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**The contribution of the health sector to civil registration and vital statistics systems:
Use of records from health services ¹**

World Health Organization

¹ The text is presented without formal editing.

The contribution of the health sector to civil registration and vital statistics systems:

Use of records from health services

Introduction

1. In the past, the health sector has played a minor role in CRVS systems, focusing on attribution of causes of death, which are sometimes, although not always, included in the death certificate. The key agents in civil registration are usually the Registrar General, Ministry of Interior or Justice, which are responsible for registration, certification and management of archives. The National Statistics Office is generally responsible for the compilation and dissemination of vital statistics.
2. However, the role of the health sector in civil registration and vital statistics systems has been changing in recent years, driven by four developments:
 - Growing demand in the health sector for accountability and resulting pressures to generate better statistics on health outcomes such as the health-related MDGs, as well as on mortality in adults to inform policies to prevent premature mortality due to noncommunicable diseases;
 - Increasing reach of health services even in remote areas, and their organizational and technical ability to provide information about births and deaths. For example, increasing proportions of births are occurring in health care facilities or in the presence of medical personnel (Figure 1);
 - Increasing use of electronic medical records which require the availability of individual unique identifiers, such as available from legal documents or numerical identifiers provided by the civil registration system;
 - Growing availability and reach of information technologies in health, such as use of hand-held devices such as mobile phones to monitor vital events, in particular pregnancy outcomes (perinatal deaths, live births maternal deaths etc).
3. The health sector faces increasing pressure to demonstrate results and this has led to the direction of significant funding to alternate methods of generating health and mortality data, including through household surveys.¹ These have proved successful for the measurement of child mortality and the number of such surveys has increased dramatically in recent years. (Figure 2) However, surveys are less efficient instruments for collecting adult and cause-specific mortality data such as maternal mortality and the result is a continuing dearth of statistics on this indicator. A recent analysis of empirical observations on maternal mortality over the period from the late 1980s to 2008 found only 484 data points globally, an average per country of less than 3 over almost two decades (Table 1).² In sub-Saharan Africa, there were only 75 empirical data observations over the period. Furthermore, in 24 countries no valid national data were available.
4. Elsewhere, the challenge of establishing complete civil registration systems has resulted in the establishment of sample systems designed to deliver specific health data including on births and deaths. In India, a sample registration system, set up by the Office of the Registrar General, involving active follow-up and tracking of vital events in randomly selected households, is the primary source of fertility and mortality data.³ Similar systems are in place in Bangladesh and China, and being set up in Tanzania.

5. These alternative approaches cannot match the advantages of a civil registration system, which registers all events and generates fertility and mortality data that are continuous, consistent, complete, and cost-effective. Consensus is emerging among technical partners that in the absence of sound civil registration systems, capacity to monitor major health-related indicators is severely impaired. Since 2007, with the publication of a series of papers on civil registration and vital statistics in the medical journal *The Lancet*, the health sector has recognised the need for a more proactive and systems-wide approach, based on civil registration systems.⁴ In 2010, the Health Metrics Network, a partnership of health and statistical constituencies hosted by the World Health Organization, established an initiative to spearhead a major push forward in this area, with a focus on innovation to strengthen the monitoring of vital events and a clear focus on the measurement of results, in particular those related to the health-related MDGs.⁵ In 2011, the WHO Commission on Information and Accountability for women's and children's health, established by the UN Secretary-General during the 2010 General Assembly, recommended that countries increase their efforts to strengthen civil registration and vital statistics.⁶

Structure and organization

6. In most countries, responsibility of different aspects of the civil registration and vital statistics systems is divided between different ministries and agencies, with the office of the registrar-general responsible for the registration and certification, and the national statistics office for the compilation of vital statistics resulting from registration. Whether the organizational structure is centralized or decentralized, birth and death information is collected through a network of local area registration offices that are supported in their functions by other reporting units such as the police, hospitals, health clinics, mortuaries and community leaders. In the compilation of the collected information and its transformation into vital statistics, the national statistical office may receive technical support from the ministry of health for coding and processing the cause-of-death data. Figure 3 illustrates such a system (this is an idealized example because it assumes that all births and deaths are registered).

7. In practice, birth and death registration can be more complex. Some countries run dual systems: one that is concerned only with registration, that issues birth and death certificates to individuals; and another that collects vital statistics through the health system. Dual data collection systems are widespread in some countries in Latin America, especially where there is limited access to civil registry offices and geographic, cultural or bureaucratic barriers to civil registries. The operation and division of responsibility in such systems needs to be considered carefully to avoid unnecessary duplication and inconsistencies in the reported numbers of births and deaths. In some cases, there is close coordination between all the government agencies involved, but coordination can sometimes be a major challenge.

8. Where many births and deaths take place in health facilities, the health sector may play a proactive role in both notification and registration of vital events. In some countries, health care workers at community level also have responsibilities for notifying births and deaths occurring outside health care facilities. In Mongolia, health facilities cover all births and deaths and play an important role in registration. In Egypt, the Ministry of Health is responsible for registering all births and deaths, both facility- and non-facility-based, as well as for compiling vital statistics. The Ministry of the Interior maintains responsibility for the issuance of certificates and for archiving all registration records. Other responsible agencies include the departments of justice and police (particularly in the case of deaths due to injuries and other external causes) and departments of the interior.

