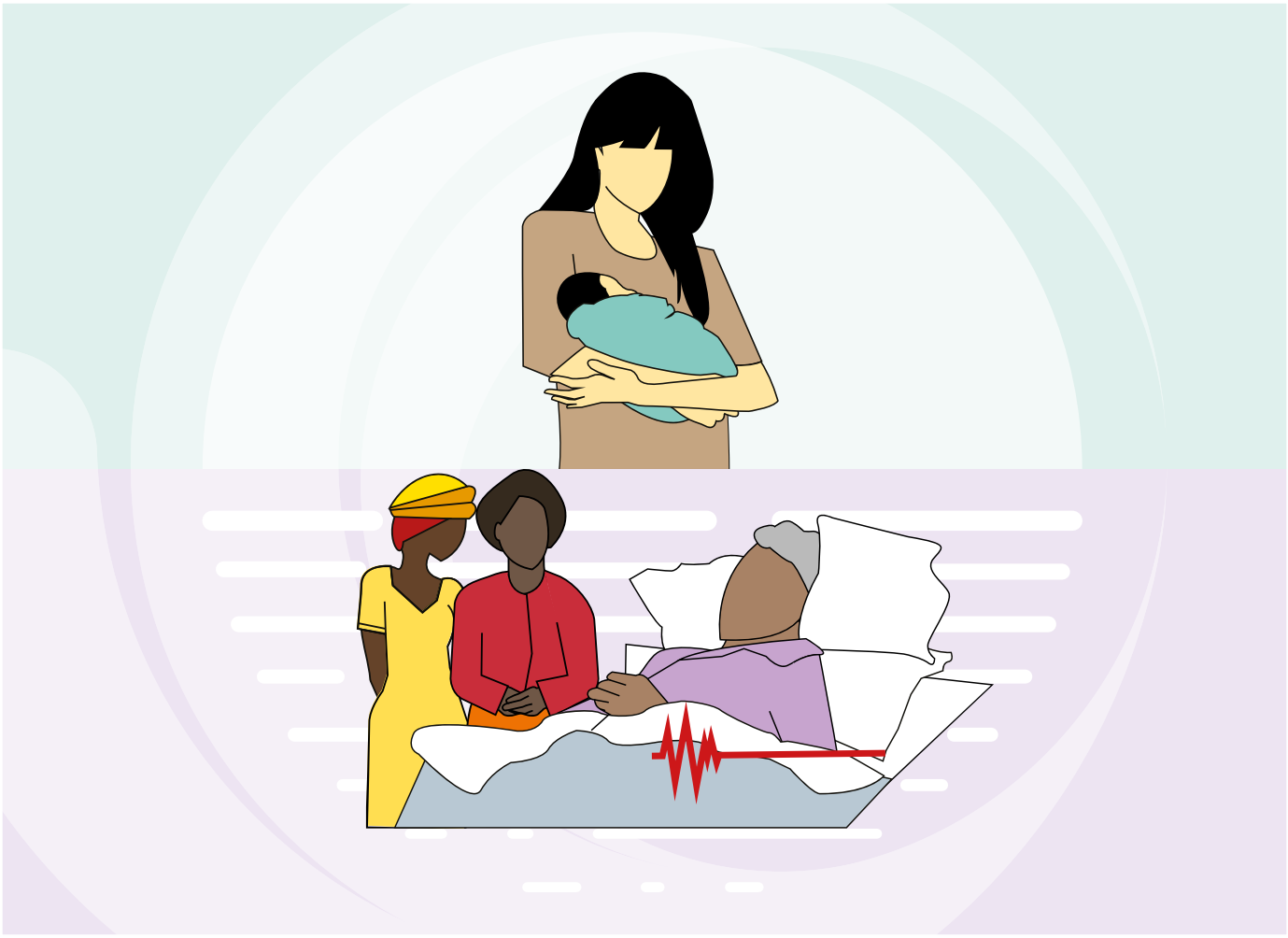

HEALTH SECTOR CONTRIBUTIONS TOWARDS IMPROVING THE CIVIL REGISTRATION OF BIRTHS AND DEATHS IN LOW-INCOME COUNTRIES

Guidance for health sector managers, civil registrars and development partners

World Health Organization

unicef
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FOREWORD

THE civil registration of births and deaths represents more than a legal recognition of a person's existence – it gives people access to services, protections, rights and benefits central to their health and well-being, as well as their ability to participate in the civil and political lives of their countries.

