occur in the first days of life. A study of trends in infant mortality in developed countries has shown that neonatal deaths (infant deaths in the first 28 days of life) are a significant proportion of total infant deaths at a wide range of infant death rates.⁹⁰ The neonatal proportion varies widely from country to country, as well as by level of infant mortality. Nevertheless, neonatal deaths should constitute between 50 and 75 per cent of all infant deaths for infant mortality rates from 20 to 100, with the proportion rising as the infant death rate falls.

421. Because of the difficulty in determining the neonatal proportion, this method will not provide a precise measure of underreporting of infant deaths. Still, a simple tabulation of infant deaths by age at death can be used to indicate that underregistration exists. Simply put, a neonatal proportion well below the range cited above demonstrates that early infant deaths are being underreported.

422. Early infant deaths, especially those occurring in health institutions, often may be reported as late foetal deaths. This may be due to a misunderstanding of the international definition of a live birth, or to a desire of the parents to avoid the burden of registering a live birth first and subsequently an infant death, or simply to the adoption of a national definition that departs from the international one, which may require that the child survives at least 12 hours, 24 hours etc. to be registered as a live birth; otherwise it is registered as a late foetal death only (e.g., Poland, Zaire etc.). Statistics showing a small number of early infant deaths along with a large number of late foetal deaths usually indicate the presence of this problem.

423. A variety of incomplete data methods for the direct estimation of registration coverage also have been developed. For example, the reverse survival ratio method estimates births during an intercensal period by projecting the population aged 0-4 backwards from the most recent census, adjusting for childhood mortality, net migration and the rate of increase in the number

of births over the period. The level of underregistration is determined by comparing estimated births with the number of registered births. This method was used to estimate underregistration of births in England and Wales in the period 1841 to 1910.⁹¹ The method is highly dependent on the accuracy of age reporting and differential under-enumeration in existing census data, as well as on the reliability of the child mortality estimates used. The technique is inappropriate for use in many developing countries, precisely because data quality assumptions are not met. In general, the method provides only an approximate measure of the level of registration coverage.

424. The same method was used to estimate the completeness of birth registration in Thailand.⁹² In this case, the reverse survival ratio method was applied to various censuses in Thailand to estimate the number of births over the period 1920 to 1969. The estimated number of births for each five-year interval was then compared with the number of registered births for the same period to assess the completeness of birth registration. In the same study, deaths were then estimated using the balancing equation, and subsequently compared with registered deaths to compute the level of underregistration of deaths. Besides the limitations of the reverse survival method discussed above, the use of the balancing equation requires accurate census and migration data, information which is not available for most developing countries. Because of these limitations, the technique can only be expected to provide approximate estimates of registration completeness.

425. More complex methods for evaluation of registration completeness have been developed in recent years.^{89, 93-99} The first of these methods estimates the level of underregistration, assuming that the population under study is stable (i.e., a population that has been subject to constant fertility and mortality for a long period of time) through comparisons of age distribution of the population with the age distribution of deaths.⁹³ Another method, also assuming stability of the population, estimates the

age distribution of the population from the age distribution of deaths and the population growth rate.⁹⁷ The ratio of the expected to the observed population then provides an estimate of the completeness of death registration. These methods, which are based on assumptions of a stable population have recently been modified, incorporating age-specific growth rates to eliminate the assumption of stability.^{98, 99}

426. The remaining methods do not require the assumption of a stable population. A method based on forward projection between censuses has been developed.⁹⁶ The technique estimates both the relative under-enumeration between the two censuses and the completeness of death registration.

(c) *Advantages of indirect methods*

427. One of the advantages of the indirect methods is that the level of registration completeness can be readily assessed as soon as the data becomes available. Several of the methods can be applied at the local or regional level, as well as the national level, providing a means of identifying the geographic location of the problem. Their ease of application makes these methods suitable for several purposes, such as the regular monitoring of completeness levels, and providing estimates of completeness for campaigns to promote improvements in registration.

(d) *Limitations of indirect methods*

428. The applicability of the indirect methods is limited by a variety of assumptions and other requirements. For example, the earliest of the methods require a stable population, that is, constant fertility and mortality.^{93, 97} Owing to declines in both fertility and mortality, the growing number of developing countries reporting make these techniques suitable in only a small number of countries. The methods not requiring the assumption of stability demand greater amounts of information.^{94, 96, 98} In general, these methods require data from two censuses, and as a result make the indirect methods unsuitable for countries that do not have reliable data from two censuses.

429. Other limitations of these methods include the assumptions of a closed population (or accurate migration statistics), no variation by age in the completeness of death registration, and accurate age reporting of deaths and of the population. In many countries, these conditions will not be met. Furthermore, the estimates of completeness of death registration provided by these methods are always relative to the degree of census enumeration. This will make the determination of the absolute level of underregistration problematic in many cases.

430. Some of these limitations can be overcome, however. For example, a much higher rate of underreporting of deaths is known to exist among infants and children than among adults in many developing countries. In order to avoid violating the assumption of no variation in completeness by age, any of these methods can be limited to estimating death registration completeness at ages 10 years and above. Similarly, the likelihood that age at death and age reporting of the population are exaggerated at the older ages can be addressed by expanding the lower age boundary of the highest age group to the point that it includes those ages at which almost all age misstatement is thought to take place.⁹⁹ These modifications reduce the sensitivity of the methods to violations of certain assumptions. No modifications have been devised to reduce the impact of violations of other basic assumptions, however.

431. Special tabulations can also be used for the evaluation of data quality. For example, cross-classifying date of occurrence and date of registration will indicate the proportion of events reported long after occurrence and hence potentially subject to recall error. Tabulating deaths by medical as opposed to lay certification of cause gives a clear indication of the potential accuracy of cause-of-death data.

C. CHOOSING AN APPROPRIATE METHOD TO ASSESS COMPLETENESS AND QUALITY OF REGISTRATION DATA

432. A variety of direct and indirect methods for the evaluation

of registration coverage and quality of vital statistics data have been described above. The selection of the most appropriate method, whether direct or indirect, will depend on various factors, including the needs of the analyst and the resources available for the study.

433. In designing the evaluation study, the following requirements, at a minimum, should be specified.

1. *Objectives*

434. The ultimate goals of the study should be clearly determined, e.g., whether the results will be used to promote improvements in registration, to pinpoint specific problems, or for other uses. The ends to which the study findings will be applied may in large part dictate the choice of method. If the objective is to promote overall registration improvement, it may be sufficient to address coverage problems in general terms and then use this information to encourage the cooperation of the public, the local registrars and collaborating agencies. In this case, indirect evaluation methods will suffice. Similarly, indirect methods can be used for routine monitoring of completeness levels. If the end is to identify and eliminate specific coverage problems, direct methods may be more appropriate.

2. *Degree of precision*

435. Another consideration is the required level of precision of assessment of completeness or quality. In some cases, an approximate estimate will suffice. The level of accuracy required will be in part a function of the level of completeness or of quality of the registration system. If reporting is grossly deficient, an adequate estimate obtained through an indirect method will be appropriate. If the major problems have been resolved, but significant minor problems still remain, direct methods may be the best way to identify them. Once a registration system attains a high level of completeness and quality, indirect methods are generally employed on a regular basis to ensure that coverage and data accuracy do not deteriorate.

3. *Timeliness*

436. An important criterion for selecting the most suitable method is the time within which the results are needed. If the objective of the study is to verify that a problem is developing, the results should be made available as soon as possible. In general, this will call for the use of an indirect method, although direct evaluation may be feasible if a reasonably complete list of events, such as an administrative list, is readily available. On the other hand, if the study is part of a long-term registration development plan, more time-consuming techniques, such as direct methods, can be considered.

4. *Type of event to be studied*

437. The study may evaluate births or deaths, or a specific subset of these events, such as infant deaths, or more than one type of vital event. Many of the methods described above are most appropriate for a specific type of event. Care should be taken to select appropriate methods for the proposed study. If several types of events are to be covered in the study, a variety of evaluation methods may be required.

5. *Assessing coverage and/or quality of the system*

438. The study may be limited to an evaluation of coverage (quantity) and/or to an assessment of vital statistics quality as well. Both indirect and direct methods can be used to assess registration completeness (coverage) as well as data quality. Direct methods will provide more precise estimates of vital statistics quality, particularly for items such as causes of death. In addition, direct methods are required if it is necessary to identify the source of the problem.

6. *Resources*

439. Other decisive factors are the amount of funding available for the evaluation study, the availability of skilled analysts,

the type of other data sources that can be used for the study and the degree of their accuracy. Ultimately, the choice of an evaluation method may be decided by the resources available for the study. The cost of direct evaluation may be prohibitive given existing budget constraints, particularly if data collection in the field is required to construct the separate list of events. If, on the other hand, the necessary questions can be added to an upcoming census or survey, data collection costs can be minimized. The quality of available data will also be a factor. If the available

administrative lists or data from a census or survey are grossly incomplete, indirect methods may be preferred. Finally, skilled personnel must be available to carry out the study. The level of expertise of the available staff may dictate the choice of method to be applied, particularly if an indirect method is to be used.

440. Possible solutions for completeness and quality problems identified in the civil registration and vital statistics systems are listed in table 5.2.

TABLE 5.2. SOURCES AND POSSIBLE SOLUTIONS TO PROBLEMS OF CIVIL REGISTRATION COMPLETENESS, AND TO THE QUALITY AND TIMELINESS OF VITAL STATISTICS

<i>Nature of problem</i>	<i>Source of problem: general public</i>	<i>Possible solution</i>	<i>Source of problem: registration office</i>	<i>Possible solution</i>
A. Coverage problems				
1.1 Vital events not registered	Population unaware of their responsibility to report vital events	Publicity campaign	Registrar has many other duties	Identify a person whose duties are entirely or chiefly registration
	Lack of interest	Publicity campaign		
	Unable to pay fees	Free registration for live births and deaths	Lack of registration offices in some communities	Relocation of registration offices; mobile registration units
	Relatives of deceased preoccupied with other problems	Publicity campaign health system notifies registration system of event	Inappropriate definition of live birth	Adoption of internationally recommended definition of live birth
	Vital event deliberately not reported to registrar	All of the above	Misunderstanding of definition of live birth or other events or of registration procedures	Training programme for civil registrars
1.2 Duplicate registration	Lost the only existing copy	Maintain duplicate registers	Easier to do a new registration than to get copy of the original record	Improve filing and file checking procedures; establish procedures for cooperation with other registration offices
	Errors in original record	Establish administrative procedures to facilitate correction of records		
	Individual has moved from usual place of residence and needs a legal copy of the record	Creation of archives at the regional level and the establishment of channels for cooperation to facilitate provision of duplicate copies	Lack of files or registers in the community; destruction of the archives	Maintain back-up of registers; create archives at the regional level
			Unsuccessful search for a vital record	Improve filing and file checking procedures
1.3 Illegal registration	Born in foreign country and wants to register in the country of new residence	Personnel training and communication among registration offices	Illegal changes	Inspection of civil registers and supervision of registrars personnel training
1.4 Late registration	Ignorance of time allowed for registration	Publicity campaign	Lack of civil registration offices in some communities	Relocation of registration offices; mobile registrars
	Lack of interest	Publicity campaign	Accessibility problems	Establish registration offices in medical units and other places
	Unable to pay fees for late registration	Free late registration of live births and deaths		
			Lack of knowledge of the importance of the problem	Training programme civil registrars; discussion of problems in registrar newsletter
1.5 Statistical reports delayed or not processed			Reports are delayed or never sent to central office	Design and implement a document control procedure
			Central office does not request the statistical reports	Same as above
			Reports lost in transmission	Same as above
			Receipt of reports not controlled; only parts are received	Same as above
			Reports received but not processed	Same as above

TABLE 5.2 (continued)

<i>Nature of problem</i>	<i>Source of problem: general public</i>	<i>Possible solution</i>	<i>Source of problem: registration office</i>	<i>Possible solution</i>
1.6 Improper statistical			Processing includes documents from other years A number of statistical reports are duplicated in processing	Same as above Same as above
B. Quality problems				
2.1 Omission of data	Refusal to respond	Publicity campaign; training programme for civil registrars	Content of forms varies across country Inadequate supply of printed forms Registrar lacks knowledge of statistical information needed and its uses Lack of coordination among civil registration, statistical service and health service	Standardized forms Establish system for control and distribution of printed form Training programme for registrars; define type of information needed and their uses Establish mechanisms for coordination among services involved in registration
2.2 Significant partial non-response	Refusal to respond	Publicity campaign; training programme for civil registrars	Registrar does not word questions properly Too many questions included	Training programme for registrars; develop manual of procedures for registrars Revise content of forms
2.3 Inaccurate data	Misunderstanding of questions	Training programme for registrars on interviewing techniques	Registrar does not know definitions; does not word questions properly; lacks proper guidelines Printed forms not available Forms are poorly designed, request too much information	Training programme for registrars; development of procedures manuals Establish system for control and distribution of printed form Revise design and content of forms
2.4 Processing errors			Coding errors Editing errors Data entry errors Errors in the definition of data processing criteria	Verification of coding Development of computer edit programs to control range and check consistency of responses Complete verification of data entry Careful development data processing concepts and definition by data users and producers
C. Timeliness				
3.1 Delay in statistical reporting	Late registration	Establish a permanent mechanism to control the completeness and timeliness of statistical reporting	Registrars do not see the need to send statistical reports on a regular basis The central vital statistics office does not request the statistical reports There are legal sanctions for late registration that preclude registration completeness	In-job training programme for registrars Establish mechanisms of coordination between the collection and compiling office Avoid painful legal procedures for late registration

TABLE 5.2 (continued)

<i>Nature of problem</i>	<i>Source of problem: general public</i>	<i>Possible solution</i>	<i>Source of problem: registration office</i>	<i>Possible solution</i>
3.2 Statistical reports are not processed on time			Too many controls at the reception of statistical reports	Simplify the control procedures of reception
			Lack of clerical personnel for editing, coding and data processing	Assign permanently personnel to perform these duties
			Lack of data entry equipment	Install the more suitable data entry equipment
			National statistical authorities do not give the right priority to the vital statistics programme	Revise the prioritization of vital statistics within the general statistical programme

VI. STRATEGY FOR IMPROVING CIVIL REGISTRATION AND VITAL STATISTICS SYSTEMS

441. An effective civil registration and vital statistics system depends on the availability of highly technical and specialized expertise within the general public administration. Modern management techniques and information sciences must be utilized. Continuous improvement of the system using innovative approaches should be institutionalized so that the system can be operated in an efficient manner. An approach to improve civil registration and vital statistics systems may begin with a systematic examination of the internal activities of the civil registration and vital statistics processes, as well as the external relationship of other systems that are related to civil registration and vital statistics. The structure or the organization of the system which was imposed by legal mandate and financial bounds needs to be examined. The day-to-day operations of the system, including the registration and statistical reporting functions, the network of registration offices, personnel issues, the physical equipment and supplies and other facilities, need to be continuously monitored. Cooperation and coordination with other government agencies and the general public in order to facilitate the functioning of civil registration and vital statistics systems need to be developed, strengthened and enlarged.

442. There are several areas of work that should be undertaken and developed either separately or together to improve the system. These include training for registrars and statisticians, training the general public, organizing seminars and workshops, soliciting feedback from users, establishing national and regional civil registration and vital statistics committees, developing and implementing various action plans for improving the systems etc.

A. TRAINING AND STRATEGY FOR IMPROVING THE SYSTEMS

1. Training

443. Training is a major area that can lead to effective strengthening of the system. It can generate several immediate benefits, including (a) correcting poor understanding of the tasks to be performed; (b) improving morale, which may be low owing to one's perception of lack of necessary skills; (c) enlisting a more active participation from the individual; (d) providing a basis for the development and introduction of new procedures, equipment and techniques to upgrade the system; (e) encouraging input and feedback from individuals, including suggestions for changes and possible ways of implementing them.