9. Despite the multiple roles and responsibilities of different agencies, few developing countries have established institutional mechanisms for collaboration, coordination and sharing of vital statistics. Such mechanisms enable data collected from different sources to be pooled and reconciled. Thailand has a strong national coordination body that brings together both government agencies with responsibilities in aspects of vital statistics, as well as independent researchers and academic bodies. The absence of such coordination mechanisms is one of the main reasons for incomplete vital statistics.⁷

Legal framework and procedures for notification and registration

10. Whatever the administrative structures in place, certain legal, regulatory and procedural conditions need to be met if the system is to function effectively in notifying, registering and counting births, deaths and causes of death.

11. The law should provide clear and unambiguous definitions of live birth and fetal death, aligned with the standards of the International Statistical Classification of Diseases and Related Health Conditions (ICD) 10th Revision.⁸ There is no international definition of death; ascertainment that death has occurred is determined locally, depending on available medical care and technologies.

12. In all settings, the law should require that all hospitals and health facilities report births and deaths and it should state clearly to whom they should be reported. Facility-reported data may be used to verify the civil registration figures or they may serve as the starting point for event notification prior to registration. Legal clarity is essential in countries where the private, NGO, and social insurance sectors are significant providers of health care and, a substantial proportion of births and deaths occur in nongovernmental institutions. The law should be specific in requiring all of these institutions to report vital events.

13. The law should also clearly state that deaths occurring in live born infants, including those that take place within a short time after birth, should be registered both as births and as deaths. Currently, deaths occurring within the first 24 hours or a few days after birth are often missed from registration systems because they are misreported as fetal deaths. This sometimes happens in order to spare families anguish but gives rise to biased and misleading estimates of neonatal mortality and thus reduces the ability of the health sector to implement and monitor interventions to track such deaths.

14. In order to facilitate the complete identification of maternal deaths, the law should include a requirement that all deaths in women of reproductive age be investigated and that all maternal and perinatal deaths be subject to confidential enquiry or audit.

15. The law should specify the official documentation needed for burial or cremation. An effective way to ensure that deaths are registered is to require death registration documents before burial or cremation can take place. Indeed, often it is the undertaker who is responsible for the registration, in which case the undertaker, with the assistance of relatives, prepares all the papers necessary for death registration, and must file these with the civil registration office before the deceased person can be transported to a final resting place.

16. The law should clearly state who can certify death and the cause of death. For both legal and public health purposes, medical certification of the cause of death is essential, because without it there will be little confidence in the accuracy of diagnoses or in the quality of statistics on causes of death.

17. In countries where most deaths take place in health facilities or at home with the support of health professionals, the use of the international form of the death certificate should be standard practice, and all deaths should be certified and coded in accordance with the ICD.

18. Clarity in the legal and regulatory framework for civil registration should be accompanied by clear rules and procedures relating to vital events notification and registration, starting from the notification of the events – births, deaths and fetal deaths (if recorded) – through each step in the registration and subsequent certification process. For births, it is the birth attendant who usually issues a birth notification. For deaths, there is an important distinction between death notification and certification of cause of death by a doctor, responsibility for both generally lying with the attending doctor or with the family doctor if the death occurred at home.

19. The responsibility for birth and death registration lies with the family. In practice, in many developing countries family members may not understand the difference between the notification form and the legal registration paper, and thus fail to go to the civil registration office to register the event. As a result, vital events risk being missed, as the examples from Mexico show (Figures 4a and 4b).

20. As increasing numbers of births take place with medical assistance, it is recommended that the birth form include an attachment for collecting medical details about the birth, the health of the baby and the health of the mother. This information can be used for linking the records of mothers and infants, a process that has proved valuable in identifying infant and maternal deaths initially missed through the routine registration system. The increasing availability of unique personal identifiers is a valuable aid in this regard. Furthermore, these birth records can be used to identify high-risk infants and mothers for subsequent follow-up. In addition to birth weight, data should include prematurity, gravidity, parity, birth order (for multiple births), method of delivery, complications during delivery, stillbirth and date of the mother's most recent delivery.

21. If special procedures exist for certifying accidental deaths (e.g. reporting to a coroner or similar), the procedures for registering these events should also be clearly stipulated.

22. Rules and procedures should be described separately for events that take place outside of hospitals and for those that occur within hospitals (both public and private).

23. For births and deaths that occur outside health facilities, the possibility of using community health workers to report vital events to the local civil registration authorities should be explored. Many countries are currently investigating this option, often using mobile phones to facilitate and speed up reporting. Countries include Bangladesh, Kenya, Ethiopia, and Ghana. The success of this strategy will depend critically on the application of international standards for the minimum information items to be collected using mobile phones, which WHO is currently developing in collaboration with UN Statistics Division. As part of this, it is essential to establish a nationally owned data architecture including a database for the compilation, management and sharing of data. This should be administered by the relevant national agency, usually the national statistics office, working in collaboration with the ministry of health. The lessons learnt from country efforts (several supported by the Health Metrics Network) will contribute to the evidence base of how to increase the reporting of vital events at community level.