But in many parts of the world, weak civil registration systems leave many births and deaths unregistered and uncounted.

This "scandal of invisibility" is linked to increased risks of poverty, vulnerability, statelessness, marginalization and exclusion from health, social, economic and political development.

And the problem is significant. Today, around 3 in 10 infants globally have not had their births registered – over 80% of them in sub-Saharan Africa and South Asia.

This leaves them unable to make claims of nationality, exercise civil and political rights, access services such as health and education, and participate in their societies. It also renders people – especially girls and women – vulnerable to exploitation and hardship.

At the same time, globally, fewer than half of all deaths are formally reported, legally registered or officially counted, and the causes of these unregistered deaths are largely unknown.

Without this legal documentation, surviving family members lack evidence of changed civil status, depriving surviving spouses of the opportunity to remarry, and making it difficult for surviving family members to access possessions, benefits, entitlements and inheritance. It also leaves children vulnerable to orphanhood.

As we release this new guidance on how the health sector can help improve the civil registration of births and deaths, the world is struggling to combat the COVID-19 pandemic. Improved data on births and deaths would dramatically help countries and communities improve local and national planning and monitoring efforts to defeat COVID-19.

Beyond COVID-19, civil registration and vital statistics (CRVS) systems are also a cornerstone of a strong health system for the future. By providing governments with reliable and up-to-date fertility and mortality statistics, including causes of death, authorities and policy-makers can effectively design, target and deliver stronger, evidence-based health programming.

As the United Nations Children's Fund (UNICEF) and World Health Organization (WHO) jointly release this new guidance, we also recognize that we cannot achieve stronger CRVS systems without the advice of global experts and partners around the world.

We look forward to working with all partners to bring this new guidance to life, and realize our shared vision of stronger civil registration systems that can unlock better health outcomes for people around the world.

Dr Tedros Adhanom Ghebreyesus
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World Health Organization

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ABBREVIATIONS

APAI-CRVS	Africa Programme for Accelerated Improvement in Civil Registration and Vital Statistics
API	application programming interfaces
ASFR	age-specific fertility rate
ASMR	age-specific mortality rate
BCG	Bacille Calmette–Guérin (vaccine)
CDR	crude death rate
CHW	community health worker
CR	civil registration
CRO	civil registration office
CRVS	civil registration and vital statistics
CSEG	Core Stillbirth Estimation Group
DHIS2	District Health Information System 2
DHS	Demographic and Health Surveys
DPT	diphtheria–pertussis–tetanus vaccine
ENMR	early neonatal mortality rate
EPI	Expanded Programme on Immunization
GDPR	General Data Protection Regulation (European Union)
HAART	highly active antiretroviral therapy
HIV	human immunodeficiency virus
HMIS	health management information systems
ICD	International Classification of Diseases
ICT	information and communications technologies
ID	individual identity
IDSR	integrated disease surveillance and response
IHR	International Health Regulations
IMR	infant mortality rate
KMC	kangaroo mother care
LBW	low birth weight
LIA	Legal Identity Agenda (UN)
LMIC	low- and middle-income countries
MCCD	Medical Certificate of Cause of Death
MCV	measles-containing vaccine
MICS	Multiple Indicator Cluster Surveys
MLDI	medico-legal death investigation
MMR	maternal mortality ratio
MPDSR	maternal and perinatal death surveillance and response
NGO	nongovernmental organization
NMR	neonatal mortality rate
NVP	nevirapine prophylaxis

OHCHR	Office of the United Nations High Commissioner for Human Rights
PCVA	physician-certified verbal autopsy
PIN	personal identification number
PMR	perinatal mortality rate
PMTCT	prevention of mother-to-child transmission of HIV
PNM	post-neonatal mortality
RITA	Registration, Insolvency and Trusteeship Agency (United Republic of Tanzania)
RMNCH	reproductive, maternal, newborn and child health
SBR	stillbirth rate
SDG	Sustainable Development Goal
SMoL	startup mortality list (WHO)
SOP	standard operating procedure
TB	tuberculosis
TFR	total fertility rate
UHC	universal health coverage
UIN	unique identification number
UN	United Nations
UNECA	United Nations Economic Commission for Africa
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNGA	United Nations General Assembly
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
UNSD	United Nations Statistics Division
USAID	United States Agency for International Development
U5MR	under 5 mortality rate
VA	verbal autopsy
WHO	World Health Organization