444. Training can be a cost-effective undertaking, based on the needs of a given area of the civil registration operation or a geographic region such as urban or rural registration areas. The training plan should distinguish between internal training, which is directed towards civil registrars and technical and administrative personnel, and external training, which is directed towards policy makers, local officials, health personnel and others associated with civil registration improvement. Internal training emphasizes techniques, methods and skill-level competencies and addresses issues of professional roles and functions. External training educates groups about the needs and functions of civil registration and vital statistics systems. It seeks to increase understanding and cooperation. This area is often neglected or bypassed as a mechanism for improvement, yet it involves a crucial aspect of the environment for cooperation and support.

As a major area for civil registration enhancement, a subsequent section on public education and cooperation details training and education specifically targeted at the needs of the civil registration system external to the operating system.

445. As in other activities, training should draw on a multi-disciplinary team, including both civil registration experts and non-registration personnel, such as teachers and communications experts, who can jointly provide the best learning tools and strategies.

446. Some training efforts should include seminars, with participants from both within and outside the system. Selected seminars with a mixture of participants produces a problem-solving atmosphere conducive to sharing experiences and establishing two-way communication. Valuable understanding and an increase in technical skill applications emerge from appropriately developed seminars involving people from both within and outside the system. This type of training and communication draws on the overlap of the three areas, according to the systems analysis approach suggested in figure XII.

2. Seminars and workshops

447. Seminars and workshops should draw personnel from within the systems to elicit inputs and exchange views on problems encountered in civil registration and vital statistics operations. They should also include technical persons or administrators drawn selectively from outside the systems to help present fresh ideas and approaches. Such outside personnel may include, for instance, equipment and process specialists, records storage and retrieval experts or data-processing consultants.

3. Feedback from users

448. To improve the civil registration and vital statistics systems, it is important to gain public support and to address the concerns they have or steps they think need to be initiated. This activity is a key to improvement as it prompts a positive and participative environment for change. Details of the scope and types of audiences that need to be addressed are discussed below, in the section on public education and cooperation.

4. National and regional civil registration and vital statistics committees

449. These committees can provide an appropriate forum for leadership and authority for needed improvement. The aim would be to organize support and coordinate participation of the interested technical, professional and governmental groups that will participate in the improvement. Membership for such national and regional civil registration and vital statistics committees can be organized to provide a balance of concerns of public and technical problems. Views can be aired in an atmosphere of problem-solving and promotion of necessary change.

5. Development and implementation of action plans

450. An illustration of a series of activities for implementation under different stages of development of civil registration and vital statistics systems is given in table 6.1. The table lists a number of activities that may be undertaken and the time ref-

Figure XII. Three general areas for systems analysis application to strengthen the registration system

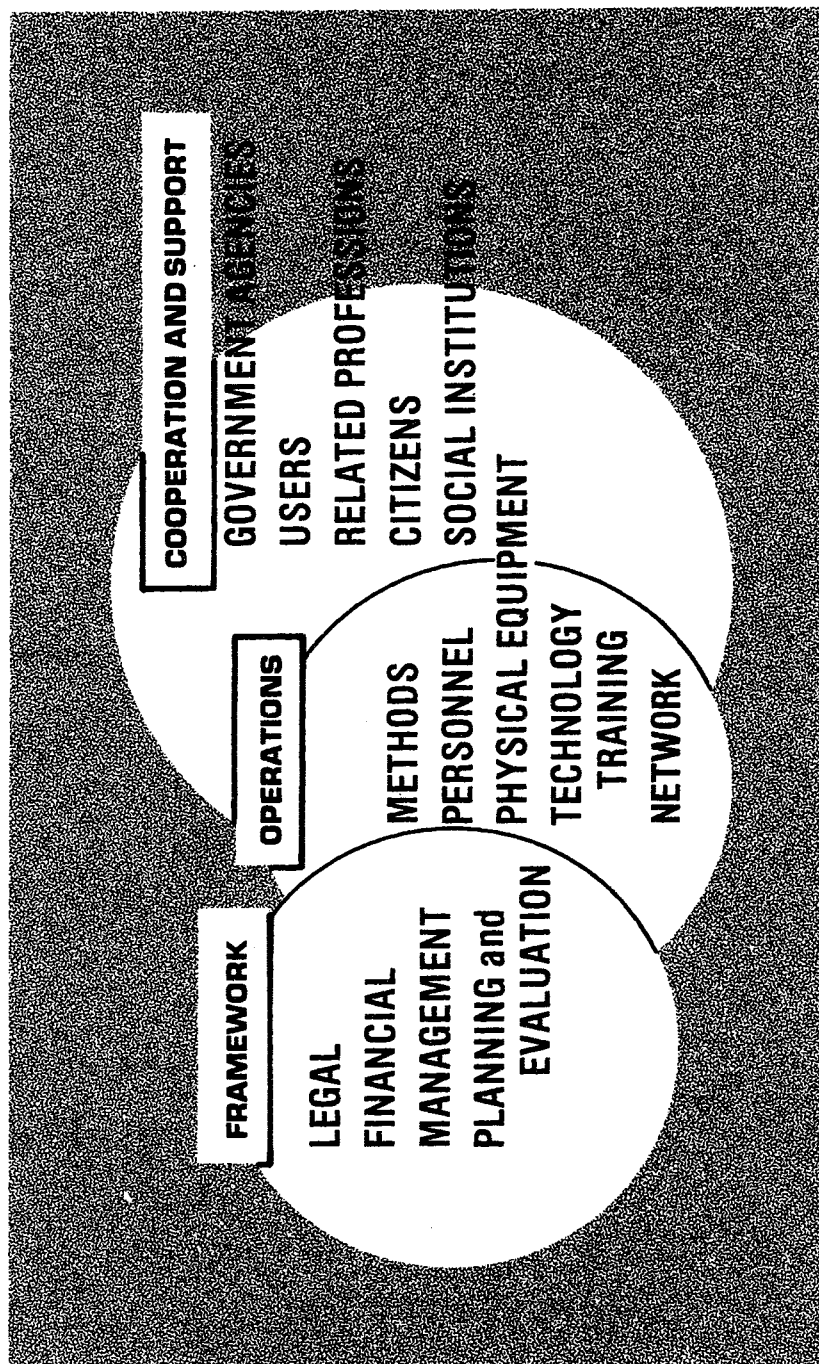


TABLE 6.1. ILLUSTRATION OF A SERIES OF ACTIVITIES FOR IMPLEMENTATION UNDER STAGES OF DEVELOPMENT OF CIVIL REGISTRATION AND VITAL STATISTICS SYSTEMS

Component/activity	Early stage	Intermediate stage	Long term
A. General components			
Legal analysis	Lay groundwork for development or revision of legal code through working session on need for establishment or strengthening of civil registration and vital statistics laws.	Select legal reform group consisting of registration and vital statistics representatives, legal expert, international consultant, representatives of police, judiciary and others. Ensure that revised laws and changes in reporting forms harmonize completely.	Enact legal reforms. This may be a very long-term goal, but is well worth the effort.
Internal management analysis	Review existing management practices, propose changes as appropriate. Upgrade staff positions, organize problem-solving meetings among central office and field staff.	Establish permanent in-service training programme, continue upgrading of staff positions and proposals for new positions. Begin development of measures for evaluation of central and field staff.	Maintain in-service training programme and problem-solving meetings. Utilize measures for performance evaluation and identification of problem areas.
Physical facilities and records storage ...	Study measures that could be taken to enhance safety of records within the central office and those held by local registrars.	Obtain financial support for physical changes to improve fire safety and protect records; obtain reserve equipment and improve environment to enhance productivity of equipment and staff.	Investigate other measures for improvement of physical facilities and storage of records. Implement as funds allow.
B. Vital records certified copy production			
Elimination of backlog	Ensure existing backlog of certificate requests is eliminated.	Review system to determine more efficient procedures, including equipment needs.	Implement and maintain revised system.
Quality control procedures	Develop quality control procedures for evaluation of registration certificate production system, including log-in/log-out and document tracking system.	Implement procedures, use results to guide modification of system.	Maintain procedures modifying as necessary.
C. Data preparation and storage			
Data entry, coding, editing	Establish data-processing capability and introduce quality control procedures to assure careful monitoring of work flow and quality.	Review production quotas and quality control procedures, revise as necessary.	Implement revised procedures and quotas, maintain quality of work performed.
Data and source programme storage liaison with the central data-processing unit (CDPU)	Establish proper liaison between staff of registration/statistical offices and data-processing unit.	Evaluate procedures used for data transfer to CDPU, data storage.	Revise procedures as necessary to assure smooth workflow from staff to CDPU and return.
D. Data analysis			
Vital statistics and registration tabulations	Revise/correct tabulation programmes as necessary. Train selected staff in use of software packages.	Resume publication of annual vital statistics report, with basic set of tables. Produce special tables on request.	Revise basic set of tables to reflect needs of registration and various data users.
Analysis of vital statistics data	Introduce training in analysis of vital statistics data, use of packaged analysis programmes.	Evaluate quality of vital statistics data.	Provide analysis service for data users.
E. Internal management			
Personnel	Establish or upgrade staff positions, reorganize staff where necessary.	Develop problem-solving seminars to improve staff knowledge, develop capabilities of staff, communicate management interest in staff and concern for system improvement.	Institutionalize in-service training and continuous evaluation of system productivity.
Scheduling and external liaison	Introduce or review all systems within the office to determine appropriate scheduling and coordination of activities.	Implement appropriate changes to assure activity scheduling and coordination within central office.	Test management approach to resolution of bottlenecks or temporary trouble spots within office.

TABLE 6.1 (continued)

Component/activity	Early stage	Intermediate stage	Long term
Supplies and forms	Conduct inventory of available supplies, including stocks of various registration and statistical forms. Estimate future requirements for supplies and forms, given various changes planned for registration improvement.	Evaluate existing forms, determine which should be eliminated and which forms revised. Obtain funding to ensure adequate stock of supplies and blank forms.	Complete revision of forms and elimination of unnecessary forms. Maintain appropriate levels of supplies and blank forms.
F. Field support staff			
Personnel	Assist field representatives in development of their skills. Define objectives/duties of regional registrars.	Hire, train and install parish (district) registrars in each parish (district). Redefine duties of central field representative staff in light of regional registrars.	Evaluate effectiveness of regional registrars. Modify objectives and duties as appropriate, plan in-service training as needed.
Travel budget	Determine level of funds needed to provide adequate supervision of field staff supplies needed for monitoring.	Propose budget changes for travel, supplies needed in supervision by regional registrars and reduced central field representative staff.	Evaluate adequacy of travel and supply budget, modifying as appropriate in future.
G. External components			
Local registrars			
Training and support	Develop training programme for each region. Evaluate and revise local registrar's manual as appropriate.	Complete training programme. Produce final version of local registrar's manual incorporating all changes in procedures, forms and other duties of local registrar made as part of system evaluation.	Establish training programme for newly hired local registrars and refresher courses for existing local registrars. Revise manual as needed. Organize association of local registrars, produce newsletter.
Procedures	Develop or evaluate existing procedures for local registrars, proposing changes as needed.	Revise procedures for local registrars, if necessary.	Devise measures for the long-term evaluation of local registrar procedures. Revise procedures as indicated by evaluation.
Registration fees	Determine appropriate registration fee structure for remuneration of local registrars.	Obtaining funding increase to allow payment of increased fees. Use higher fees to attract replacements for unqualified local registrars.	Ensure that fees can be increased to reflect increases in cost of living perhaps on same scale as salary increases for regular government employees.
Review of the network of the registration units	Study measures to define or redefine boundaries of the registration units.	Initiate plans for the creation of new registration units.	Establish new registration units in isolated places and health institutions to ease vital registration.
Health personnel			
Training and liaison	Initiate training programme in each district. Begin work on manual of registration duties for health personnel.	Continue training programme. Develop registration training component for other personnel such as health physicians, nurses, midwives.	Prepare and distribute registration manual for health personnel. Institutionalize training programme, maintain contact with health training programmes.
Influence coverage and timeliness	Establish regular liaison between registration and health offices.	Carry out training session for health personnel and maintain liaison with them by regular visits from registration offices.	Evaluate liaison effort and revise if necessary. Develop and utilize measures to evaluate coverage and timeliness of health personnel.
Public			
Education on registration use	Develop publicity programme to explain to the public the importance of civil registration, to encourage participation, to assure provision of current and complete information to local registrars.	Carry out country-wide publicity programme. Disseminate changes in fees and procedures that affect the public. Develop measures for evaluation of impact of programme on public participation.	Devise and implement long-term information programme to assure public compliance with civil registration system. Disseminate information on future changes in the system.

TABLE 6.1 (continued)

Component/activity	Early stage	Intermediate stage	Long term
Registration fee changes	Study existing fees and financial needs to determine new fee-for-service schedule.	Implement new fees as service improves. Use increased revenues to justify expanded budget for registration improvement.	Revise fees as necessary to reflect increased costs of services.
Police, judiciary and coroners	Encourage cooperation of these groups in registration process by increased contacts, invitation to conference, representation in legal reform group. Establish lines of communication.	Ensure each group's approval of legal changes prior to revision of law. Develop short training/information session for the different groups.	Implement short sessions. Maintain communication with groups to ensure compliances and to obtain feedback on needed future changes in system.
Resident training institution development	Develop detailed plans for course on analysis and evaluation of vital statistics and health data.	Include vital statistics course in colleges and/or appropriate institutions.	Institutionalize course at colleges and/or appropriate institutions and select instructor, revise instructional material as necessary, monitor future presentations of course.
H. Technical, legal and political base for change			
Liaison and communication	Develop contacts and lines of communication with various government agencies such as health, finance, judiciary, police, and collaborating universities and other agencies and institutions to build consensus and input. Invite all of these to conference.	Utilize consensus and input from all agencies and institutions in review and reform of system.	Maintain lines of communication to ensure cooperation and to provide feedback as part of monitoring system.
Technical analysis	Develop policy analysis evaluating alternative courses of action for registration.	Provide back-up documents on budget, personnel, technical and other requisites for improvement of the systems.	Ensure that systems revision accords with policy recommendations as much as possible. Provide future back-up documents as needed.
Vital statistics conference	Organize conference so as to obtain input from all institutions involved in the systems and the public on changes and improvement to be made. Obtain cooperation of all groups in implementing changes and improvements.	Publish conference proceedings, including suggested changes and improvements. Use the conference as basis for implementing changes in the systems, basic input in education/publicity programme.	Continue implementation of proposed changes and improvements. Maintain momentum by scheduling short meetings of conference participants to evaluate progress and investigate other changes and improvements needed.

ferences for actions for each of the activities. The early stage or short-term activities may be implemented within one year after the plan begins. It includes work to establish a new system or measure or to re-establish or strengthen the existing system or measure for civil registration and vital statistics work. The intermediate term includes activities that require more preparation and refinement or that rely on pilot studies or evaluation methods and budget authorization. These activities may be implemented in one to three years after the short-term activities have been implemented. They may also be implemented immediately in those countries where the short-term activities have already been accomplished. The long-term activities are more complex and require considerable technical changes either in the organization of the system or in its operations.

451. Countries may wish to develop their own tables similar to the illustration. This table can serve to portray needed changes over time to both technical personnel and the interested non-technical persons or agency. Furthermore, it can function as a summary of alternative actions or serve to make choices and provide a mechanism to monitor and evaluate the plans and

actions once implemented. The activities that are proceeding on schedule, as well as those falling behind, can be tracked and identified by monitoring and evaluation.

B. PUBLIC EDUCATION AND COOPERATION

452. Much emphasis has to be placed on the necessity of public cooperation and education for the success of the civil registration and vital statistics systems. In innovative approaches to the public, three groups of audiences can be targeted: the general public, members of institutions, professions or agencies and government officials.