Causes of death

24. Cause of death information is an essential aspect of vital statistics with multiple purposes including, epidemiological monitoring and analysis, disease prevention, and management of health care. Currently, only about 70 WHO member States report cause-of-death data of acceptable quality from their civil registration and vital statistics systems (Figure 5).⁹ In the other 50 or so countries that produce some cause-of-death data, the quality of the information is inadequate because of poor certification and coding practices. A high proportion of these deaths are assigned to non-specific or “ill-defined causes” such as old age, fever, stopped breathing, etc. These vague diagnoses are of no use for public health purposes.

25. For producing reliable cause-of-death statistics, there are two related but distinct steps. The first is death certification, whereby a medically qualified doctor assigns a cause of death using the International form of medical certificate of cause of death, which is shown in Box 1. This form was designed to make it easier to select the underlying cause of death when two or more causes are recorded on the death certificate. The second step involves coding the cause of death on the medical certificate to one of the specific codes described in the International Classification of Diseases.¹⁰ This step permits the cause of death information on the certificate to be translated into statistical categories and subsequently tabulated for dissemination and use.

Cause of death certification

26. When deaths occur in hospitals or situations where medical care is provided, the cause of death certificate is completed by physicians. However, the quality of death certification is often inadequate. Studies examining the causes of poor certification in developing countries are rare, but the limited information that exists suggests that inaccuracies in the data are mostly derived from characteristics of the certifier (such as lack of training), the certificate (such as not aligned with ICD practices), the deceased person (such as older age groups) and the cause of death (such as sudden death).¹¹ In many countries, the public health value of routine data collection is not well understood and there are insufficient regulations and procedures to ensure that medical certification is done correctly.

27. When a death occurs in a medical establishment or where a doctor is available, the process is initiated by the doctor completing a death certificate. The family of the deceased can then use the certificate to register the death and obtain a burial permit. In many developed countries, the doctor sends a copy of the certificate to the undertaker responsible for disposing of the body. It is the undertaker who must register the death with the civil registration authority, to get permission to transport and dispose of the body.

28. Collaboration between health practitioners and hospitals is crucial for the proper attribution of cause of death but is difficult to achieve in countries with inadequate legislative frameworks or weak governance. Even where medical certification of the cause of death is common practice, it does not necessarily mean that the correct cause of death is written on the death certificate in the correct way. Most doctors certify death infrequently and may have forgotten their medical school training or their knowledge may be outdated. Limited diagnostic facilities, human error, inexperience and lack of awareness of the importance of cause-of-death data all contribute to poor diagnostic accuracy. Further, there may be financial or social consequences for the family that deter the doctor from reporting the true cause of

death. Examples include life-insurance schemes that reimburse medical expenses for certain health conditions only, or the social stigma associated with HIV/AIDS and drug overdose.

29. In many countries, there is a need for increasing training of physicians in the correct application of the ICD rules with regard to death certification. This implies both additional training courses as part of medical school curricula as well as further training, in particular for categories of physicians that are frequently required to certify deaths.

30. In order to ensure complete notification of maternal deaths, it is recommended that the death certificate include a checkbox which specifically asks whether a deceased woman of reproductive age was pregnant when she died or had recently been pregnant. This has enabled more maternal deaths to be identified, for example, Sri Lanka and the USA.

31. In cases of sudden death, it is also necessary to have someone who is medically trained to assess whether a death can be considered as natural (due to disease) or due to some external cause (accident, suicide or homicide). Unnatural deaths include deaths caused by accidents, suicides and homicides; deaths with unknown causes; and certain special cases (such as deaths occurring in prison or during anaesthesia). In many countries, all unnatural deaths are referred to special enquiry, often by a coroner or special medical examiner, who carries out an investigation into the circumstances surrounding the death. The types of deaths subject to a special enquiry are laid down in a coroners Act or other regulations.

32. Deaths from external causes are frequently underreported. Although accidents and violence typically account for about 10% of all deaths (and an even higher percentage in some countries), they are often systematically undercounted by civil registration systems.¹² Among the most important reasons for this underreporting is the legal requirement that deaths due to accidents and violence be investigated by the police or a coroner (Box 2). In such cases, the cause of death may be initially registered as not defined or unknown, pending the outcome of the investigation. It is common for there to be significant delays in finalizing the data, and the true cause of death may never be corrected in the vital statistics system.

33. Accidental deaths may also be missed if the ICD rules are not correctly applied, and the cause of death is attributed to the immediate condition that led to death (e.g. pneumonia), instead of to the underlying injury that precipitated the sequence of morbid conditions that led to death.

34. In some countries, coroners are usually magistrates, employed by the department of justice. Police officers assist coroners or special examiners with their enquiries into the cause of death. A postmortem examination is often ordered to establish the medical cause of death. This is a detailed internal and external examination of the body by a pathologist or government medical officer. During a postmortem, all parts of the body are inspected thoroughly to determine the presence, nature and extent of any disease or injury. In most cases, laboratory tests are also needed. Tests can include microscopic examination of tissue samples from the major organs, and may include chemical analysis for drugs, alcohol or poisons. While the event of death can usually be recognized by a layperson, the cause of death has to be correctly diagnosed by a qualified medical doctor. In countries where there is a shortage of medical doctors in rural areas, it is often the village leader or local registrar who provides a lay opinion about the cause of death. However, non-medically certified data on causes of death are of little value either at the individual level, for legal purposes, or at the population level, for public health purposes. In statistical analyses these data should never be combined with cause-of-death data that are medically certified.