EXECUTIVE SUMMARY

THE civil registration of births and deaths provides legal evidence of their occurrence and enables individuals and families to document identity, civil status and family relations, to claim social, economic and political rights, and to access multiple socioeconomic benefits. Beneficiaries of registration also include local and national agencies of the state because the information collected on individual births and deaths can be compiled and analysed to generate vital statistics on fertility and mortality, including patterns of causes of death. These foundational statistics underpin policy and planning across multiple sectors, as well as health.

Individuals and families must take responsibility for ensuring that births and deaths are registered. But they face many hurdles: registration points may be far away, difficult and costly to reach, and registration processes may be complex and daunting, especially for people who are economically and socially disadvantaged.

The health sector can be a powerful ally in helping families overcome such barriers and ensure that the births and deaths of their loved ones are officially registered. Health workers are in contact with people throughout the life course – during pregnancy, at birth, during infancy and childhood, adolescence, adulthood and in old age. They provide care during hospitalization and in the community, especially for people with chronic and other long-term conditions. These workers can record key information on births and deaths and, where the law permits, can be designated as informants of the occurrence of births and deaths to the civil registrar. Moreover, only trained medical professionals have the knowledge and skills to reliably ascertain causes of death according to international standards.

This document, jointly developed by the United Nations Children's Fund (UNICEF) and the World Health Organization (WHO), with inputs from technical partners and country representatives, aims to bring health and civil registration and vital statistics (CRVS) stakeholders together in a joint endeavour in support of people's rights and obligations related to civil registration. It suggests ways in which civil registration authorities can tap into the widely distributed network of health workers, accepting information from them on births and deaths for the purpose of registration, or, indeed, delegating certain tasks to the health sector. It enshrines the recording and sharing of information on births and deaths with civil registration authorities as a key responsibility of health workers when an infant is born or when someone dies. This need not be a burden; the information required for civil registration is a subset of that routinely collected in health settings for patient management and for public health purposes.

The guidance opens by describing the characteristics of the civil registration system and provides references to principles and standards as set by the United Nations and WHO. It also lays out the major steps involved from the occurrence of a birth or a death, to its inclusion in the civil registration system, the issuance of related certificates, and the process whereby the information contained in the individual records is transformed into statistics on fertility and mortality. However, the main focus of this guidance is on the initial steps of birth or death notification, registration and certification.

The document outlines the mutually beneficial relationships between national CRVS systems, whereby the health sector is both a beneficiary of an improved CRVS system and a major contributor to CRVS strengthening. Major barriers to birth and death registration and opportunities for overcoming them through stronger cross-sectoral linkages and a supportive enabling context are described.

The two main chapters of the document offer practical, operational guidance for the health sector on birth registration and on death registration. Each chapter provides a generic description of the registration process and highlights the opportunities for using health records to identify the occurrence of births and deaths and provide the information needed for civil registration. Throughout, a distinction is drawn between the information required for legal registration purposes and more detailed information needed for health and statistical purposes. Both chapters address the role of the health sector in the recording of

information on stillbirths which are not registered in the same way as live births but which should be formally recorded in both health and civil registration systems as key markers of health and development. Both chapters present process indicators, which can be used to track progress towards the achievement of increased birth and death registration and outline the required minimum statistical tabulations on births and deaths. The document concludes with a description of the supportive context and conditions needed to achieve productive linkages between health and civil registration systems.

1

INTRODUCTION

1.1 Rationale and objectives

The impetus for this guidance is the startling fact that the births of 166 million children under age 5 and 29 million deaths are not registered worldwide, and millions of people are without fundamental legal trace of their existence (UNICEF, 2019, WHO, 2017, p. 7). One out of four children under age 5 and half of all deaths are never officially recorded in a country's civil registration system, leading to a "scandal of invisibility" associated with increased risks of poverty, vulnerability, marginalization and exclusion from health, social, economic and political development. Many unregistered persons are at risk of statelessness because of their inability to register their birth or otherwise prove their entitlement to nationality through parentage and civil status (UNHCR, 2012, 19).