1. The general public

453. This group is composed of individuals whose vital events will be reported for registration by designated respondents. The individuals will have the vital events registered or will draw upon the system for legal documents. There should be efforts to acquaint people with the message to register and the motivation to do so. The messages may be short, carried by ra-

dio, television, posters or other mass media, and emphasize the important use or contribution of civil registration and the benefit for each individual in registering events, the simplicity of the process itself, the time allowances for registration and the place to register.

2. Members of institutions, professions or agencies

454. This group may influence individuals to participate in civil registration or may avail themselves of products of registration. Members of this group include school teachers, influential community leaders and both governmental and private institutions that promote economic and social development. Efforts should be made to gain their assistance in promoting the improvement of the civil registration and vital statistics systems. Such campaigns can be carried out through professional or institutional meetings. They may be supplemented by a kit or set of materials to aid the professional in disseminating the message to the public with whom they come in contact. Local teachers and school administrators are examples of professional groups who often can be helpful and are willing to promote civil registration. These professionals usually represent a favourable conduit to the public.

3. Government officials

455. This group includes those who participate directly in the civil registration and vital statistics process but whose principal duties are outside the systems. Members of this group should represent physicians, health workers, clinical and hospital personnel, marriage officers, divorce officers and local government authorities dealing with civil registration. Materials should be presented on public education, showing ways to educate the public and the procedures themselves on a step-by-step basis. In addition, the campaign must emphasize the specific areas and duties entailed in the group's role.

456. The key to public education and cooperation is to recognize issues and direct specific efforts to various levels or types of audiences to which the education efforts are addressed. Cooperation and public education are at once interrelated and separate. Education informs the public about the purpose of the civil registration and vital statistics systems, how to use the systems and the steps to be followed. It also lays the foundation for cooperation, but requires supplying more technical detail. Cooperation places the emphasis on more active participation in the civil registration process. Several different modes for education and cooperation have been suggested. The choice and strategy depend on an adequate plan to pinpoint the needs and specific areas for education and cooperation existing in a given setting. The challenge that often faces civil registration is public and professional apathy and therefore education and cooperation are important elements in the promotion of civil registration. Communications experts can provide valuable help in framing awareness and motivational programmes in conjunction with the educational needs and evaluation studies.

457. In all educational and promotional campaigns, the efforts of local registration officials and authorities will play a key role. Some representation from such local groups should be included in the planning process. With adequate guidance and support, the local civil registrars may become a focal point for registration improvement and a continued source of effort to secure additional public support and upgrade their own efforts.

C. EVALUATION STUDIES

458. Evaluation or performance monitoring systems are part of the ongoing implementation process and operation of the civil registration and vital statistics systems. Included in any improvement strategy should also be the provision of an evaluation unit within the civil registration operation. The unit should be capable of organizing management studies. Several types of

evaluations complement the use of the management techniques. They include external evaluation, internal evaluation, pilot studies or demonstration area projects.

1. External evaluation method: the market research approach

459. The objective of this approach is to obtain feedback on the opinions and perceptions of the users of the services of the civil registration and vital statistics systems. In this evaluation effort, attitudes and perceptions, as well as more factual data on the operation of the systems, can be collected.

460. The market research approach may be informal, using focus groups or individuals brought together to discuss their use and perceptions of the systems. It may also be a formal one, based on a survey of a representative sample of the groups whose opinions are sought, usually employing a questionnaire or survey instrument. This approach has not been used extensively in civil registration and vital statistics systems evaluation, although it is commonplace in industrial and trade sector development.

2. Internal evaluation: within the system

461. This evaluation focuses on the internal function of the systems. There are generally two types of evaluation done: (a) evaluations that emphasize production measures (the more frequently encountered type of evaluation in vital statistics) and (b) evaluations that use attitudinal and qualitative measures (less frequently done but an important evaluative adjunct to the operation of the civil registration and vital statistics systems). Two sub-areas are defined: performance measure evaluation and attitudinal measure evaluation.

(a) Performance measure evaluation

462. A set of evaluative criteria needs to be established to examine the performance of the systems in terms of staff, cost and operation. In effect, these measures monitor input and process measures of the systems. The factor of cost, including (a) the cost of collecting the raw data, (b) the cost of processing the raw data, and (c) the cost of disseminating the statistics to users, may be used as an illustration. In most countries, the raw data are simply by-products of the legal registration of vital events, and the collection cost may not be a major concern. However, the processing and dissemination costs require careful scrutiny. It is especially important when a decision is necessary for the choice of specific new equipment and new procedures.

463. The adequacy and quality of statistics can be examined with respect to coverage, content, tabulations, timeliness of statistics and continuity over time. These have been discussed in various sections of chapter V.

(b) Attitudinal measure evaluation

464. Surveys may be conducted to uncover problems among users and contributors to the systems, as well as among the personnel of the civil registration and vital statistics systems, to obtain attitudinal information and measures that can lead to problem solving, greater efficiency and improved priority setting.

3. Pilot studies and demonstration area projects

465. Contributions to the implementation or evaluation of new practices or improvement strategies may be accomplished through the use of pilot studies and demonstration area projects.

466. The pilot study is carried out to examine the feasibility of introducing a change such as new recommendations or procedures, its potential efficiency and contribution to quality. It may be used to examine new modes of registration, data flow, data processing innovations etc.

467. The demonstration area approach provides a mechanism to field a new innovation or improvement effort on a manageable scale in a country that is seeking to upgrade its civil registration and vital statistics systems. The demonstration may have as its purpose either to examine the administrative effort or modification needed before implementing the new procedures fully or to show the gains capable if funding or resources were available to extend the new systems regionally or nationally. Demonstration areas have been used by countries to improve registration completeness with different degrees of success, as some of them failed to carry over the lessons learned in the demonstration area experiences to the national level. Sustained national commitment over the years is, however, essential to the success of this approach.

D. USE OF EMERGING TECHNOLOGY

468. Contributing to a substantial improvement in timeliness and quality is the present level and sophistication of technology and methods for electronic data processing. New technology offers potentially significant benefits to the civil registration and vital statistics systems: it may increase efficiency in operations and timeliness, improve the quality of the records collected and the safety of the documents in storage, extend services, improve public perception and so on. Registration systems should routinely monitor the emerging techniques and technology and assess the utility for the existing system. No doubt, there are benefits and costs to innovations. Systematic monitoring of emerging technologies provides the civil registration and vital statistics systems an opportunity to become aware and to take advantage of new technology on a cost-saving basis.

VII. INTERRELATIONSHIP BETWEEN THE POPULATION REGISTER AND THE CIVIL REGISTRATION AND VITAL STATISTICS SYSTEMS

469. A population register is an individualized data system, that is, a mechanism for continuous recording, and/or coordinated linkage, of selected information pertaining to each member of the resident population of a country or area, making it possible to determine up-to-date information about the size and characteristics of the population at selected time intervals.¹⁰⁰ It is understood that the organization, as well as the operation, of the system should have a legal basis.

470. Population registers are built up from a base consisting of an inventory of the inhabitants of an area and their characteristics, such as age and sex, and the facts of birth, death, adoption, legitimation, marriage, divorce, occupation and level of education; and the continuous updating of this information. Thus, they are the result of a continuous process, in which notifications of certain events, recorded originally in different administrative systems, are automatically linked to a population register on a current basis. The method and sources of updating should cover all changes, so that the characteristics of individuals in the register remain reliable.

471. To assist in locating a record for a particular person or household or family in a population register, indexes are provided. The latter are built up in several ways, for example, (a) an alphabetical listing, by name, of each person included in a register, the records of which are arranged in other than alphabetical order; (b) a street address or geographical index to facilitate entering the event into the register; and (c) a serial index of unique personal numbers by which each person may be identified. The entire system of files and indexes within one country is called a "population register".

472. This chapter describes some basic features of the population register and its organization, addressing mainly its linkage with the civil registration and vital statistics systems. This brief description is supplemented by country examples to illustrate the various stages of development of the population registers worldwide, as well as giving a practical insight into the operation of those systems.

473. The earliest reference to a register of households and persons comes from China, in the Western Zhou Dynasty (1100-771 B.C.). Household registration in Japan began in the seventh century during the Taika restoration. The earliest population registers in Europe were the parish registers of Sweden and Finland, which originated during the seventeenth century. A system of population register was introduced in Hungary in the eighteenth century. By the beginning of the twentieth century, some form of population registration was in operation in Belgium, China, Czechoslovakia, Finland, Germany, Hungary, Italy, Japan, Korea, Liechtenstein, Luxembourg, the Netherlands, Sweden and Switzerland. At the end of the 1960s, population registers were known to be in at least 65 countries.

474. It is worth while to outline the process of development of population registers in the Nordic countries and the role of the centralization process for the unification of the registers related to individuals. By the beginning of the twentieth century, many Northern European countries, namely, Denmark, Finland, Norway and Sweden had established population registers. Originally these were local registers administered at the municipal, county or parish level. By the 1950s, a movement to centralize the registers had begun, and while the local registers were kept intact, data from the local registers were gathered to feed the central register, which was usually maintained at the national statistical services.

475. Nowadays, those population registers are the most developed and may be the best known whose build-up started long before the introduction of electronic data-processing equipment. Similar systems in Israel, Bulgaria, Hungary, and the former German Democratic Republic were established, however, on new bases, relying on computers of high speed and capacity.

A. MAIN USES OF THE POPULATION REGISTER

1. Administrative uses

476. The main function of the population register is to provide reliable information for the administrative purposes of government, particularly for programme planning, budgeting and taxation. The registers are also useful for other administrative purposes, such as for developing personal identification, voting, education, and military service, social insurance and welfare files and for police and court references. Register information is also utilized for issuing documents needed for the admission of children to nurseries, kindergartens and schools, and the assignment of local residents to health clinics. In some other countries, population registers are used for managing food rationing.

2. Statistical uses

477. Population registers have proved their usefulness in the development of population statistics, especially for studies of internal and international migration, population estimation, census planning, census evaluation, sampling frame, and health and genetic studies. The latter uses have greatly increased in recent years with the introduction of individual identification numbers in the registers and the use of computers.

478. If complete, population registers can produce the most accurate and complete account of migrants, both internal and international, through its linkage with the file of changes of residence from one locality to another and with the file of the arrivals to and departures from a country.

479. Lists of inhabitants residing in the smallest administrative division of a country can be made available for census planning purposes, which are very valuable data at the enumeration phase. On the basis of these figures, the number of enumerators and schedules to be printed and distributed can be estimated. Likewise, they can yield estimates of the average size of households in different areas.

480. Population registers represent one of the independent sources of data with which the population census results can be compared as part of the process of evaluating the accuracy of the latter. Comparison can be made between aggregates compiled from the two sources or by one-to-one matching of the corresponding records of the individuals so as to correct either the census or the population register.

481. In addition to furnishing current data as such, sample frames can be drawn from population registers for surveys with a variety of purposes: demographic, socio-economic, health and other.

482. Family histories required for genetic studies can be obtained from population registers. For example, it is said that the population register of Japan can yield information pertinent to the reproductive fitness of an individual, consanguinity, number of children, sex ratio at birth, geographic marriage circle, mortality of siblings and children, and so on. The Japanese reg-

ister is organized on the basis of family concept; thus information is recorded for generation after generation, and data can be assembled on at least five past generations because of the length of time these registers have been in existence. The use of the electronic computers in Finland, Norway and Sweden for the processing of their family-register data has raised the possibility for their integrated use for investigations in human genetics.

483. The same potential use can be obtained by linking and merging records from separate vital records originating in the civil registration system, as was already discussed in chapter II.

B. ADMINISTRATIVE ARRANGEMENTS OF THE POPULATION REGISTER

1. Administration authority

484. The authority administering the population register may be the Ministry of the Interior if its role is mainly to fulfil administrative purposes. In Denmark, the Central Population Register is administered by the Secretariat for Personal Registration in the Department of the Interior. In Israel, the task of administering and updating the population register was entrusted to the Ministry of the Interior (Population Registration Administration). When the main role of the population register is to produce statistics, the most appropriate authority may be the Statistical Service. In Hungary, for example, the population register is directed by the State Population Registration Office under the supervision of the President of the Hungarian Central Statistical Office.

485. In some other countries, centralized supervision may be in the hands of the Ministry of Justice, the Ministry of Finance or the National Civil Registration Office. Some registers may be under the administration of the police or the armed forces.

486. There are also population registers with no national central authority, as they are locally administered at the municipal, county, province, or state level, in which case the local authorities at those levels are responsible for their operation and maintenance. These are, for example, the population register of Belgium, where responsibility is vested in each province, and that of the former Federal Republic of Germany where responsibility is exercised by the ministries of the interior of each province. In Switzerland, the Resident Register is under the authority of the individual cantons.

2. Types of arrangements for population registers

487. The basic features of population registers as they apply to the production of statistics are described below:

(a) Centralized population register at the national level

488. A central population register at the national level is one that covers all the territory of a country although there may be some subgroups of the population being excluded from the register (for example, population under 18 years of age). As a general pattern, it may comprise all the resident population of a country.

489. Such a register, operated at the national level, is one in which current data for resident population of a country are stored in various files at a national government office which, in turn, administers the network of local population register offices. Under this arrangement, the various kinds of data are collected at the local level and supplied to the central file on a current basis.

490. The main task of a population register is to meet the information demands of the central administration and to supply data in a centrally coordinated way. The production of statistics, especially population statistics, is often done in the central office of the population register.

491. The central office of the population register has administrative and technical responsibilities for the network of local

population registers, whenever they form the basis of its administrative structure. It coordinates their work, defines the data to be collected, establishes standards for data handling and generates the individual's unique identification number, which is one of the key elements for easy reference on the population files.

492. Subject to the availability of resources and suitable personnel, a network of computerized regional registration centres may be established, which will certainly facilitate the storage and the retrieval of registered information. However, it should be stressed that a central computerized population register operates remarkably well in countries with small population size. For example, Denmark, Finland and Norway each had a population of less than five million inhabitants when their central population register was developed. Although it might not be impossible to keep in hand the information flow in a centralized-computerized population register for a country with a large population, 100 million and above, it would be too complex and expensive to be practical.

(b) Local population registers

493. The term local population register, just like the term local civil registration unit, applies to an area of less than national scope, such as a state, a province, a county or a municipality. Thus, the entire territory of a country could be covered by a network of local population registers.

494. Local population registrars may be under the central authority of a national population register (as in Finland and Norway), or under a population register at the subnational level, such as a county (as in Denmark and Sweden); or they may look to no higher administrative authority being administered solely at those local levels.

495. In Bulgaria and the former German Democratic Republic, the local registers were established in parallel with the regional (county) registers. In Hungary, the local registers were built up at the same time as the central computerized population register, therefore, the former are branches of the latter.

3. Unit of registration

496. Population registers are individualized data systems. The unit of registration is the individual. In some cases, changes referring to one individual (death) affect the characteristic of another individual (marital status of the married partner). Individuals can also be combined into a family or a household unit. An essential element in the production of reliable statistics directly related to a population register as well as of statistics that can be derived from such a register is the personal identification number, a basic coordinating element. The personal identification number is, in fact, the one basic link in any grouping or combination of personal statistical data that are drawn directly from a population register. Where the personal identification number is available, it enhances the extraction of data on characteristics of members of a family.

497. Therefore, data related to individual persons in a population register may be individually organized, or family-member-related or household-member-related. In the Nordic and other European countries, the entire register machinery is concerned with the individual person, while the KOSEKI register in Japan and the Korean registers are family-related registers. The Chinese registers are, however, household-related.