35. In settings where deaths occur outside of medical facilities, verbal autopsy can be used to determine cause of death. It is important to note that the purpose of a verbal autopsy is to obtain information on cause of death at the community or population level but not to legally assign cause of death at the individual level. Verbal autopsy involves asking caregivers, friends or family members about signs and symptoms experienced by the deceased person in the period before death. This should be done with a standard questionnaire that collects details on signs, symptoms and any medical history or events prior to death.¹³ The cause of death or the sequence of causes that led to death is traditionally assigned by a panel of doctors, based on the responses questionnaire and other available information. More recently, computer-assisted statistical tools have been developed to automate the assignment of causes of death. These have produced excellent results and are considerably more cost-effective than the use of physician cause of death assignment.¹⁴

Mortality coding

36. It is not sufficient that the certification of cause of death is correctly done according to ICD standards, it is also essential that the coding of the cause of death is correct and is compliant with ICD rules. Correct selection and coding of the underlying cause of death depends critically on the quality of medical certification which is itself dependent on the quality and completeness of medical records. Most deaths are associated with multiple medical conditions, all of which may have contributed to the death. The international standards provide rules for selecting the cause of death most important or relevant to public health, that is, the underlying cause that gave rise to the chain of other conditions associated with the death. Correctly selecting the underlying cause of death and coding it according to ICD rules and procedures is not a trivial matter; it requires training and skills development. Where the importance of coding mortality data correctly is not understood information that is needed for development of health policies can be lost.

37. Countries should use the alphanumeric codes of the ICD classification for coding and classifying deaths, and use the latest version of the ICD, which is currently the 10th revision, 2nd edition. If this ICD version is not being used, it is important to discuss the specific steps required to upgrade to ICD-10. Correct application of the ICD will be easier if a version is available in one (or more) of the national languages. It is particularly important to compile a list of locally used medical terms, and include this in the alphabetical index volume (see Volume 3 of ICD-10). The basic ICD classification is a list of three-character categories, each of which can be further divided into up to 10 four-character subcategories. When coding skills and resources are limited, it is useful and sometimes necessary to code to a less detailed summary list of categories. Although summary lists reduce the precision of coding (because each category represents a group of diseases rather than a single disease or injury entity), using these larger aggregates tends to diminish the public health impact of diagnostic and coding errors, and improve comparability.

38. In some countries, mortality coding is done centrally, often in the ministry of health or national statistical office; in other countries, coding is done in hospitals where the death occurred. Centralized coding of cause of death facilitates the application of common standards and procedure; it is also likely to make error detection and correction easier. In decentralized coding systems used in hospitals, it is easier to access the patient records in case of doubt about the certification, and there are advantages in terms of timeliness and local level use of the data. However, there are risks of a certain amount of local interpretation, which could result in national data inconsistencies.

39. Automated coding systems are in use in many developed countries and can greatly facilitate correct coding for most deaths. One example is Iris, a software has been designed so that it can be adapted and used by any country. Iris is the product of a long international collaboration aiming at improving and facilitating the quality and comparability of mortality statistics.¹⁵ However, a cadre of specialist coders will always be required for difficult or complex cases and automated coding systems cannot be used for coding external causes of death

40. In some countries, coding is done by the same physicians who certify the cause of death. This is not the preferred option; few physicians have the requisite detailed knowledge of the ICD coding categories and coding is not the best use of their medical skills.

41. It is more appropriate if coding is done by administrative clerks/clinical coders and statistical assistants who have been specially trained. This fosters the development of a specific cadre of specialized coders who have in-depth knowledge of the ICD rules and procedures. All coders should follow a formal training course on correct coding of death certificates. On-the-job training is important, but training courses with standardized curricula ensure consistency of knowledge transfer.

Data quality checks

42. Data evaluation and critical assessment should be integral to all vital statistics systems but is often neglected. The result is that the information on births and deaths collected at great expense is not used as well as it could be, and those collecting the data are not fully rewarded for their efforts.

43. Completeness can be evaluated directly by careful monitoring of statistical returns from local registrars and identifying gaps or discrepancies in trends of time that could be indicative of a breakdown in the reporting system. Delayed registration should be tracked because it is indicative of under-reporting in previous time periods. Ongoing measurement of the delay between occurrence and registration can indicate whether the system is improving or deteriorating.

44. Completeness can also be evaluated using demographic techniques. Some methods compare data from independent sources (direct “capture–recapture” approaches). There are also indirect demographic techniques for estimating the completeness of death registration; for example, the Bennett–Horiuchi, Chanrasekaran–Deming and Brass Growth Balance methods. These are described in the UN Principles and Recommendations. 14 Methods such as these are often used by national statistics offices or academic institutions to estimate registration completeness.

45. To be useful for public health purposes and population planning needs, data at the individual level need to be aggregated in a way that maximizes their public health relevance. There are international standards for the most useful ways of aggregating and tabulating data, and these standards can assist countries in the use of statistics for health and social policy and planning. For example, the UN provides a minimal list of recommended characteristics for tabulating birth and death statistics.¹⁶ The ICD proposes four different condensed cause-of-death tabulation lists, and also provides recommended age groups. Volume 1 of the ICD-10 contains recommended tabulation lists. More recently, WHO has provided advice to countries about how to compile leading cause of death lists.¹⁷

46. As a minimum, cause of death tabulations should include the following information, by ICD 3- or 4- digit codes, where available. For countries unable to report in such detail, tables should be presented using the ICD tabulations short list.