The civil registration of births and deaths represents the legal recognition of a person's existence, from the start of life until death, and implies an acknowledgement of the responsibilities of the state towards the individual. The civil registration of a birth or death, including a stillbirth, within days of its occurrence helps to enable individuals and their families to access essential resources and health care.

The low rates of civil registration that currently exist in many low- and middle-income countries (LMIC) have been attributed to a multiplicity of barriers. These include outdated or inadequate civil registration systems and laws; inaccessibility and remoteness of registration offices; prohibitively high direct and indirect costs associated with civil registration; overly complex forms and procedures involving multiple visits; and lack of awareness of the importance of civil registration and the benefits of legal registration documents. In addition, a range of social and cultural factors makes it especially difficult for vulnerable groups – such as women and girls, the poor, migrants and stateless persons – to access civil registration.

This document is based on the premise that the health sector can help overcome many of these barriers and play an active role in ensuring that many more births and deaths are officially registered by national civil registration systems. This follows because "vital events" such as births and deaths often take place within the health sector. Health workers are in contact with people throughout the life course; they are often present at a birth, provide care during hospitalization and through community-based programmes, offer health support throughout childhood, adulthood and into old age and therefore are well-placed to record the circumstances of a birth or a death. Furthermore, where the law permits, health workers can be designated as official informants of the occurrence of births and deaths and in this capacity can provide the civil registration authorities, usually a local civil registrar (CR), with the information that is needed to formally register a vital event.

The benefits of higher rates of civil registration are not limited to the individual nor are they one-sided: the state and the health sector also have much to gain from improved systems for registering births and deaths. Information collected through civil registration can be used to generate vital statistics on fertility and mortality on a continuous basis, both nationally and down to the lowest administrative level of a country. These data support the planning, delivery and monitoring of health status and health system functioning and are, therefore, fundamental to health decision-making and policy development. The COVID-19 pandemic has thrown a spotlight on the critical importance of vital statistics, specifically on deaths and their causes. The civil registration of deaths is key to understanding a pandemic's spread, size and trajectory (Shkolnikov et al., 2020). The main objectives of this guidance document are thus:

- to make the case for the proactive involvement of the health sector in civil registration and vital statistics (CRVS) systems; and
- to draw attention to the mutual benefits of health sector involvement to strengthen the civil registration system and improve vital statistics used for monitoring health outcomes.

In order to fulfil these overarching objectives, this guidance document sets out the pathways whereby health sector officials can contribute to making major vital events – births and deaths – known to the civil registry so that they can be officially registered, thus providing individuals and their families with the relevant certificates and a gateway to the benefits associated with civil registration. While the focus of the guidance is on the processes leading up to the registration and certification of births and deaths, this document also provides advice on enhancing the availability and quality of vital statistics, by highlighting the data elements that are needed to compute internationally comparable fertility and mortality indicators.

1.2 What is civil registration and why does it matter?

The 1948 Declaration of Human Rights (UNGA, 1948, article 6) and other global accords, including the 1989 Convention on the Rights of the Child (UNGA, 1989, article 7, p. 3), affirm that every person has the right to be recognized as such before the law.[1] Civil registration is the process by which a person's legal identity is bestowed, and conventionally commences with the recording of an individual's birth and the issuance of a birth certificate.

Civil registration is defined by the United Nations (UN) as the "continuous, permanent, compulsory, and universal recording of the occurrence and characteristics of vital events pertaining to the population, as provided through decree or regulation in accordance with the legal requirements in each country" (UNSD, 2014, para. 279). It is carried out primarily for the purpose of providing people with the legal documents they need, such as birth and death certificates. The vital events that the UN recommends be included in civil registration systems are live births, stillbirths, deaths, marriages, divorces, annulments, judicial separations, adoptions, legitimations and recognitions (UNSD, 2014, para. 290). In this publication we focus on the civil registration of live births, stillbirths and deaths.

The birth certificate provides not only the first documentary evidence of an individual's legal identity and family relationships, but also a foundation upon which other individual identity systems can be built. The registration of deaths provides evidence of the cessation of the legal and administrative relationship between the individual and the state and enables the updating of administrative registers, such as the national identity management system, the population register and various social security and welfare registers, as well as the electoral roll.