498. An example showing how a personal identification number may be constructed is given in chapter III above.

C. COORDINATION ARRANGEMENTS BETWEEN THE POPULATION REGISTER AND THE CIVIL REGISTRATION AND VITAL STATISTICS SYSTEMS

1. Coordination between independent population register and vital statistics systems

499. Some countries may have independent organizations for the population register and the vital statistics system. This

is frequently the case in an administratively oriented population register. It is also possible that the registration of certain events for statistical purposes, such as births and deaths, is under a third administration. However, if needed, the population register can produce a series of vital statistics, and inconsistencies in the two sets of data may emerge. This is the same case as when the civil registration system and the vital statistics system are under two different administrations.

500. The coordination of vital statistics processing under this arrangement is possible at two levels: the data collection level and the data processing level. In the latter solution, the population register supplies all of its data to the vital statistics administration to produce vital statistics. An example of this arrangement is the Swedish population register, where the county administrations of the register (regional level) notify the statistical office on changes in the population register every week and those changes are incorporated as part of the vital statistics information. Therefore, the parish level population registers of Sweden (local registers) are responsible for the registration of all population events including vital events, and the statistical authority is responsible for producing all vital statistical reports.

501. Similarly, in Denmark, the local population registers administered by *Datacentralen* have responsibility for recording vital and other events pertinent to the population register, and thus they have all elements for updating personal information. The responsibility for statistics, including vital statistics, rests with the Central Bureau of Statistics of Denmark (*Danmarks Statistik*), in cooperation with the Secretariat for Personal Registration, the National Health Service, the Local Tax Offices, Research Institutes and other government agencies.

502. The population register of Israel operates in a similar manner, responsible for the registration of all events. The vital statistics are compiled by the Central Bureau of Statistics under the Ministry of Health and Welfare. The population registers, organized at the regional level, deal with changes of residence, registration and certification of births, deaths, issuing passports, identity cards, changes in legal residence status (for example, from tourist visas to permanent resident). The file of various events is based on one copy of a form, coded and punched once for use by the population register. Therefore, data in the population register is the same as that used for statistical needs.

2. An integrated population register and vital statistics system

503. An integrated population registration and vital statistics system means that vital statistics are produced on a population registration basis. The agency responsible for the population register is concerned not only with the registration of various population events and their changes but also for the updating of the register and the compilation of vital statistics. The Norwegian and Bulgarian population registers belong to this type of arrangement. They are under the administration of the statistical authority of the country.

504. The experience of some countries has shown that when a single record is used for both population register and vital statistics purposes, the most difficult task is how to handle confidential medical data on births, deaths and foetal deaths. The problem of using the same form for registration and statistics has been discussed in chapter III above. For illustration purposes, the Norway population register is here used as an example.

505. For births and deaths, the Norwegians use two sets of reports. One contains information primarily for administrative use, and another contains medical information. Although vital records on births are first sent to the local population register and then to the Central Bureau of Statistics, the medical records are sent to the Medical Birth Registry. To supply various information to the Medical Registry, including the birth number for infants and parents, records on tape from the central population register are linked each month with the medical reports relating

to the mother and child. In addition to transferring identification numbers to the Medical Registry, this linkage can reveal cases where civil or medical reports are lacking. This control has proved important in improving the quality and completeness of birth statistics, because foetal deaths and live-born infants who die shortly after birth are not always reported in the registration system.

506. In the production of death statistics, medical and vital records from the population register are linked by birth and death dates. Through this process, non-matching death records and duplicate records are listed. After correcting the errors, medical reports, as well as certain information on the reports that are missing, are obtained. The central population register can generate all deaths that are not reported in the local population register and a complete file of the deaths can be obtained, including the names of the deceased. This register file is used for production of a national death index that can be used for death clearance by all institutions.

D. LINKAGE OF THE POPULATION REGISTER WITH OTHER ADMINISTRATIVE RECORDS SYSTEMS

507. A population register operates mostly in a unidirectional way in relation to other government administrative systems. It supplies various types of population and personal data continuously or regularly (weekly, monthly etc.) and their changes to other administrative systems. Under this arrangement, all governmental agencies can receive uniform data from a single source and the information flow becomes more simple and reliable.

508. In the following sections, the linkages with other important government administrative systems are briefly presented.

1. Social security and pension schemes

509. The different health insurance systems, the retirement fund and the registration of pensioners, and in general those entitled to different allowances, require the registration of almost the entire population. In most countries with developed social security systems, the required registration is uniformly done. Their relations with the population register increase the efficiency of administration by entering those individuals qualified for social benefits when pertinent lists are timely provided by the population register to ease the clearing up of those files (e.g. when death occurs).

510. The linkages between the population register and different social security systems require the personal identification number established by the population register. In several countries (e.g. Australia, Austria, Czechoslovakia and Switzerland), the personal number in the population register was introduced in connection with the social security number.

2. Health services

511. Health services can benefit from information on causes of death reported on a regular basis by the population register. Lists of the deceased by causes of death can be the basis for further research when these data are merged through the personal identification number with the health records routinely maintained by the health system. For statistical and research purposes, special cancer registers have been developed in Sweden, Norway and Denmark; medicines and drugs registers are in operation in Sweden and Denmark, among others.

3. Personal identification services

512. The population register can maintain linkages with government agencies concerned with personal identification when they are under separate services. The population register can provide information for such purposes as military drafting, rationing and voting.

4. *Education files*

513. The utilization of the population register in the field of education starts with the basic list of children of school age. Subsequently, close cooperation with the agency responsible for education administration, which maintains current registers of students enrolled in schools, is imperative to ensure the supply of data needed to update the educational changes in the population register. Such practices have been developed in Bulgaria, and it is envisaged to include them in the population register of Hungary. In general, the public will not report to the registration office whenever the educational level of an individual changes, and the data recorded in the register for school age population are often obsolete. Special efforts have to be made to keep the information up to date.

5. *Labour force*

514. The population register can link with the registers of employers, of unemployment and others to maintain updated in-

formation on the regional supply and distribution of the labour force and its composition by various characteristics such as sex and age.

6. *Housing, real estate, building and domicile registers*

515. For taxation purposes and for management of real estate, the establishment of linkages with those concerned services can provide the necessary information. It is particularly important to maintain close cooperation with the government agency that prepares the housing registers, as it is the basis for the population and housing censuses and other inquiries. The Danish, Finnish, Swedish and Norwegian population registers provide examples of the interrelationship with the above registers, which have been used extensively in their "registered base" population and housing censuses. The population register and the Central Housing Administration of the former German Democratic Republic have worked very closely with each other in sharing information needed for the respective administrations.

VIII. OTHER DATA COLLECTION METHODS AND TECHNIQUES PROVIDING VITAL STATISTICS AND RATES

516. Vital statistics derived from civil registration records are a continuous flow data. Since they are compiled from the local registers, their coverage is nationwide and comprehensive if both the registration and statistics systems are well maintained. Most of the civil registration systems, except those of developed countries and a few developing countries are, however, far from yielding the complete and accurate data needed for the direct estimation of basic social and demographic measures. While the lack of reliable vital statistics, in particular birth and death statistics from the civil registration system, has been apparent for the last four decades, the demand for accurate data on fertility and mortality has grown immensely over the same period in the developing countries. To fulfil these gaps, the other two principal methods of data collection, that is, the population censuses and the household sample surveys, have substantially contributed by providing the data required for the estimation of the vital rates: crude birth and death rates, general and total fertility rates, gross and net reproduction rates, life expectancy and so on. These approaches have brought to light much-needed information on levels, patterns and trends in fertility, nuptiality and mortality.

517. This chapter presents, first, an overview of the various approaches to collection of fertility, nuptiality and mortality data in censuses and sample surveys that countries may want to implement in the absence of reliable civil registration and vital statistics systems. A comprehensive study of how these approaches have evolved in population censuses is presented in the *Handbook of Population and Housing Censuses* (part II), based on over 300 censuses undertaken between 1965 and 1984.¹⁰¹ The approaches followed in household sample surveys to obtain data on fertility, nuptiality and mortality are discussed by type of survey, whether a single-round retrospective survey, a multi-round survey or a dual-records system.¹⁰² The potential of each method to overcome some of the most serious errors and biases, and obtain reliable data at least on the major subdivisions of the country is also discussed. Also, the advantages and limitations of data from these methods are brought out on the basis of past experiences around the world.

518. Next, this chapter will review briefly indirect techniques for estimating vital statistics and rates. A detailed description of the assumptions underlying the indirect techniques is provided in various United Nations publications referred to in chapter V.¹⁰³ The immediate potentiality offered by the indirect estimation techniques makes them an attractive means to generate measures of fertility and mortality if requisite data from censuses and surveys are available. But the application of these techniques depends much on the purposes to be served by the various estimates taking into account the limitations of the different methods. The assumptions underlying the indirect techniques must be carefully considered before selecting any particular technique. Once the technique has been selected, the parameters derived need to be evaluated by internal and external comparison for which all data sources available should be used.¹⁰⁴

A. POPULATION CENSUSES FOR COLLECTING DATA ON FERTILITY, NUPTIALITY AND MORTALITY

519. The population census was originally seen as providing data on the population at risk only, that is, the denominator needed to estimate the birth and death rates, the age-sex specific

fertility and mortality rates, and other basic demographic parameters. However, the rates so obtained in a sizeable number of developing countries were too low to be accepted as true values. Therefore, other specific questions were devised to gather the information on fertility and mortality in the population censuses.

520. With regard to statistics on marriages, the civil registration system covers only the legal marriages and not all other types of marriages, such as religious marriages, customary marriages, consensual unions. Furthermore, statistics on divorces from the civil registration system are equally restricted to the dissolutions of legal marriages. Therefore, there are inherent difficulties in measuring the dynamics of nuptiality from the civil registration data and presenting a complete picture of the family formation and the modes of dissolution. Similarly, statistics on single persons are missing in the civil registration system. In an attempt to cope with these gaps, questions regarding current marital status have been included in population censuses to conveniently measure marital status at a specific point in time, including the time of marriage (or date of first marriage).

521. The various approaches used in population censuses to collect data on fertility, nuptiality and mortality are illustrated in this section. As the proper wording of the questions is relevant to the completeness and quality of the data collection, some examples are also provided.

1. Current births and deaths

522. Early efforts have been made in population censuses to collect live births and deaths in the 12 months preceding the interview (or any other fixed period, such as 24 months, and so on). This approach was intended for the direct estimation of birth and death rates. When sex and age of the deceased were included, age-sex-specific mortality rates were calculated and from them other mortality measures were derived, as both numerators and denominators were then readily available in censuses.

523. The earliest attempts of this type have been found in the censuses of the United States of America in the nineteenth century, when data from civil registration were largely unsatisfactory. More recently, attempts by other countries have included similar retrospective questions for collecting information on births and deaths in the past year in their censuses. As shown in tables 8.1 and 8.2, 33 out of 174 censuses studied during the 1970 census decade (1965-1974), and 46 out of 201 during the 1980 census decade (1975-1984), have inquired about the number of births in a fixed-period preceding the census date. The information was collected either by asking the heads of households how many children had been born alive in the household in the preceding 12 months (or 24 months) or asking each woman of child-bearing age, the question: "How many children have you borne alive in the past twelve months?" The latter approach, that of inquiring of women, is considered to yield better results than the former method and it also permits the estimation of current age-specific fertility rates and other refined fertility measures. As a general rule, these questions have been asked in addition to a series of questions on fertility addressed to women in their child-bearing ages.

524. Similarly, the number of deaths among members of households in the preceding 12 months (or any other fixed period) preceding the census date was collected in 11 censuses in

TABLE 8.1. TYPES OF DATA ON FERTILITY COLLECTED IN COUNTRIES WHERE
TWO OR MORE POPULATION CENSUSES HAVE BEEN CONDUCTED BETWEEN 1965 AND 1984

Types of data on fertility collected	Total		Africa		N. America		S. America		Asia		Europe		Oceania	
	1965- 1974	1975- 1984	1965- 1974	1975- 1984	1965- 1974	1975- 1984	1965- 1974	1975- 1984	1965- 1974	1975- 1984	1965- 1974	1975- 1984	1965- 1974	1975- 1984
Total censuses	108	105	19	23	28	28	9	8	19	19	21	16	12	11
1. CEBA ^a	50	27	4	3	9	6	4		13	7	13	9	7	2
2. CBA ^b within a period preceding the census date (asked each woman in her child-bearing age)	2				1				1					
3. CEBA, CBA, within a period preceding the census date	13	23	8	8	3		1	3	1	9				3
4. Maternity history	9	7	1	1							8	6		
5. CEBA, date of birth of the last child born alive	12	20	6	5	1	5	2	4	3	3				3
6. CEBA, date of birth of the first child	2	1											2	1
7. CEBA, dates of birth of the first and the last child	2	4		2									2	2
8. CEBA, date of birth of CEBA, CBA, within a period preceding the census date, dates of birth of the first and the last child	15	15			14	14	1	1						
9. CEBA, CBA within a period preceding the census date, date of birth of the first child	2						1						1	
10. CEBA, date of birth of the last child, live births in household within a period preceding the census date	1	1		1					1					
11. CEBA, live births in household within a period preceding the census date		2		2										
12. CBA, within a period preceding the census date; CEBA and live births in household within a period preceding the census date		1		1										
13. CEBA, live births in household within a period preceding the census date		2				2								
14. CBA and live births in household within a period preceding the census date		1				1								
15. CEBA, CBA, within a period preceding the census date; date of birth of the first child; live births in household within a period preceding the census date		1										1		

Source: *Handbook of Population and Housing Censuses (Part II)*. Studies in Methods, Series F, No. 54 (United Nations publication).

^a CEBA: Children ever born alive.
^b CBA: Children born alive.

TABLE 8.2. TYPES OF DATA ON CURRENT MORTALITY COLLECTED IN POPULATION CENSUSES:
BETWEEN 1965 AND 1984 (HOUSEHOLD APPROACH)

Types of data collected	Total		Africa		N. America		S. America		Asia		Europe		Oceania	
	1965- 1974	1975- 1984	1965- 1974	1975- 1984	1965- 1974	1975- 1984	1965- 1974	1975- 1984	1965- 1974	1975- 1984	1965- 1974	1975- 1984	1965- 1974	1975- 1984
Total censuses	11	28	5	22	2	1	1	1	3	3				1
1. Total number of deaths, ^a	2		1				1							
2. Total number of deaths, ^a by sex		3		2										1
3. Total number of deaths, ^a by sex, age (or age groups) or date of birth	6	14	4	14	2									
4. Total number of deaths, ^a by sex, age (or age groups) or date of birth and date of death (or age)	3	11		6		1		1	3	3				

Source: *Handbook of Population and Housing Censuses (Part II)*. Studies in Methods, Series F, No. 54 (United Nations publication).

^a Deaths in the 12 months (or 24 months) preceding the census date.

the 1970s and in 28 censuses in the 1980s. Data on the sex and age of the deceased were collected in 9 censuses in the 1970s and in 28 censuses in the 1980s, mainly censuses in Africa and Asia (see table 8.2).

525. Each country has paraphrased the questions in different ways, and some of the most commonly used forms are as follows:

Births in the previous 12 months

How many children were born alive in this household in the past year? (addressed to the head of the household)

Was any child born alive in this household last year? (addressed to the head of the household)

How many children did you give birth to alive last year? (addressed to women in their child-bearing period, usually 15 to 49 years)

Deaths in the previous 12 months

(addressed to the head of the household):

How many deaths have there been in your household last year?

How many deaths have there been in this household during (calendar year)?

Was there any death in this household last year?

Some countries have included sex and age of the deceased (or date of birth and date of death); and some countries also inquired about the total number of deaths in the 24 months preceding the census date.