- Numbers of deaths for a specified year;
- By sex (i.e. for males and females separately);
- By age at death using the following age groupings:
 - Within the first 24 hours after birth
 - Between 1 day and 28 days after birth;
 - Between completed months 1-11;
 - Between completed years 1-4;
 - Completed years 5-9;
 - Completed years 10-14 etc, by 5-year age groups, up to completed years 80-84;
 - Completed years 85 and over;

47. To assist countries in validating and correcting their mortality data, WHO, in partnership with the University of Queensland, has developed a mortality statistics assessment guide and toolkit which describes simple ways of analysing the internal validity and coherence of mortality data and shows how comparisons with other, external, sources of mortality data can be used to assess data consistency and plausibility.¹⁸

48. In countries with compulsory and universal recording of vital events, the national vital statistics system should be able to provide annual data showing frequency distributions for births, deaths, and cause of death; geographical differentials for the most important characteristics; and time series showing the major trends (at least over the past decade or two).

49. Death rates are usually age standardized, to separate the impact of population age structure from true mortality impact. There are guidelines on how to choose a standard age structure to determine “age-standardized rates”, as well as advice on how to calculate and interpret the results.¹⁹ As with age, data and analyses of causes of death should always be presented separately for males and females, to maximize their public health value. Some causes of death (e.g. road traffic accidents) are more common among men than women. Conversely, only women can die from maternal causes, and some cancers (e.g cervical cancer in women and prostate cancer in men) are clearly sex-specific.

50. In the case of cause-of-death statistics, tabulating and checking the validity of data is complex. Before data are released, a number of simple plausibility and consistency checks should always be performed to assess how robust and credible the data are, and for what purpose they can be used. For example, an important consideration in assessing the quality of cause-of-death statistics is the need to identify and analyse the proportion of deaths that have been assigned to ill-defined cause-of-death categories. This proportion should be carefully monitored over time, because any change in the proportion of deaths assigned to these categories will affect the interpretation of trends in specific causes. Deaths coded to these categories have no public health utility, and great efforts should be made to avoid this practice. It is also important to be aware that some major cause-of-death categories in the ICD contain several non-specific disease codes that tend to be overused in countries with poor certification and coding. These “convenience” codes are also of very limited value for public health purposes. Avoiding these vague and ill-defined diagnoses wherever possible

requires additional care and appreciation among certifying doctors of the true value of accurate cause-of-death statistics.

Data access and dissemination

51. In many countries, policies around the management, dissemination and use of vital statistics are poorly developed. In fact, vital statistics data have little intrinsic value in themselves. Only after they have been compiled, managed and analysed do they produce information. And information acquires added value when it is integrated with other information and formatted for presentation, communication or dissemination evaluated in terms of the issues confronting decision-makers.

52. Once data have been checked for completeness and quality, and appropriately aggregated and tabulated, they should be rendered accessible to potential users through an integrated data repository that allows users to query the data and generate outputs of relevance to their specific needs. Users of vital statistics data include the health sector as well as other social and economic sectors, academic institutions and researchers, civil society groups, NGOs and development partners.

Conclusions

53. In most settings, the ministry of health has a widespread network of health care facilities, including hospitals, health centres, and health posts, and outreach clinics. This stable, complex and functional network provides a mechanism for reaching individuals and families in the community. Community health workers, for example, have frequent contacts with the local population through provision of maternity and infant care, and services for the detection and treatment of diseases such as malaria, HIV/AIDS, and tuberculosis. By contrast, community members will have only occasional contact with the civil registrar's office, if and when they register a birth or death. In recognition of this, many countries, such as Ethiopia and Rwanda, are developing programmes to monitor vital events using health extension workers.

54. The health sector is a major user of vital events data for health programme planning, monitoring and evaluation. It is also increasingly contributing to the collection of birth and death data through health care facilities. This has led health agencies to take a more proactive role in support of improved civil registration and vital statistics systems. Existing standards and guidelines developed by the World Health Organization have focused primarily on cause of death certification and coding. However, work is currently under way to support ministries of health to work closely with other stakeholders, notably registrars-general, ministries of the interior and justice, and national statistics offices, in improve the completeness and quality of civil registration and vital statistics.²⁰

Table 1 Empirical observations of maternal mortality by major sources, late 1980s to 2008

Data sources	Global		Sub-Saharan Africa	
	Number	% of total births	Number	% of total births
Complete civil registration with medical certification of cause	296	61	4	5
Household surveys	118	24	64	85
Census	14	3	6	8
Sample registration	4	1	0	0
Surveillance	41	8	1	1
Reproductive age mortality studies	11	2	0	0
All sources	484	100	75	100

Box 1 International form of medical certificate of cause of death

Death certificates are the main source of mortality data. A properly completed certificate of death shows clearly why and how the death occurred; it also contains key personal characteristics of the deceased person. The parts of this certificate that give information on cause of death (Parts I and II), and a section to record the time interval between the onset of each condition and the date of death, are shown below.