Registration of births and deaths benefits individuals and families, primarily by facilitating access to a range of social, economic and political services (see Box 1). More fundamentally, persons who are registered and who are in possession of civil registration documentation are less vulnerable to statelessness and all its associated risks. The benefits of registration are especially evident during periods of conflicts and humanitarian disaster, when possession of or the ability to access civil registration records becomes critical for the re-unification of separated families.

For the state's administrative purposes, civil registration is the source of information needed to maintain up-to-date information on births, deaths and civil status, which form the basis of sustainable identity management systems (Mills et al., 2019). In addition, information compiled from birth and death registration systems underpins planning across multiple sectors and supports the development of policies and action plans aimed at improving health and well-being across the life course and for disadvantaged or vulnerable populations (see Box 1 and Section 2.2).

Civil registration, which is by definition, universal and continuous and establishes a legal identity for every individual from birth, is fundamental to the provision of essential health care for all. A robust civil registration system that is integrated with individual identities (IDs) goes further and contributes to implementing effective and efficient programmes aimed at achieving universal health coverage (UHC) (Dharwadker and Mills, 2019).

1.3 Civil registration records as a source of vital statistics and development indicators

As mentioned in Box 1, civil registration is important not only because it confers legal identity, but also because civil registration records provide the basis for vital statistics. The continuous, permanent, compulsory and universal nature of civil registration means that these records can be used to generate an ongoing and timely stream of vital statistics to compute demographic and other key development indicators, for the whole population of a given territory. For this reason, it is increasingly common to link these two functions and refer to the CRVS system.

The statistical products of civil registration are of particular relevance for health. The WHO Constitution (1946), which envisages "…the highest attainable standard of health as a fundamental right of every human being", creates a legal obligation on Member States to ensure access to timely, acceptable and affordable health care of appropriate quality, as well as to the underlying determinants of health, such as safe and potable water, sanitation, food, housing, health-related information and education, and gender equality. It is more difficult to reliably plan and develop services in the absence of accurate data on the size of populations and their age and sex structures. Likewise, the attainment

[1] 1989 Convention on the Rights of the Child is the most widely ratified human rights treaty. It reaffirms this most basic human right, that is, the right to be "registered immediately after birth". Article 7 of the 1989 Convention on the Rights of the Child states that: "The child shall be registered immediately after birth and shall have the right from birth to a name, the right to acquire a nationality…" and Article 8 commits State Parties "to respect the right of the child to preserve his or her identity".

Box 1. Why governments should invest in civil registration systems

The process of civil registration, in particular the registration of births and deaths, provides legal evidence of the events and is associated with an array of benefits for individuals and their families. Civil registration also supports the administrative and statistical functions of the state.

Birth registration signifies the beginning of the legal contract between the individual and the state. It provides documentary evidence of the date and place of birth and parentage and thus legally establishes age. Registration can thus help to enforce age-related laws (e.g. marriage, suffrage/enfranchisement, retirement) and to protect children from situations of exploitation and violence, such as child marriage and child labour. While birth registration does not in itself confer citizenship upon the child, it is often essential for its acquisition, depending on a country's laws.

Children who are not registered at birth are at risk of being excluded from multiple legal, social and economic benefits, including citizenship. For instance, a birth certificate may be required to obtain access to basic services such as health care and education. In later life, a birth certificate may be needed for many purposes: to obtain social security or to secure employment in the formal sector; to buy or to prove the right to inherit property; to obtain identity cards; to open a bank account; to vote; and to obtain a passport. Overall, the lack of a birth certificate can have a serious, cumulative, negative effect on a person's opportunities in life.

Death registration is important for both individuals and the state. Death certificates are a legal requirement for establishing inheritance and insurance claims for surviving family members, and for claiming citizenship by descent. Orphaned children often require death certificates in order to establish their familial relationships and ensuing claims of status, such as citizenship. Many countries require a surviving spouse to provide a death certificate for a former spouse before they can remarry. For the state, death registration signals the removal of deceased persons from administrative systems, such as the population register and the electoral roll, and triggers the cessation of social and economic benefits. Death registration provides protection from benefit fraud and from identity theft.