526. It is observed that quality of data gathered through these approaches has been poor. In some, analysis of the collected data led to the conclusion that the questions had not produced useful results.¹⁰⁵ The poor performance is attributable to the recall lapse, misconception of the reference period, misstatement of ages, inclusion of foetal deaths, or simply misunderstanding of the nature of the question. Despite all these problems, collection of data in population censuses on deaths by sex and age might be useful inputs to indirect estimation due to new developments in methodological analysis.¹⁰⁶

2. Children ever born alive and children still living

527. Traditionally, questions on the number of children ever born alive to adult women and, of them, the number who are still living and/or the number who are dead at the time of the census have been widely asked in population censuses. In the last 20 years or more, information on the number of children ever born was obtained either by one straightforward question: "How many children have you ever borne alive?", or by two separate questions: (a) "How many children, who were born alive, are still living at the time of the census?", and (b) "How many children who were born alive have died up to the census date?". The reason for asking the two questions was to minimize the omission of children ever born who had died shortly after birth.

528. The straightforward question only was asked in 50 censuses in the 1970s and 27 censuses in the 1980s (table 8.1). Furthermore, 67 censuses in the 1970s and 88 censuses in the 1980s have included two questions: one on children ever born alive and another on children still living. Information on children still living (or dead at the census date) was useful in estimating mortality in infancy and childhood. New refinements in indirect methodology have since been proposed.¹⁰⁷

529. Information on children born alive has been collected mainly from all women in their reproductive ages regardless of the civil status. However, some countries gathered this information for a segment of the total women. For example, in some societies, the questions on children ever born alive and/or surviving are too sensitive to query single women, and so a number of countries have restricted these questions to ever-

married women or currently-married women. International comparability has remained largely hampered as a result of this diversity of universes from which data were collected.

530. The main limitation of such information on lifetime fertility is that no timing of birth could be inferred for the age-specific fertility rates estimated on the basis of these data, except the recent improvements in methodology. In most censuses, information collected on children ever born alive clearly suffered from serious omission, especially for the older cohorts of women, i.e., 35 years and above. It was explained that these women might not have reported their children who had left home and were living elsewhere or those who had died in early infancy. New strategies have been suggested so as to minimize those errors and include, for instance, asking a series of questions in population censuses as follows:

Of the total number of children you have ever borne alive:

How many are currently living with you in this household?

How many are currently living elsewhere in another household?

How many have died up to the census date?

531. Seventeen censuses in the 1970s and 28 censuses in the 1980s have approached the problem as above. However, owing to the numerous topics to be covered and space limitations in a census questionnaire, these new strategies are more suitable for a survey, as they are more lengthy and time consuming and require specially trained enumerators.

3. Date of the most recent live birth

532. At the same time that improvements in techniques for collecting data on dead and living children were made, another strategy was sought to acquire data on recent fertility and infant mortality.¹⁰⁸ It included collecting the date of birth of the most recent child born alive and the survival status of this child at the time of the census inquiry; if the child were dead, its sex was sometimes collected. Data on children born alive in the preceding 12 months and among them children who had died in the same period could then be obtained at the processing stage more accurately. This approach was meant to minimize the well known problem of misunderstanding of the reference period. The question on the survival of the last child at the census date was intended for improving the count on infant deaths.

533. Thirty censuses in the 1970s and 40 censuses in the 1980s have gathered data on current fertility through the question on the date of birth of the last child born alive (table 8.1). Survival of the last child born alive was included only in 28 censuses in the 1970s and in 58 censuses in the 1980s (table 8.3).

534. Aside from these approaches, 5 censuses in the 1970s and 13 censuses in the 1980 decade have included a straightforward question to collect information on infant deaths with reference to a retrospective fixed-period, generally one year preceding the census date. Infant deaths by sex were investigated in four African countries between 1978 and 1984. This approach obviously has all the limitations described for deaths of all ages in the previous twelve months.

535. Few censuses have inquired about the name and date of birth of each child born alive, whether or not it was alive at the time of the census, and, if not, the date of death: that is, a maternity history. In the 1970s and 1980s, 9 and 7 censuses, respectively, have included this approach. It was used in a sample survey undertaken as a component of the population census programme, as it is actually a technique more suitable for sample surveys owing to the lengthy interview required and added complexities at the coding, editing and tabulation stages.

536. Undoubtedly, inquiring about the date of birth of the last child born alive and whether or not it was still alive at the time of the census, and about its sex, has had better results than the traditional straightforward questions on children ever born alive in the past year and how many were dead among them.

TABLE 8.3. TYPES OF DATA ON INDIRECT ESTIMATIONS OF MORTALITY COLLECTED IN POPULATION CENSUSES BETWEEN 1965 AND 1984

Types of data collected on indirect estimation of mortality	Total		Africa		N. America		S. America		Asia		Europe		Oceania	
	1965-1974	1975-1984	1965-1974	1975-1984	1965-1974	1975-1984	1965-1974	1975-1984	1965-1974	1975-1984	1965-1974	1975-1984	1965-1974	1975-1984
Total number of censuses	174	201	36	55	36	35	12	16	35	40	36	34	19	21
1. CEBA ^a , CL ^b	42	33	7	2	2	4	4	5	14	16	5	2	10	4
2. CBA ^a within a period preceding the census date, CEBA, CL; deaths among CBA within a period preceding the census date or survival of the last CBA	7	10	2	4	2		1	1		3			2	2
3. CEBA, CL; orphanhood	3	8	2	2		1			1					5
4. CEBA, CL; deaths among CBA within a period preceding the census date or survival of the last CBA; orphanhood	6	11	2	5	2	3	1	2					1	1
5. Date of birth of the last CBA and survival	15	25	7	7	2	5	3	5	3	3		2		3
6. CEBA, CL; deaths among CBA within a period preceding the census date or survival of the last CBA; deaths in household within a period preceding the census date		12		9						3				
7. CEBA, CL; deaths in household within a period preceding the census date	5	8	3	4		1			2	3				
8. CEBA, CL; deaths in household within a period preceding the census date orphanhood	3	4	1	3	1		1	1						
9. CEBA; date of deaths in household	1	6		5	1					1				
10. CEBA, CL; death among CBA within a period preceding the census date; orphanhood; deaths in household within a period preceding the census date	1	2	1	2										
11. Maternity history	2	2	1	1							1	1		
12. Live births in household with other combinations of data on indirect estimations of mortality	4	4	1	1	1				1	1	1	1		1
13. No questions on indirect estimation of mortality	85	76	9	10	25	21	2	2	14	10	29	28	6	5

Source: *Handbook of Population and Housing Censuses (Part II). Studies in Methods, Series F, No. 54* (United Nations publication).

^a CEBA: Children ever born alive.

^b CL: Children still living.

^c CBA: Children born alive.

Such questions have, in fact, reduced the problem of misunderstanding of the reference period, and therefore the resulting estimates of infant mortality and current age-specific fertility rates have improved. However, they did not overcome all the problems of information derived from retrospective questions. A number of analytical techniques for the assessment and correction of basic data have been developed to make better use of such data and it is likely that the above-mentioned questions will be included in future censuses as the civil registration systems improve to yield the required good quality data.

4. Data on orphanhood

537. Developments in indirect techniques for demographic estimation of adult male and female mortality have led to the inclusion of specific questions in censuses and sample surveys to collect data on survival of natural or biological mother and father.¹⁰⁹ The relevant census questions are as follows:

Is your mother still alive?

Is your father still alive?

538. Data gathered through these questions contain no information about timing either, as the expected responses were simply either yes or no. Data on orphanhood of both mother and father were collected in 10 censuses of the 1970s and 1980s. Maternal orphanhood was collected in 5 censuses of the 1970s and in 15 censuses of the 1980s.

539. A question intended to overcome duplications of parents commonly reported by siblings was later proposed: "Are you the oldest surviving child of your mother/father?" Thus, tabulations on orphanhood from mother/father will be restricted to the eldest surviving children. These questions were included in the 1974 census of Bangladesh, and in the 1978 censuses of the United Republic of Tanzania and Kiribati. Further analysis of these data in different countries of the world, have shown, however, that an exaggerated number of people claimed to be the eldest child of their mother.

540. The most common problems of these data arose from the adoption practice, multiple reporting of the same parents by siblings, the effect of declining mortality and misreporting of age.

5. Data on widowhood

541. It was suggested that inquiries be made about the survival of the first spouse among the ever-married population, to aid in the estimation of adult male and female mortality.¹¹⁰ The earliest attempts, in population censuses, are found in the United States of America (in a retrospective survey of fertility and mortality tied to the 1970 population census), in Bangladesh (1974), in the United Republic of Tanzania (1978) and more recently in France (1982) and in Mauritius (1983). The universe from which these data were collected was the ever-married population. The most common wording of the question was: "Is your first husband (spouse) still alive?"

542. The poor performance of the suggested approach has been attributed to the effect of remarriage, as it is likely that respondents who have been remarried might give information for their present and not for their first spouse. Another source of error arose in those countries having a sizeable proportion of their population living in consensual unions. It is assumed that these people might have been confused about what constituted a previous marriage.

543. The set of items in population census schedules from 1965 to 1984, intended for the measurement of fertility and mortality, are shown in tables 8.1, 8.2 and 8.3.

6. *Other relevant data from population censuses for the measurement of fertility, nuptiality and mortality*

544. The population census collects various socio-economic data that are useful in calculating basic demographic parameters. Available data on population totals, by age, sex, place of birth, current marital status, usual place of residence and other economic and social characteristics, down to the smallest geographical subdivision of the country, allow for estimating age-specific and character-specific fertility, nuptiality, and mortality rates, life tables and other basic parameters, in combination with accurate data from the civil registration system. For countries with defective registration data, some of the same data can be extremely useful for demographic estimation through a number of indirect techniques.

545. Nuptiality data collected in the population censuses can play a significant role in improving indirect estimates of fertility and mortality when age misstatement is a major problem in population censuses. Age misreporting distorts the patterns of fertility and mortality derived from techniques that use cross-tabulations of women by age and children ever born alive, surviving children, births and infant deaths in the previous year, and so on. It is believed that date of marriage is much more easily recalled than age (or date of birth) because marriage is a very important event and more recent than birth. Therefore, questions to measure "duration or time in marriage" were suggested. Examples of such questions in censuses are:

What is the date of your first marriage? (or age at first marriage)

Time, in years, since the first marriage? (or time elapsed, in years, from the first marriage)

How many years have you been married?

546. Information on duration or time in marriage was collected in 59 censuses in the 1970s and in 55 censuses of the 1980s. Some censuses included an additional question: "Are you still in your first marriage?" to make sure that the time in marriage refers to the first marriage only.

547. Other data relevant to fertility estimation are mother's age at the time of her first live-born child. In the 1970s 37 censuses and in the 1980s 32 censuses have collected this information.

548. As was mentioned earlier, nuptiality patterns at a certain point in time can be obtained by including in censuses a question: "What is your current marital status?" for populations 15 years old and above.

549. Finally, an item that is usually collected in population censuses for control purposes, that is, "the relationship of each reported household member to the head or reference member of household", has also been used since early in the 1970s for fertility estimation in some countries. This is the so-called own-children method, which uses the information on relationship to identify the natural mother, when possible, of each child enumerated in the correspondent census questionnaire. From such data, maternity histories are reconstructed and from them aggregate fertility and age-structure of fertility can be estimated, provided that age misreporting is not severe.¹¹¹

7. *Advantages and disadvantages of census data for deriving fertility and mortality estimates*

550. The strength of the census data stems from the fact that population figures by sex, age, place of birth, usual residence and other social and economic variables are readily available at all levels of geographical subdivisions of the country. The census also provides needed data on the population at risk to calculate various basic demographic parameters.

551. The general limitations of the census data are those common to information gathered from retrospective questions. Any historical reconstruction of personal data is subject to recall lapse error. Further, the operational time and cost are larger than in the case of sample surveys. Moreover, the respondent in a population census is, in general, the head of the household who also serves as a proxy respondent for other household members. This is a factor, among others, that leads to misstatements of age, underreporting of births, misdating of births and deaths. Even if errors in the data were minimized, a population census can seldom provide timely data for estimation of fertility and mortality because detailed census data are generally not available until at least two or three years after the field-work has ended. A further shortcoming is that a census can collect very little information about each vital event, thus limiting any in-depth study. The most common errors found in population censuses relating to data on fertility may be listed as follows:¹¹²

Errors of omission:

Children who died

Children who left home

Children born of a husband other than the current one

Children given out in adoption

Errors of inclusion:

Foetal deaths reported as children who died in infancy

Children borne by another wife to current husband

Adopted children

Grandchildren

552. In addition to the above errors of complete count, there are, as noted earlier, problems of memory lapse and of age misstatements in many developing countries where people do not know their correct age. If age structure is distorted, the specific fertility and mortality rates and derived indicators are affected. Even though there are a number of methods for smoothing the age distribution, they are mostly suited for closed populations, thus making very difficult the adjustment of age-sex structure at the subnational levels; or else net internal migration should be known.

553. Finally, as a census is a very costly operation and requires long advance planning, it is taken only periodically at about 10-year intervals. Therefore, a series of assumptions and population projections are essential in the post-censal period.

554. These are some of the reasons for seeking other methods of data collection to measure recent changes in fertility and mortality, assess population growth and evaluate a number of population programmes. Household sample surveys provide an important vehicle for the collection of fertility, nuptiality and mortality data, offering more flexibility for asking a series of questions and combining different techniques for in-depth interview by a small well-trained staff.

B. *HOUSEHOLD SAMPLE SURVEYS FOR COLLECTING DATA ON FERTILITY, NUPTIALITY AND MORTALITY*

555. Developments in sampling theory and household survey methods in the last three decades have led to the growing use of sample surveys to collect required data on fertility, nuptiality and mortality. Shortly after the Second World War, retrospective surveys began to be used in developing countries. In the beginning, these surveys approached the problem in the same way as the population censuses, through retrospective

questions. In the period of 1960-1980, 81 developing countries conducted at least one major survey: 33 countries in Africa, 24 in Asia and 24 in Latin America. More than one half of the 81 fertility surveys were conducted as part of or in association with the World Fertility Survey programme.¹¹³ Follow-up sample surveys (named also prospective survey, multi-round survey, household change technique) were undertaken by a number of countries to better assess their current levels and patterns of fertility and mortality and the population growth. This approach has eliminated the problems posed by misunderstanding the reference period commonly implied in retrospective questions and has minimized the effect of the recall lapse. A more complex approach of data collection, namely, the dual-records system that combines a multi-round survey with a continuous recording of vital events in the sample areas, has gained considerable importance mainly in Asian countries.

556. The various methods devised to collect birth, death, civil status and other relevant data for the estimation of basic demographic measures in sample surveys are broadly discussed in this section.

1. *Single-round retrospective survey methods*

557. Countries have conducted two types of single-round retrospective surveys. One type has made use of a shorter questionnaire similar to the census type. The other has used an individual extended questionnaire combined with a shorter, or extended, household questionnaire. The individual extended questionnaire was intended for a subsample of the population only, usually women of child-bearing age. In both, the households in the sample were interviewed once. An extended household questionnaire with retrospective questions on fertility and mortality, has given the opportunity for mutual evaluation and plausibility of the parameters they yield.

558. Most of the single-round retrospective surveys using a short questionnaire have included retrospective questions similar to those in population censuses to obtain the number of children ever born alive, the surviving children up to the date of the interview, the date of the most recent live birth and whether or not the child is alive at the time of the inquiry (or births and deaths in the past twelve months), data on orphanhood from mother and father and data on survival of the first spouse. Another similarity is that the information is obtained from a responsible adult member of the household. The main difference stems from the fact that a survey is in a better position than a census to gather better quality data. This is so because it is related to a small part of the population, and thus the interviewers are less numerous compared to those required for a population census. The latter allows for a better training of the staff and a closer supervision of the field-work. Furthermore, all the subsequent stages up to the dissemination of the data can be closely controlled.