In completing the certificate, the certifier should report any disease, abnormality, injury or external cause that is believed to have contributed to the death. Modes of death (e.g. respiratory failure and heart failure) should not be considered as causes of death.

INTERNATIONAL FORM OF MEDICAL CERTIFICATE OF CAUSE OF DEATH

Cause of death		Approximate interval between onset and death
I		
Disease or condition directly leading to death*	(a)
	due to (or as a consequence of)	
Antecedent causes Morbid conditions, if any, giving rise to the above cause, stating the underlying condition last	(b)
	due to (or as a consequence of)	
	(c)
	due to (or as a consequence of)	
	(d)
II		
Other significant conditions contributing to the death, but not related to the disease or condition causing it

*This does not mean the mode of dying, e.g. heart failure, respiratory failure. It means the disease, injury, or complication that caused death.		

Source: WHO (2007) (28)

Box 2 **Special enquiry systems**

Unnatural deaths include deaths caused by accidents, suicides and homicides; deaths with unknown causes; deaths in which the deceased person did not see a doctor in the preceding three months; and certain special cases (e.g. deaths occurring in prison or during anaesthesia). In many countries, all unnatural deaths are referred to special enquiry, often by a coroner or special medical examiner who carries out an investigation into the circumstances surrounding the death. The types of deaths subject to a special enquiry are laid down in a coroners Act or other regulations.

In some countries, coroners are usually magistrates, employed by the department of justice. Police officers assist coroners or special examiners with their enquiries into the cause of death. A postmortem examination is often ordered to establish the medical cause of death. A postmortem is a detailed internal and external examination of the body by a pathologist or government medical officer. During a postmortem, all parts of the body are inspected thoroughly to determine the presence, nature and extent of any disease or injury. In most cases, laboratory tests are also needed. Tests can include microscopic examination of tissue samples from the major organs, and may include chemical analysis for drugs, alcohol or poisons.

Figure 1 - Percentage of births with a skilled attendant by country income groups, 2000-2008

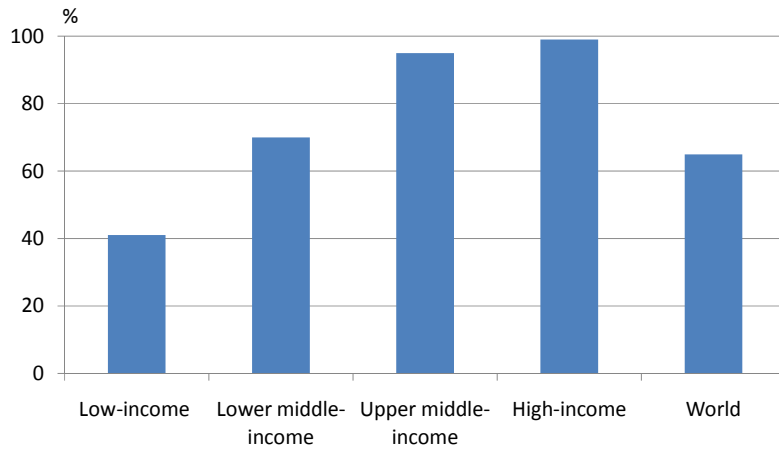


Figure 2 - Number of surveys in low-income countries generating child mortality data, 1980-2009

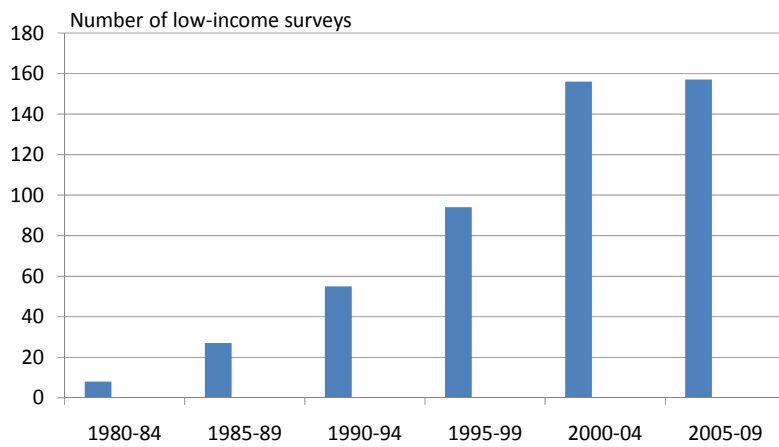
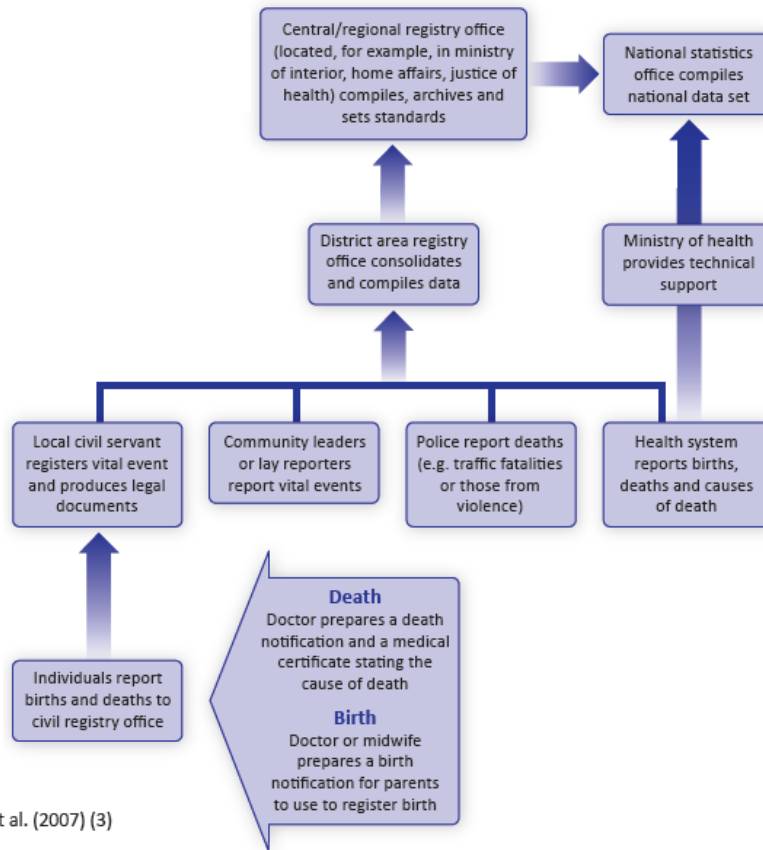


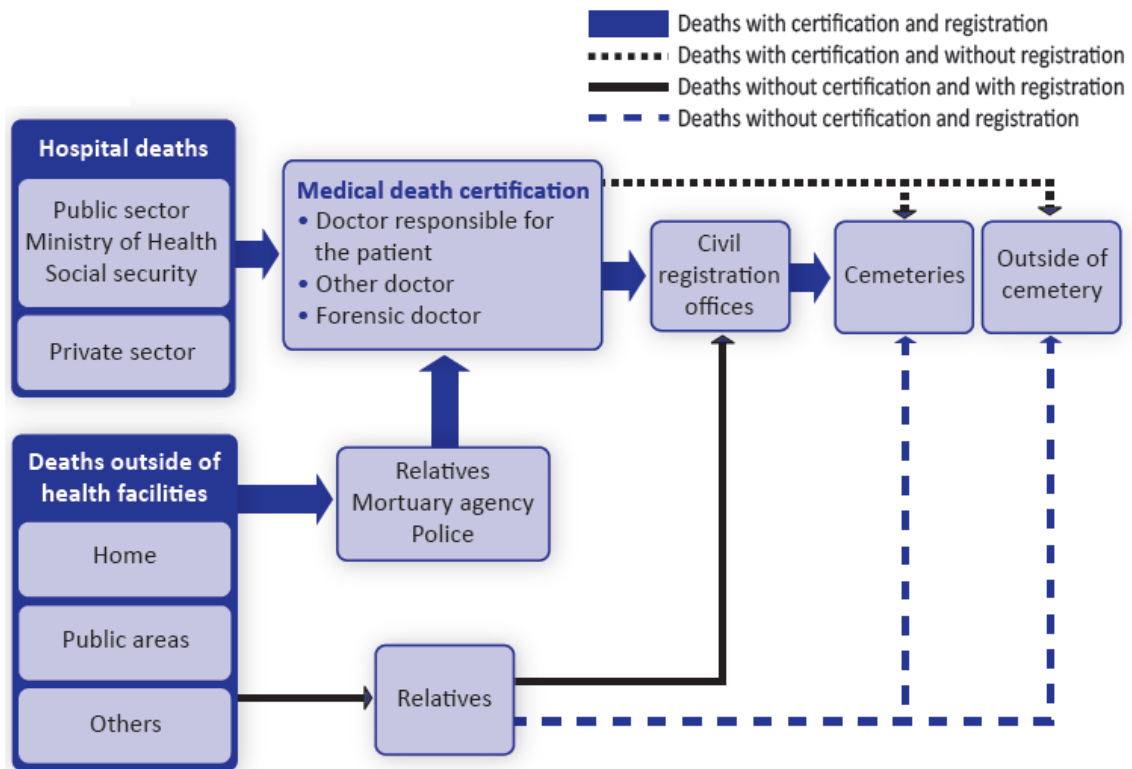
Figure 3 Schematic presentation of civil registration and vital statistics systems



Based on Setel et al. (2007) (3)