559. A retrospective survey of this type is also more suitable than a census to paraphrase the questions in a most desirable way. This is the case, for example, of children still living and children who have died for whom the following questions can be addressed for each sex:

Of all sons that you have ever borne alive:

How many sons are living with you in this household?

How many sons are living elsewhere in another household?

How many sons have died?

Similar inquiries have to be made for daughters.

560. The most common question asked on lifetime fertility in single-round surveys has been the number of children ever born alive. Although this is a straightforward question posed by better trained enumerators, it is subject to the same different kinds of response errors as the census method. They have resulted in overcounts as well as undercounts of the number of children ever born alive, particularly owing to errors of memory lapse. The undercount of infants and young children mentioned

in the case of censuses is generally not different in retrospective surveys of this type (see the listed errors on children ever born alive and the problems of misstatement of age in reconstructing personal histories of individuals, referred to in paragraph 551). High quality of data are difficult to obtain, especially when large numbers of individuals are sampled. Even if highly skilled personnel are used and the training and organization of the field-work staff are adequate, social conditions of the population can still distort such simple facts as age, historical data regarding births and deaths and so on.

561. The experience with retrospective surveys of this kind in obtaining complete counts of vital events has not been encouraging. For instance, the estimated median percentage of births covered in seven Asian population growth estimation studies, involving single-round surveys, was 67 per cent, and the range was 28 to 96 per cent when compared with estimates from the dual-records system. The median percentage of deaths covered was 51 per cent and range was 23 to 90 per cent.¹¹⁴

562. Despite all the limitations of the data, single-round retrospective surveys of the type commented on here have been the main sources of data for mortality and fertility estimates in developing countries. Still further, it has been suggested that the value of this type of survey could be greatly enhanced if they were repeated at regular intervals. Such repetition does not imply re-interviewing the same households, but the successive samples should all be representative either of the country as a whole or of the same subdivisions within it.¹¹⁵

563. The main advantages of the single-round approach can be found in cost-effectiveness and timeliness. Survey data of this kind could be available in about two years, including the length of advance planning, pre-testing, field-work, data processing and dissemination of the data compared to the longest period for a population census, a follow-up survey or a dual-records system.

564. A list of recommended topics for use in demographic sample surveys is given below. This list includes topics for investigation concerning the appropriate population base and information on births and deaths, from which population estimates can be developed at the level of detail needed for the calculation of the various vital rates. The list also contains a minimum of basic items required for the measurement of population change, and of patterns of fertility and mortality, as well as items on socio-economic background for studies of differentials in fertility and mortality.

Items to be collected from all members of the household

Name and surname

Relationship to the head of the household

Relationship among the members of the family

Sex

Date of birth

Age

Ethnic (and or national group)

Place of birth

Place of usual residence

Orphanhood from mother/father and identification of the mother/father if living in the household

Items to be collected from selected members of the household

For persons 15 years of age and over

Widowhood status (first husband/first wife still alive) (only for ever-married population)

Civil status

Time in marriage (date of first marriage)

Occupation; status in employment and type of economic activity

For women 15 years of age and over

Total number of children ever born alive, by sex

Total number of children ever born alive and still living, by sex

Date of birth of the last child born alive

Survival of the last child born alive at the time of the survey, and sex

Date of death of the last child born alive

Items to be collected from all households in the sample

Deaths in the previous twelve months (or 24 months) in the household

Name and surname, sex, date of birth (or age) and date of death of each deceased

Population at risk:

Household members present

Household members temporarily absent

Household visitors

Geographical location of the household

565. Examples of the other type of single-round retrospective survey that had used extended individual questionnaires, including a birth history and/or pregnancy history (maternity history) are those of the World Fertility Survey programme (WFS) and of the Demographic and Health Survey programme (DHS).¹¹⁶ Questionnaires were designed in the participating countries using the core documents as the starting point and modifying or adding modules to suit the country needs. During the 1970s, 38 countries participated in the WFS and during the 1980s, 31 countries in the DHS programme.

566. A birth history or a pregnancy history has been included and completed, for each ever-married woman or other well-defined sub-universe in the above-mentioned surveys undertaken to measure the patterns, trends and levels of fertility and infant and child mortality. Extended questionnaires were coupled either with shorter household schedules or extended household schedules. The shorter house schedule provided a list of all household members, usually including visitors, by sex, age, relationship, and (in some cases) marital status. Its purposes were to serve as a document for the listing of persons and to provide base data for computation of demographic rates.

567. Extended household schedules included the foregoing information and also asked each woman of child-bearing age, the number and survival of children ever born alive and the date, survival and sex of the last live birth. The purpose of these questions was to provide estimates of lifetime fertility, recent fertility and child mortality via indirect methods. The household schedule has sometimes been used to provide aggregate fertility data on marginal groups not eligible for in-depth interview: single women, for example.

568. The approaches made in WFS and DHS surveys through maternity histories have overcome the lack of information about timing in estimates of fertility and mortality derived from lifetime fertility, thus avoiding reliance on theoretical demographic models to estimate the basic measures. It also minimizes the errors generally found when traditional retrospective questions were asked in single-round surveys and population censuses. In fact, the maternity history approach has collected from each ever-married woman, the following information for each birth: name, date of birth, sex, survivorship status, and age at last birthday, or age at death as appropriate. Because of the more detailed information collected in the birth history, it offers a richer set of data for analysis. For instance, infant and child mortality rates can be calculated from these data for about 20 years prior to the survey. Both, the numerators and denominators of the rates are built-in in the maternity history. Similarly, age-specific fertility rates can be calculated for a number of years prior to the survey.

569. Along with a maternity history, the WFS and DHS surveys have included a wider range of social, economical and other variables, namely, respondent's background, contraceptive knowledge and use, marriage history, fertility regulation, work

history, husband's background, and so on. They have largely contributed to a better understanding of differentials in fertility and mortality.

570. It is worth noting that the interviewers for this type of survey need to be far more skilled and better trained than those for censuses and regular retrospective surveys; and interviewers are preferably women owing to the nature of the questions asked. The field-work also requires closer supervision. Furthermore, the primary respondent must be the woman herself and not a proxy respondent, because of the large amount of personal and historical data that have to be provided, namely a series of questions on pregnancies, contraception, early child deaths and so on. And not only must the respondent be the woman herself, but it is also important that she be isolated from other members of the family during the interview so that the quality of data reported is accurate. It is well known that accuracy of data, in cultures where women play a traditional protected role within the community, depends largely on the presence of women as survey interviewers.

571. Experience drawn from analysing these data have shown, however, that even maternity histories are subject to several sources of error arising from dating births and deaths and age misstatements and underreporting of children.¹¹⁷ Systematic errors persisted even when detailed questionnaires were used. The most important disadvantage of the birth history approach is in the difficulty of obtaining accurate data on the timing of all births. Another potential drawback concerns the universe from which data are gathered. First of all, only those women surviving up to the survey date were interviewed; there is no record of the fertility of the women who did not survive. A second issue has to do with limitation of the respondents to the ever-married women.

572. Among the other limitations is the longer time required for each interview compared with that for a population census or a regular retrospective survey. A study conducted among countries participating in the WFS programme revealed that the time per interview (with ever-married women only) ranged from 25 minutes in Thailand to 57 minutes in Bangladesh;¹¹⁸ this increased significantly the cost of the survey. Furthermore, the complexity of data collected for every woman called for very skilled personnel at the data-processing stage.

2. Follow-up survey methods

573. To avoid as much as possible memory lapse and misunderstanding of the reference period, a prospective survey approach was developed to collect current data on fertility, nuptiality and mortality. In this approach, cluster samples of households are interviewed repeatedly within certain periods of time. For instance, three or more rounds were conducted by countries at more or less six-month intervals so that vital events could be easily recalled. An inventory of all resident members of the household and certain basic particulars are recorded in the first round. At each subsequent round, changes in the household composition since the last interview are recorded including information on births, marital status, deaths, and in- and out-migration among members of the household. Special instructions are given to the interviewers to record emigrations and also to be sure that a death is not omitted in order to minimize the well-known problem of omissions of deaths in this kind of field inquiry, especially since the death of a member of the household frequently leads to the dissolution of the household and presents problems of locating individuals in the sample household in subsequent follow-up inquiries.

574. To improve the reports on infant deaths, a question on whether or not the interviewed woman in her child-bearing period is pregnant at the time of each interview is sometimes recorded. Thus, in the subsequent rounds, the outcome of those pregnancies can be obtained and infant deaths, neonatal deaths and maternal deaths registered.¹¹⁹

575. A perfect consistency of numerators and denominators can be secured with this approach in terms of age and place of residence, and other characteristics, such as births, deaths, marriages and in- and out-migrants, are obtained on a prospective basis. Current levels, structure and differentials on fertility and mortality can be directly calculated from these data without relying upon any demographic model. The follow-up approach can produce mean annual vital rates and natural and total population growth rates at the subnational as well as the national level, provided that the size of the sample is large enough to secure a sufficient number of vital events and that high quality data are gathered. Unlike retrospective questions on mortality this method allows for the calculation of mortality parameters for each age group in the population.

576. Moreover, information on the population at risk is obtained directly from the survey; the reference period is readily fixed by the date of the first and the last rounds in which each person is covered by the survey; and the effect of in- and out-migration is controlled for every sampled subdivision within the country.

577. The follow-up survey method, which involves re-interviewing, permits correction of inconsistent data found in previous rounds. It also allows the inclusion of a retrospective survey, for example, in the last round of the follow-up survey, so that two different approaches can be made to measure fertility and mortality without significantly increasing the cost. Peru used this method to evaluate two approaches for measuring fertility and mortality.¹²⁰

578. Among its disadvantages is the need for a large sample in order to secure a sufficient number of births and deaths, as they have low frequency of occurrence in the population, especially when differentials are to be studied. Other drawbacks of this method are those concerned with timing, cost and administration. The field-work itself is never less than two years, to which the time required for advance planning and data processing must be added. The cost is larger compared to that of a single-round retrospective survey, because of the need to maintain the well-trained staff during the whole period of the field-work. On the administrative side, a number of surveys taken in various countries have proved that such exercises are difficult to keep at high standards of quality, as commitment of the interviewers, enthusiasm and supervision are inevitably lowered with the passing of time.¹²¹

579. To these factors, one has to add that the results from these types of surveys have also been unsatisfactory. For example, the follow-up sample should be particularly helpful in the enumeration of deaths. However, deaths are likely to be omitted for reasons that have been explained earlier, especially as those occurring to heads of households often lead to the dissolution of the households and present problems of locating individuals in the sample household in subsequent rounds. The median completeness for deaths in the 13 follow-up surveys conducted in Asian countries was 72 per cent and the range was between 50 and 89 per cent. The median completeness for births was 83 per cent and the range was between 66 to 92 per cent.¹²²

3. *Dual-records system approach*

580. To obtain further refinements in the measure of current fertility and mortality, the dual-records system was devised. As discussed earlier in chapter V, data on vital events in this system are obtained in a defined area by two independent data collection methods, a periodic household survey and a separate reporting method. The latter records vital events on a current basis in the sample households, which may involve regular visits to the household, or it may rely on a network of informers, the recorder verifying the occurrence of the events. It also can be the civil registration system itself.

581. The first round of the household survey is very much like the initial visit in the multi-round surveys, as all resident

members of the household are identified and their particulars recorded. In the subsequent rounds of the survey, the changes in the household's composition that have taken place since the last visit are recorded. After each household interview survey, the births and deaths observed independently in the two subsystems of data are matched to ascertain the events reported by both data collection methods, the events reported by the special recording subsystem only, and the events identified in the household survey only. An estimate of the vital events missed by both subsystems is made using the Chandrasekaran-Deming formula,¹²³ which permits an estimate of total events as well as provides an internal check on the completeness of the continuous recording system.

582. In the dual-records system, every event recorded by either of the subsystems is counted as an event. Therefore, it is crucial that the matching of records from the two subsystems should be of high quality so that the unmatched out-of-scope events can be deleted after a thorough field check. This will be a problem in the developing countries where manual matching is more likely to be used. Manual matching is a difficult and laborious process despite the identifying information on the two sets of records being fairly clear. Matching is difficult even if this is done by computer assisted methods. Further, in some countries, the primary match cannot be by the name of the child, because babies are not given a name until they are past the new-born stage. In some countries, nicknames are used freely and the name used may vary, depending on the occasion.

583. In addition to the various cultural factors that complicate matching, the process itself is not easy to carry out because there are no clear criteria to determine what is a match. In general, if the matching criteria are too rigid, an overcount will result. If the matching criteria are too loose, there will be an underestimate of the vital events.

584. Adding to the cost of the matching procedure are the necessary field checks of the unmatched records. Unless the facts are verified, it is possible that the counts will be inflated by the inclusion of events that are out of scope in terms of time and defined population.

585. Experiments with the dual-records system have been conducted, for instance, in Colombia, India, Kenya, Liberia, Morocco, Pakistan, the Philippines, Thailand, and Turkey. These studies have been well documented.¹²⁴ The Sample Registration Scheme of India, which is basically a dual-records system, has been operating on a continuous basis for more than twenty years.

586. Lastly, this is also a good data collection approach for estimating current levels and patterns of fertility and mortality and natural and total population growth rates at both national and subnational levels by the direct method, that is, without relying upon indirect techniques for estimation. But the cost and the matching problems are factors that have to be carefully considered.

C. *INDIRECT TECHNIQUES FOR ESTIMATION OF VITAL RATES*

587. Problems found in data from population censuses and surveys, especially those from single-round surveys, have led to the development of indirect techniques of demographic estimation. These methods are based on mathematical models and utilize data from surveys and censuses concerning children ever born alive, children surviving, date of most recent child born alive and its survival status, survival of mother and father, survival of the first spouse, age, sex and marital status and so on, to generate different kinds of fertility and mortality estimates.

588. As stated earlier, a manual on indirect techniques of demographic estimation has been published by the United Nations.¹²⁵ This manual is the most complete compilation to date of methods suitable for application to incomplete or defective demographic data and estimation of demographic measures. It includes the basic hypothesis underlying the various indirect

methods and presents examples of how to apply the methods, including some guidance on the interpretation of the results. A broad description of some of these techniques follows.

1. *Estimates of fertility*

589. Fertility estimates can be made based on data on the number of children ever born alive obtained from surveys and censuses. This measure, in conjunction with data on the age of women or the duration of marriage, yields estimates of total fertility and age-specific fertility rates or birth rates by duration of marriage. Because of the nature of the data used, these are measures of the average lifetime fertility experience of women in the population, and have no precise time reference.

590. Data on children born alive in the previous year(s) from censuses and surveys are used to estimate current age-specific fertility rates, birth rate, general and total fertility rates, the gross and net reproduction rates. The quality of data is improved by asking all women of reproductive ages about the date of their last child born alive instead of the traditional question on births in the past year. In the former case, births in the previous year are singled out at the processing stage and are cross-tabulated by five-year age groups of women in the child-bearing period. As such data always contain errors, a number of methods for adjusting the data have been proposed. For instance, it was proposed that the pattern of the specific fertility rates could be assumed correct but the level must be adjusted upwards to correspond with the level of the experience of fertility of all women in their younger ages, that is, under 35 years of age. This group is regarded as providing the most accurate information.

591. A number of other extensions to the original method have been proposed, for example, the first-births technique. Another method, requiring information on average parity from two censuses or two surveys taken five or ten years apart, permits the calculation of cohort parity increments and of age-specific fertility rates.

2. *Estimates of mortality*

592. Mortality estimates for different age and sex groups can be made by the indirect method, using retrospective data on children ever born alive and surviving, survival of mother and father, and survival of first spouse. The number of children ever born alive and the number of surviving children (or the number of children who have died up to the census or survey date) may be transformed into estimates of mortality in infancy and childhood. For estimates of adult mortality, data collected from retrospective surveys on orphanhood and widowhood may be used. The combination of those estimates then can lead to the estimation of a complete pattern of mortality by age and sex.

593. In using the data on child survivorship to estimate childhood mortality, the proportion of children that died among the children ever borne by women in the various age groups is converted into the probability of dying before attaining certain childhood ages. A set of multipliers were calculated representing certain fertility and mortality patterns. The calculation assumes a stable or stationary population, that is, there have been no changes in fertility and mortality levels over the years. Subsequent modifications in the model have, however, made it possible to take into account changes in the levels of fertility and mortality. Another assumption is that the children of women in the different age groups experience the same level of mortality. The mortality estimates for the various childhood ages represent average death rates for children of mothers in the different age groups. Therefore, no timing can be assigned to the estimates so derived. However, methods are now available for estimating the time period before the census or survey in which death occurred.

594. Answers to questions of the survival status of mother and father, or of the first spouse, form the basis of estimation of adult mortality rates. Information on the survival of parents or

spouses is usually obtained from single-round retrospective surveys, although a number of countries have included that in their censuses too.

595. The orphanhood and widowhood data may be converted into the probability of dying before the attainment of certain adult ages starting in adulthood. These estimates represent averages of mortality over the period of time that the relatives were exposed to the risk of dying. The reference period is "some years in the past". However, if the same data were available from two consecutive surveys, 5 or 10 years apart, it would be possible to produce estimates for the intersurvey period.

3. *Advantages and limitations of indirect techniques*

596. The major advantage of the indirect methods of estimation is the relative ease with which fertility and mortality rates can be derived once the required demographic data are available from censuses or surveys. Questions on children ever born alive, children still living, current births, infant deaths among current births are frequently included in censuses and surveys, but those on orphanhood and widowhood are questions specific for estimating adult survival probabilities and less likely to be readily available. Conducting a field survey to obtain needed data to estimate mortality by indirect methods adds substantially to the cost of estimation. Consideration should be given to the usefulness of the estimates to justify the cost. The indirect method has been tested with success by applying data from countries with a well-developed civil registration system.¹²⁶ This, however, does not mean that the method will work in the case of countries with poor survey or census data.

(a) *Fertility estimates*

597. The availability of data on children ever born alive or on the age distribution of children under 10 years of age from the censuses will make possible fertility studies using indirect methods. Although it is possible to obtain cumulative fertility histories of females more accurately than information on current fertility, pregnancy history inquiries are not without difficulty in the developing countries. The question needs to be asked of the woman herself, and by a female interviewer. Even so, errors of omission and overcount occur. The misreporting of age of women is another problem that will distort the fertility estimates.

598. In addition to these reporting problems, there will be children that are missed because the mother died prior to the census or the survey. Unless the fertility pattern of mothers who did not survive is similar to that of those who were enumerated, the results will be biased. Another important limitation of this method is that the fertility rates represent averages without any time reference. Unless fertility has been constant over the long period, these estimates will overstate the fertility level during the period of its decline and understate the situation in the period of increasing fertility.

(b) *Mortality estimates*

599. Data by age of mother on children ever born alive and still living are available from a number of population censuses and single-round retrospective surveys, which provide mortality estimates for the childhood period. The advantage of using census data for this purpose is that data are available for the country as a whole as well as for the major political subdivisions to satisfy some of the public health programme needs. The same data from single-round retrospective sample surveys will usually not permit estimates below the national level.

600. The underlying conditions of the model used should be considered, as well as the inaccuracies in the demographic information used as a basis for the mortality estimates. Also, inherent in estimates based on cumulative histories is the problem of location of estimates in time.

601. For the estimation of mortality in adulthood, data on survivorship of parents or of spouses may be used. Because these data are generally obtained from sample surveys, the

estimates will be feasible for the country as a whole but generally not for the geographical subdivisions.

602. Questions such as "Is your mother (or father) still alive?" are questions of fact which the respondent should be able to answer accurately for the orphanhood method. There are, however, exceptions where, for example, the child was abandoned early in life and the whereabouts of the father or the mother is not known. A child born out of wedlock may not know the identity of the father. An adopted child may respond in terms of the adopted parents rather than the natural parents. Deaths of childless couples will be missed as well as those of persons who were never married. There may arise overcounts in the case of parents with more than one child among the respondents. In addition, there is a real problem in putting the events in the proper time-frame.

603. The questions of surviving spouses in the widowhood method applies only to the ever-married population. Therefore, implicit in the method is the assumption that the mortality risk of the never-married population is similar to that of the ever-married. The model also assumes that there has not been a change in the levels of mortality and nuptiality, and the survival of the respondent is independent of that of the spouse. These assumptions do not generally hold in the real situation. There are other problems, such as obtaining information on spouses from the first marriage in case of remarriage, and on eliciting accurate age information. In the latter case, it may be possible to use duration of marriage for the inference of the length of exposure to the risk of dying, if it is determined that the information on the duration of marriage can be obtained more accurately than the age of spouse. However, like other indirect methods, specific time references are lacking in the widowhood approach.

D. CONCLUSION

604. The national data requirements concerning fertility and mortality include, as a minimum, crude birth and death rates and age-specific fertility and mortality rates for the country as a whole and its major geographical subdivisions, on a continuous basis. Data on causes of death, and seasonal data, particularly of deaths, at both subnational, national and local levels, are highly desirable for public health purposes. The importance of this type of data being available on a continuous basis is of paramount importance. Annual data are needed for monitoring changes in birth and death rates. For major subdivisions of the country and cities with relatively small frequencies of events, it may be necessary to group data for a number of years for analytical purposes.

605. The question of using indirect methods as approaches to estimating vital rates in countries without adequate birth and death registration systems depends on how well the estimates derived from such techniques can meet national requirements for vital statistics. Actually, the problem is a little more complex in that registration data are intertwined with the administrative

process of birth and death registration, which will continue to operate, and in that the official vital statistics will be disseminated from civil registration even though the quality is unsatisfactory.

606. All the indirect techniques of demographic estimation now available are capable of producing birth and death rates by age and sex for the country as a whole with varying degrees of precision. Indirect methods utilizing data from the population census can also make vital data available for subnational levels. However, sample survey data will not usually go beyond the national level without a considerable increase in the cost of data collection.

607. The accuracy of estimates is an important consideration depending on how the estimates are to be used. Non-sampling errors in the collection of demographic data are almost always greater than the sampling errors, and they are difficult to assess. The indirect estimation methods pose a further problem in determining the error arising from the failure of the basic assumptions underlying the models to fit the actual demographic situation.

608. To be useful for evaluation purposes, the various measurements of fertility, mortality and other vital rates must be sensitive to changes; otherwise, it will not be possible to measure the effectiveness of family planning activities or of public health programmes. Current estimates from follow-up surveys and dual-records systems can reflect annual changes in fertility and mortality, but estimates from indirect methods are averages centred on a period in some distant past and cannot be greatly useful for evaluation purposes. However, countries without any information on the fertility and mortality levels may find the results from indirect methods to be approximate indicators of the demographic situation.

609. To conclude, there exists no single source or approach that adequately serves the needs for vital statistics for a variety of uses. Indirect estimates of fertility, mortality and nuptiality from data collected in population censuses and surveys are valuable and complementary to direct and continuous information recorded in the civil registration system. But they are not in any respect substitutes for continuous vital statistics. Depending on the nature of uses, each data source and technique, direct and indirect, should be fully exploited by countries taking into account the specific national data circumstances and demographic situation. It is increasingly becoming a common practice to complement the results of one approach to the estimation of vital rates with those of other approaches with a view to establishing reliably, within a reasonable range, the vital rates of a country and its subdivisions. Censuses and surveys of various types are no replacements for vital statistics, but may be the only vehicles available at a certain point in time for generating estimates of vital rates in the absence of reliable civil registration data. However, the primary source that gives rise to the collection of continuous vital statistics is a sound civil registration system whose steady improvement over the coming years is essential for carrying out a variety of public policies and programmes.

ANNEX

Recommended annual tabulations of vital events

The following recommended tabulations are taken from chapter IV of *Principles and Recommendations for a Vital Statistics System*. Readers are referred to this publication for the principles for compiling vital statistics and the specifications for each tabulation, including its layout.

Tabulations on causes of death and foetal death should present data to three digits of the Tenth Revision of the International Classification of Diseases (ICD-10) of the World Health Organization, adopted in May 1990.

Furthermore, for purposes of international comparisons, countries should compile data on occupations in accordance with the International Standard Classification of Occupation (ISCO-88) of the International Labour Organisation (revised edition forthcoming).

(In the following list, an asterisk (*) denotes a first-priority item.)

LIVE BIRTHS

1. *Live births by place of occurrence**
 - 1(a) Live births cross-classified by usual residence of mother and place of occurrence*
 - 1(b) Live births cross-classified by place of usual residence* and place of previous residence (at a specified time in the past) of mother
2. *Live births by attendant at birth**
 - 2(a) Live births by place of occurrence* classified by resident status of mother* and cross-classified by attendant at birth* and hospitalization
 - 2(b) Live births cross-classified by birthweight*, attendant at birth*, and hospitalization
3. *Live births by month of occurrence**
4. *Live births cross-classified by sex* and legitimacy status**
5. *Live births by age* of mother*
 - 5(a) Live births cross-classified by age* of mother and sex* of child
 - 5(b) Live births cross-classified by age* of mother and birth order*
 - 5(c) Live births cross-classified by age* of mother and legitimacy status* of child
 - 5(d) Live births by age* and literacy status (or by educational attainment) of mother
 - 5(e) Live births cross-classified by age* and by ethnic and/or nationality group of mother
 - 5(f) Live births cross-classified by age* of mother and by age of father
 - 5(g) Live births by age* and place of birth of mother
 - 5(h) Live births cross-classified by age* and place of birth of mother, for each legitimacy status* of child
6. *Live births by age* of father*
 - 6(a) Live births cross-classified by age* and occupation of father
 - 6(b) Live births cross-classified by age* and type of activity of father
 - 6(c) Live births cross-classified by age of father and legitimacy status* of child
 - 6(d) Live births cross-classified by age and place of birth of father
 - 6(e) Live births cross-classified by age* and by ethnic and/or nationality group of father
 - 6(f) Live births cross-classified by age* and literacy status (or educational attainment) of father
7. *Live births cross-classified by age* of mother and live-birth order**
 - 7(a) Live births cross-classified by age* of mother and total birth order
 - 7(b) Live births cross-classified by age* of mother, live-birth order* and sex* of child
 - 7(c) Live births cross-classified by age* of mother, live-birth order* and legitimacy status* of child
 - 7(d) Live births cross-classified by age* of mother and live-birth order* for each category of educational attainment of mother
 - 7(e) Live births cross-classified by age* of mother and live-birth order* for each ethnic and/or nationality group of mother

- 7(f) Live births cross-classified by age* of mother and live-birth order* for each occupational group of mother
- 7(g) Live births cross-classified by age* of mother and live-birth order* for each type of activity of mother
8. *Legitimate live births by duration of marriage**
 - 8(a) Legitimate* live births cross-classified by duration of marriage* and live-birth order*
 - 8(b) Legitimate* live births cross-classified by duration of marriage* and age* of mother
 - 8(c) Legitimate* live births cross-classified by duration of current marriage* and live-birth order* for each age* (present) of mother
9. *Live births cross-classified by live-birth order* and interval since last previous live birth* to mother*
10. *Live births by birthweight*
 - 10(a) Live births cross-classified by birthweight* (or by gestational age) and occupation* of mother
 - 10(b) Live births cross-classified by birthweight* and gestational age

DEATHS

1. *Deaths by place of occurrence**
 - 1(a) Deaths by place of occurrence* classified by resident status* of decedent and cross-classified by hospitalization and type of certification*
2. *Deaths by place of usual residence* of decedent*
 - 2(a) Deaths cross-classified by place of usual residence* of decedent and place of occurrence*
 - 2(b) Deaths cross-classified by place of usual residence* and place of previous residence (at a specified time in the past) of decedent
3. *Deaths by month of occurrence**
4. *Deaths cross-classified by sex* and age**
 - 4(a) Deaths cross-classified by age* and marital status* for each sex*
 - 4(b) Deaths of married* persons cross-classified by age* of decedent and age of surviving spouse, for each sex*
 - 4(c) Deaths of married* persons cross-classified by age* and duration of current marriage, for each sex*
 - 4(d) Deaths cross-classified by age* and type of activity of decedent
 - 4(e) Deaths cross-classified by age* and occupation for each sex*
 - 4(f) Deaths cross-classified by age* and ethnic and/or nationality group of decedent
 - 4(g) Deaths cross-classified by age* and literacy status (or educational attainment), for each sex*
 - 4(h) Female deaths cross-classified by age* and number of live-born issue
5. *Deaths cross-classified by month of occurrence* and selected causes* of death*
6. *Deaths cross-classified by age* and cause* of death, for each sex**
 - 6(a) Deaths cross-classified by age*, occupation and causes* of death for each sex*
7. *Deaths cross-classified by type of certification* and cause* of death*

INFANT DEATHS (DEATHS UNDER ONE YEAR OF AGE)

1. *Infant deaths by place of occurrence**
2. *Infant deaths by place of residence* of mother*
3. *Infant deaths cross-classified by age* and sex**
 - 3(a) Infant deaths cross-classified by age* and legitimacy status, for each sex*
 - 3(b) Infant deaths cross-classified by age* and year of birth* for each sex*
4. *Infant deaths cross-classified by age* and month of occurrence**
5. *Infant deaths cross-classified by selected causes* of death and sex**

- 5(a) Infant deaths cross-classified by selected causes* of death and age*, for each sex*
- 5(b) Neonatal deaths (or infant deaths under 28 days of age) cross-classified by cause* of death and age*, for each sex*

FOETAL DEATHS

- 1. *Foetal deaths by place of occurrence**
 - 1(a) Foetal deaths by place of occurrence* classified by resident status of woman* and cross-classified by hospitalization and type of certification
- 2. *Foetal deaths by sex* and gestational age**
 - 2(a) Foetal deaths cross-classified by gestational age* and cause of death, for each sex*
 - 2(b) Foetal deaths cross-classified by gestational age* and occupation of woman
 - 2(c) Foetal deaths cross-classified by gestational age* and birthweight
- 3. *Late foetal deaths cross-classified by sex* and legitimacy status of foetus*
- 4. *Late foetal deaths cross-classified by age* of woman and legitimacy status* of foetus, for each sex**
 - 4(a) Late foetal deaths cross-classified by age* and ethnic and/or nationality group of woman
 - 4(b) Late foetal deaths cross-classified by age* and place of birth of woman, for each legitimacy status* of foetus
 - 4(c) Legitimate* late foetal deaths cross-classified by age* of woman and duration of marriage*
- 5. *Late foetal deaths cross-classified by age* of woman and total birth order**

LIVE BIRTHS AND FOETAL DEATHS

- 1. *Confinements cross-classified by type of birth* and status of issue (live-born or born dead)*
 - 1(a) Confinements cross-classified by birth order* and birthweight, for each type of birth*
 - 1(b) Confinements cross-classified by type of birth order* and age* of mother/woman for each sex*

MARRIAGES

- 1. *Marriages by month of occurrence**
- 2. *Marriages by place of usual residence* of groom*
 - 2(a) Marriages cross-classified by place of usual residence* of groom and place of occurrence*

- 2(b) Marriages cross-classified by place of usual residence* and place of previous residence (at a specified time in the past) of groom
- 3. *Marriages cross-classified by age* of bride and age* of groom*
 - 3(a) Marriages cross-classified by ethnic and/or nationality group* and age* of bride and groom separately
- 4. *Marriages cross-classified by previous marital status* of bride and previous marital status* of groom*
 - 4(a) Marriages cross-classified by previous marital status* and age* of bride and groom separately
 - 4(b) Marriages cross-classified by number of previous marriages of bride and number of previous marriages of groom
- 5. *Marriages cross-classified by literacy status (or educational attainment) of bride and groom*
- 6. *Marriages by occupation of groom*
- 7. *Marriages by type of marriage**

DIVORCES

- 1. *Divorces by place of occurrence**
- 2. *Divorces by place of usual residence* of husband*
 - 2(a) Divorces cross-classified by place of usual residence* and place of previous residence (at a specified time in the past) of husband
- 3. *Divorces cross-classified by age* of wife and age* of husband*
 - 3(a) Divorces cross-classified by ethnic and/or nationality group and age* of divorcees, tabulated separately for husband and wife
- 4. *Divorces cross-classified by duration of marriage* and age* of divorcees, tabulated separately for husband and wife*
 - 4(a) Divorces cross-classified by age* at marriage of wife and age* at marriage of husband
 - 4(b) Divorces cross-classified by year of marriage* and age* at marriage of divorcees, tabulated separately for husband and wife
- 5. *Divorces cross-classified by number of dependent children* and duration of marriage**
 - 5(a) Divorces cross-classified by number of dependent children* and year of marriage*
- 6. *Divorces cross-classified by literacy status (or educational attainment) of divorcees*
- 7. *Divorces cross-classified by occupation* of husband and occupation* of wife*
 - 7(a) Divorces cross-classified by occupation and age* of husband
- 8. *Divorces cross-classified by number of previous marriages of husband and number of previous marriages of wife*

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¹²³ Chandrasekaran and Deming, "On a method of estimating birth and death rates and the extent of registration", op. cit.