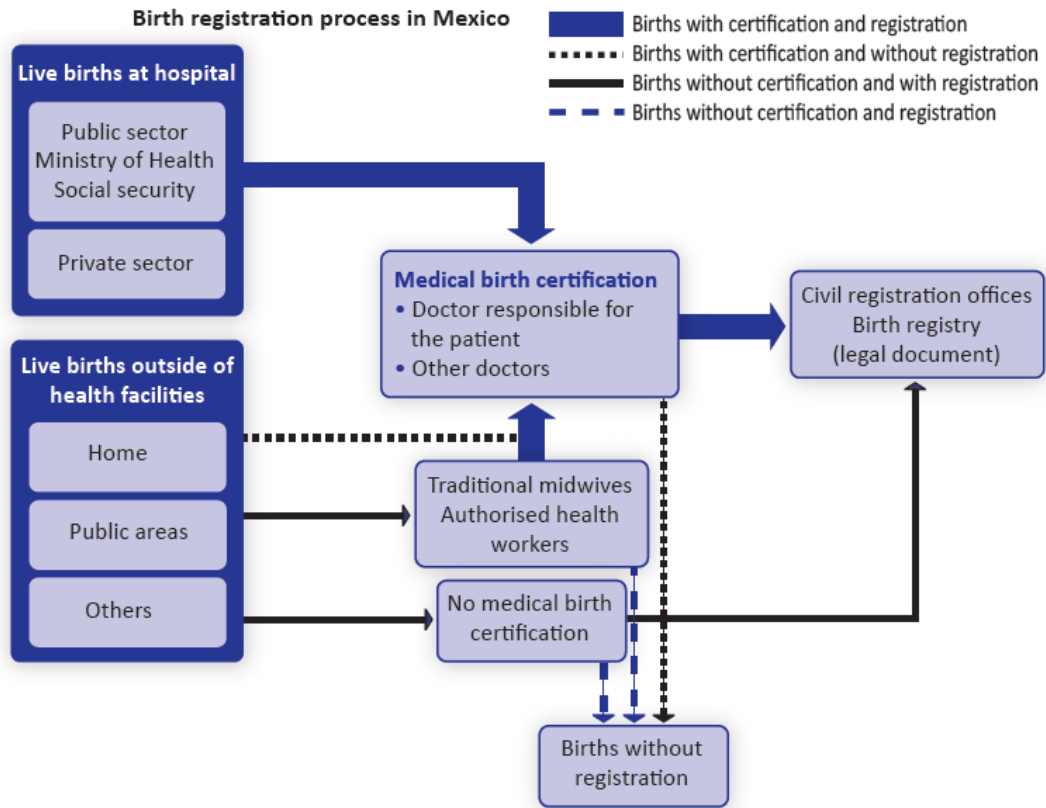
Figure 4b

Death registration and certification process in Mexico



Source: R Lozano, Institute for Health Metrics and Evaluation, University of Washington, personal communication, 2009

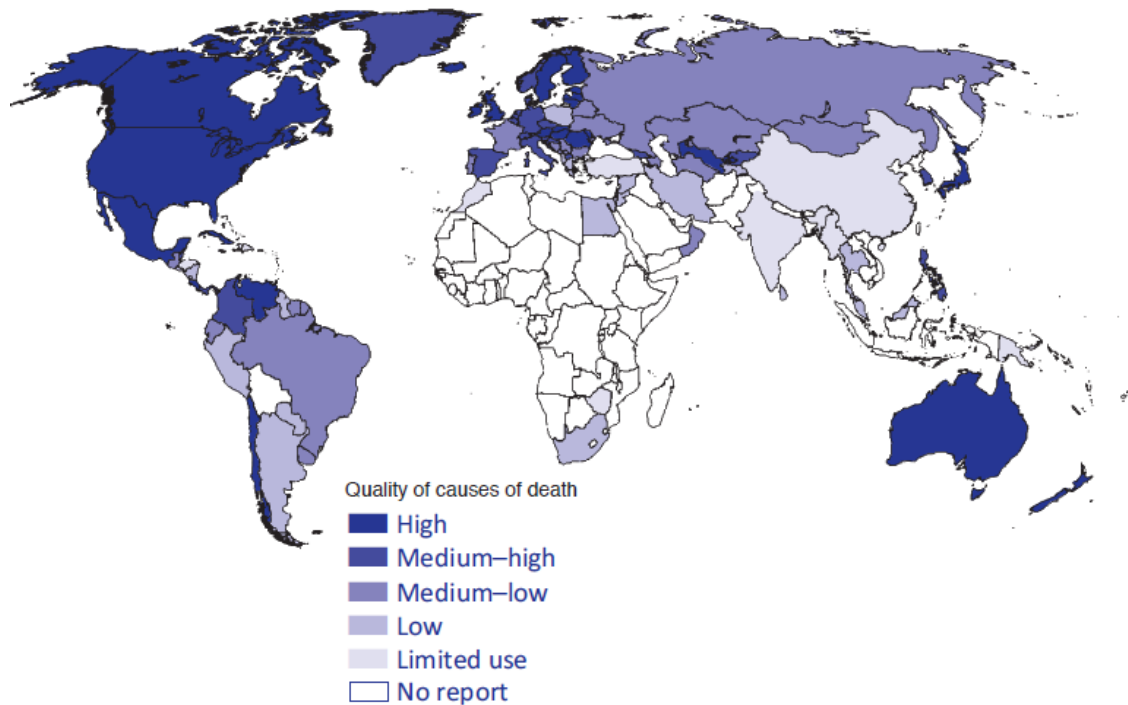
Figure 4a



Source: R Lozano, Institute for Health Metrics and Evaluation, University of Washington, personal communication, 2009

Figure 5

Quality of globally available information on causes of death



The boundaries and names shown and the designation used on this map do not imply the expression of any opinion whatsoever on the part of the WHO concerning the legal status of any country, territory, city or area of its authorities, or concerning the delimitation of its frontiers or boundaries.

Map production: Public Health Mapping and GIS Communicable Diseases (CDS), WHO.

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¹ For example, USAID-supported Demographic and Health Surveys, UNICEF-supported Multiple Indicator Cluster Surveys, and PAPCHILD and PAPFAM surveys.

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Available at <http://www.who.int/healthinfo/statistics/LancetWhoCounts/en/index.html>

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