¹²⁴ Marks, Seltzer and Krotki, op. cit. pp. 41-52; see also papers of the Laboratories for Population Statistics, Scientific Reports Series, University of North Carolina: R.J. Meyers, "The dual record system: an overview of experience in five countries (No. 26, 1976); J.W. Ligner and H.B. Wells, "Organization and methods of the dual record system of India" (No. 9, 1973); E. Chanlett and M.D. Fichet, "The dual record system: vital event recording system" (No. 27, 1976); and National Academy of Sciences, Committee on Population and Demography, "Collecting data for the estimation of fertility and mortality, Report No. 6 (Washington, D.C., National Academy Press, 1981), p. 108.

¹²⁵ *Manual X: Indirect Techniques*

¹²⁶ John Blacker, "Experiences in the use of special mortality questions in multi-purpose surveys: the single round approach, in *Data Bases for Measurement of Mortality* (United Nations publication, Sales No. E.83.XIII.3), pp. 79-89.

GLOSSARY OF TERMS

Adoption	Legal and voluntary taking and treating of the child of other parents as one's own in so far as provided by the laws of the country. By means of a judicial process, whether related or not to the adopter, the adopted child acquires the rights and status of a legitimate child.		
Age	Interval of time between the day, month and year of birth and the day, month and year of occurrence of the event expressed in the largest completed unit of solar time such as years for adults and children and months, weeks, days, hours or minutes of life, as appropriate, for infants under one year of age (Gregorian calendar).	Certificate for disposal of the corpse	See also "Underlying causes of death" and "Contributory causes of death". Certificate of registry given to the informant, in the prescribed form, on registration of a death; or a coroner's order in respect of an unnatural death for purposes of disposal of the corpse, for burial or cremation, according to the laws, religious practices and/or regulations of the country.
Annulment of a legal marriage	Invalidation or voiding of a legal marriage by a competent authority, according to the laws of the country, thus conferring on the parties the status of never having been married to each other.	Certifier of cause of death	Person authorized by law (the physician who attended the deceased in his/her last illness; or the coroner for deaths of persons who were not attended during the last illness by a physician, or for unnatural deaths due to violence or accident) who issues a certificate, on the prescribed form, stating to the best of his/her knowledge and belief, the cause of death and other facts related to the event for submission to the local registrar.
Attendant at birth	The person who assisted the mother in giving birth, whether a physician, a midwife, a nurse, other paramedical personnel, a lay person etc.	Change of name	An individual may petition to a court to have his or her name changed in the civil registry for personal reasons.
Banns of marriage (notice of forthcoming marriage)	Admonitions or proclamations of intended marriage between the parties whose names, in full, and addresses are provided in public places for a legally specified period of time.	Child allowance	Sum of money paid periodically to a single parent of a child until he/she will have attained a certain age.
Base population	Number of people in a given area (e.g. a nation, province, city etc.) to which a specific vital rate applies, that is, the denominator of the crude birth rate or death rate; that population determined by a census.	Citizenship	Legal nationality of the persons concerned (i.e. of live births, parents, decedents, brides, grooms, divorcees).
Biological family	Parents and their own children.	Civil register	Official loose-leaf file or a ledger book for each type of vital event where vital events and changes in the civil status occurring to the population in a well-defined area (e.g. a county, district, municipality, parish and so on) are legally registered, following established procedures.
Birth (or parity) order	Numerical order of the live birth or foetal death, recorded in relation to all previous issue of the mother, irrespective of whether the issue is a live birth or foetal death or whether pregnancies were nuptial or extranuptial.	Civil registrar	Official charged with the responsibility for civil registration and for recording and reporting information on vital events for statistical purposes.
Blood relatives	Persons related through common descent from the same progenitor or ancestor.	Civil registration and vital statistical systems	Governmental machinery set up in the country, province, state or other territorial subdivision of the country to do both the recording of vital events for legal purposes and the compilation of vital statistics from those records, as provided in the laws and regulations of the country.
Burial permit	Official statement authorizing the removal of the dead body (corpse) to the cemetery.		
Canvasser method	Information for each individual in a population census or sample survey, collected and entered on the questionnaire by an enumerator designated to perform this operation in a specified area.	Civil registration system	Governmental machinery set up in the country, state, province or any other territorial subdivision of the country for the purpose of legal recording of vital events and other events related to the civil status of the population on a continuous basis, as provided by the laws and regulations of the country, state, province etc.
Causes of death	All diseases, morbid conditions or injuries that either resulted in or contributed to death, and the circumstances of the accident or violence that produced any such injuries. Symptoms or modes of dying, such as heart failure or asthenia, are not considered to be causes of death for statistical purposes.		

Cohort	A group of persons who experience a certain event in a specified period of time. For example, the birth cohort of 1985 would be the people born in that year.		confers on the parties the right to re-marriage under civil, religious and/or other provisions in accordance with the laws of the country.
Compilation of vital data	Process of condensing information by classifying and tabulating vital statistical data into various categories or groups with the object of producing vital statistics according to a determined tabulation programme.	Dual records system	The simultaneous collection of vital events, mainly births and deaths and the appropriate exposed-to-the-risk population, by two collecting methods which, ideally, are independent of each other (a) a continuous vital event recording procedure which may be other than the civil registration system; and (b) a periodic household sample survey conducted in the same geographical area. Matching of the events reported by the two procedures provides methods of improving the estimate of the total number of vital events.
Contributory cause of death	A significant condition that unfavourably influences the course of the morbid process and thus contributes to the fatal outcome, but which is not related to the disease or condition directly causing death.		
Coroner	Officer of a county, district, municipality etc., holding inquest on bodies of persons who may have died by violence or accident (unnatural deaths).	Duration of marriage	The interval of time between the day, month and year of marriage to date. It is often expressed in completed years.
Crude birth rate	Number of live births occurring among the population of a given geographical area during a given year, per 1,000 mid-year total population of the given geographical area during the same year.	Early foetal death	The death prior to the complete expulsion or extraction from its mother of a product of conception of less than 20 completed weeks of gestation.
Crude death rate	Number of deaths occurring among the population of a given geographical area during a given year per 1,000 mid-year total population of the given geographical area during the same year.	Enumerator	Survey personnel charged with carrying out that part of an enumeration consisting of the counting and listing of people or assisting respondents in answering the questions and in completing the questionnaire.
Crude divorce rate	Number of divorces occurring among the population of a given geographical area during a given year per 1,000 mid-year total population of the given geographical area during the same year.	Foetal death	The death prior to the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of the period of gestation; the death is indicated by the fact that after such separation, the foetus does not breathe or show any other evidence of life such as beating of the heart, pulsation of the umbilical cord or definite movement of voluntary muscles.
Crude marriage rate	Number of marriages occurring among the population of a given geographical area during a given year per 1,000 mid-year total population of the given geographical area during the same year.	Foetal death rate	Number of foetal deaths occurring among the population of a given geographical area during a given year per 1,000 total births (live births plus foetal deaths).
Date of birth	The hour (minute), day, month and year of birth established in order that exact age may be determined in completed years, months, days, hours (minutes) of life, as required.	Follow-up survey (or multi-round survey or multi-phase survey)	A type of survey in which households included in it are repeatedly interviewed in the second, third, fourth or more visits, to obtain information on vital events by noting the changes in composition of the households that have taken place between successive visits.
Date of occurrence of a vital event	The exact day, month and year (Gregorian calendar), as well as the hour and minute, if appropriate, when the event occurred.		
Date of registration of a vital event	The day, month and year (Gregorian calendar) when the entry in the civil register is made.	Gestational period	Interval in completed weeks between the first day of the last menstrual period of the mother and the day, month and year of delivery irrespective of whether the product of conception is a live birth or born with no evidence of life (foetal death).
De facto population	A concept under which individuals (or vital events) are recorded (or are attributed) to the geographical area where they were present (or occurred) at a specified time.	Head of the household	One of the members of the household recognized as the head of unit by the other members of the household unit or by himself (or herself) if living alone.
De jure population	A concept under which individuals (or vital events) are recorded (or are attributed) to a geographical area on the basis of the place of residence.	Household	A unit that comprises either an individual who makes provision for his or her own food or other essentials for living or a group of two or more persons living together who make common provision for food and other essentials for living.
Delayed (late registration)	Vital event registered beyond the prescribed period specified in existing laws, rules or regulations once certain requirements have been met.		
Divorce	Final legal dissolution of a marriage; a separation of husband and wife that		

Illegitimate child	Child of parents who, according to national law or customs, were not married at the time of its birth.		vital event well in advance of the legally designated informant.
Infant mortality rate	Number of deaths under one year of age occurring among the live births in a given geographical area during a given year, per 1,000 live births occurring among the population of the given geographical area during the same year.	Place of occurrence	Civil subdivision of the country (district, county, municipality and province, department, state), in which a live birth or a death, foetal death, marriage or divorce takes place.
Informant	The individual whose responsibility, designated by law, is to report to the local registrar the <i>fact</i> of the occurrence of a vital event and to provide all the information and characteristics related to the event. Only on the basis of his or her report may the event be legally registered by the local registrar.	Place of residence	Civil subdivision of a country (district, county, municipality; and province, department, state) in which the individual resides.
Intermediate foetal death	Death prior to the complete expulsion or extraction from its mother of a product of conception at 20, but less than 28 weeks of gestation.	Population at risk	Population that is exposed to the occurrence of a vital event, for example, the total population in the case of deaths, the legally married population in the case of divorces, and so on.
Interval since last previous live birth	Time elapsed, in completed months, between the day, month and year of the last previous delivery of a live-born child and the date of delivery of the last live birth.	Population census	The process of collecting, compiling, evaluating, analysing, and publishing or otherwise disseminating demographic, economic and social data pertaining, at a specific time, to all persons in a country or in a well-delimited part of a country.
Judicial (legal) separation	Disunion of married persons according to the laws of each country, without conferring on the parties the right to remarriage.	Probability sample	Sample selected by a method based on the theory of probability (random process), that is, by a method involving knowledge of the likelihood of any unit being selected.
Late foetal death	Death prior to the complete expulsion or extraction from its mother of a product of conception at 28 weeks or more weeks of gestation.	Qualitative errors	Non-sampling errors such as errors arising from ignorance or forgetfulness of the facts, refusal to reply to a question, failure to understand a question or failure of the interviewer to put the question clearly or to record its answers properly.
Legitimate child	Child born to parents who were legally married at the time of its birth in accordance with the laws or customs of the country.	Rate of natural increase	Difference between the number of live births and the number of deaths occurring in a year, divided by the mid-year population of that year, multiplied by a factor (usually 1,000). It is equal to the difference between the crude birth rate and the crude death rate. This measure of the population change excludes the effects of migration.
Legitimation	Formal investing of a person with the status and rights of legitimacy, according to the laws of the country.	Recall lapse	Failure to remember in reporting events or characteristics in response to retrospective questions.
Lifetime fertility	Number of children ever born alive during the entire reproductive period of the woman.	Recognition	Judicial statement authorizing the civil registrar to enter in the register the last name of the father, given to a child born out of wedlock whose birth record has been made previously.
Marital status	Civil status of each individual in relation to the marriage laws or customs of the country, i.e. never married, married, widowed and not remarried, divorced and not remarried, married but legally separated, <i>de facto</i> union.	Record linkage	A merging that brings together information from two or more sources of data with the object of consolidating facts concerning an individual or an event that are not available in any separate record.
Marriage order	Rank order (i.e. first, second, third etc.) of the legal marriage being contracted or of the legal marriage being dissolved.	Registration method	Continuous, permanent, compulsory recording of the occurrence of vital events together with certain identifying or descriptive characteristics concerning them, as provided through the civil code, laws or regulations of each country. The vital events may be live births, foetal deaths, deaths, marriages, divorces, judicial separations, annulments of marriage, adoptions, recognitions (acknowledgements of natural children), legitimations.
Maternal mortality rate	Number of deaths from puerperal causes occurring among the female population of a given geographical area during a given year, per 100,000 live births occurring among the population of the given geographical area during the same year.		
Neo-natal mortality rate	Number of deaths during the first 28 completed days of life occurring among the live births in a given geographical area during a given year, per 1,000 live births.		
Notifier	Designated person charged with the responsibility of making known to the local civil registrar the occurrence of a		

Retrospective demographic survey	A type of demographic survey containing questions, related to the occurrence of vital events during a specified period preceding the date of interview.		which the legal relationship of husband and wife is constituted, that is, whether civil, civil-religious, religious only or customary.
Sampling	Process of selecting a number of cases from all the cases in a particular group or universe.	Underlying cause of death	The disease or injury that initiated the train of morbid events leading directly to death or the circumstances of the accident or violence that produced the fatal injury. The underlying cause of death is the one to be adopted as the cause for tabulation of mortality statistics. (See also "contributory cause of death".)
Sampling unit	One of the units into which an aggregate is divided for the purpose of sampling, each unit being regarded as individual and indivisible when the selection is made. Such units may be defined on some natural basis, such as a household or a person, or on some arbitrary basis, such as areas defined by coordinates on a map.	Vital event	Live birth, death, foetal death, marriage, divorce, adoption, legitimation, recognition of parenthood, annulment of marriage, or legal separation.
Self-enumeration	Completion of census survey questionnaires by the respondents themselves.	Vital event record	Legal document entered in the civil register which attests to the occurrence and characteristics of a vital event.
Sex ratio at birth	Number of boys born alive per 100 girls born alive.	Vital statistical record	Document or form, containing the items of information concerning an individual vital event or a number of vital events of the same type, filled in at the time of registration, to meet the needs of vital statistics compilation.
Single-round survey	Survey taken once only, in contrast with a multi-round survey which consists of several survey rounds taken at successive points in time.	Vital statistics	Information systematically collected and compiled in numerical form, relating to or derived from vital event records.
Statistical reporting	Transmission of statistical reports on vital events to the agency responsible for compilation of statistics on these events.	Weight at birth	Weight determined immediately after a child is born, whether alive or dead (generally expressed in grams).
Total coverage	Registration of all vital events occurring in each geographical area and among all population groups of the country.		
Type of marriage	The type of act, ceremony or process by		