In addition to the benefits to individuals and families, birth and death registration play a crucial role in the generation of **vital statistics**. Civil registration records provide the basic demographic data that are needed by governments to track the size, age and sex distribution, and growth rates of their populations. Such data are also needed to construct key international development indicators such as birth rates, mortality rates and life expectancy, ideally with disaggregation by age, sex and administrative area. Moreover, the ability of countries to monitor their progress towards the SDGs relies heavily on access to the disaggregated data on births, deaths and cause of death that a CRVS system can provide. With 12 of the 17 SDGs requiring civil registration data for measuring progress, investments in civil registration systems are an important step in achieving the SDGs (Mills et al., 2017). **The need for reliable data on deaths and their causes has been amplified during the COVID-19 pandemic (see Box 2) and as discussed in Chapter 4**.

When civil registration records are complete and accurate, the civil registration system facilitates democratic governance. The civil registration vital statistics guide governments in developing policies and plans for basic service coverage, as well as social and economic development, that responds to the specific needs of different populations. Through these mechanisms, civil registration facilitates the access of both children and adults to protection under the law, to services and entitlements and to social and economic opportunities, and can improve their ability to exercise their civil rights (UNICEF, 2013).

of UHC depends on the availability of accurate population data in order to inform service delivery and provision of health-related services and commodities.

Table 1.1 lists the key fertility and mortality indicators that are used to guide public health policy development, all of which are based on data collected through CRVS systems. In addition to detailed and disaggregated information on the numbers of births and deaths (including cause of death), CRVS systems provide the numerators and population denominators needed for the calculation of several fertility and mortality rates and ratios. For example, and as shown in Table 1.1, the total number of births is the denominator for the stillbirth rate, while the total number of live births is the denominator for early childhood mortality rates and the maternal mortality ratio (MMR). These indicators are universally used by policy-makers as important markers of maternal and child health and the strength of health care systems. Data generated by the CRVS system are also an invaluable source of the data required to monitor progress towards the SDGs, several of which relate to reducing specific causes of premature mortality (see Table 1.2 and Box 1).

A well-functioning CRVS system generates a continuous stream of data on births and deaths not only to support decision-making at international and national levels, but also at the local level. Civil registration data, disaggregated by administrative area, are an important source of timely data on deaths and, importantly, on cause of death; acquisition of which permits analysis of geographic disparities in mortality levels and causes, and allows public health authorities to identify parts of the country in need of improved health facility access and targeted public health interventions. Timely mortality data also help decision-makers identify areas where there may be unexpected increases in deaths, for example, due to extreme seasonal conditions or an emerging epidemic, as described by the European Mortality Monitoring network (EuroMOMO, 2020a) (Box 2).

Table 1.1 Fertility and mortality indicators generated by CRVS systems

Indicators from the CRVS system may be produced for annual or other time periods, and disaggregated by age, sex and geographic area

Indicator	Definition
Number of live births	Total number of live births
Crude birth rate	Number of live births per 1000 population
Age-specific fertility rate (ASFR)	Number of live births to women of a specified age or age group per 1000 women in that age group
Total fertility rate (for women in their child-bearing age 15–49 years) (TFR)	The average number of live births women would have at the end of their reproductive period if they were subject to the age-specific fertility rates of a given period and if they were not subject to mortality. It is expressed as live births per woman.
Sex ratio at birth	Ratio of male births per 100 female births
Numbers of deaths	Total number of deaths, and number of deaths by cause of death
Crude death rate (CDR)	Number of deaths per 1000 population
Stillbirth rate (SBR)	Number of stillbirths (≥ 1000 grams or ≥ 28 weeks' gestation) per 1000 total births
Early neonatal mortality rate (ENMR)	Number of deaths from 0–6 completed days of life per 1000 live births
Neonatal mortality rate (NMR)	Number of deaths from 0–27 completed days of life per 1000 live births
Perinatal mortality rate (PMR)	Number of stillbirths plus early neonatal deaths per 1000 total births
Post-neonatal mortality rate (PNMR)	Number of deaths from 28 days to under 1 year of age per 1000 live births
Maternal mortality ratio (MMR)	Number of deaths of women during pregnancy or within 42 days of termination of pregnancy per 100 000 live births
Infant mortality rate (IMR)	Number of deaths under 1 year of age per 1000 live births
Under 5 mortality rate (U5MR)	Number of deaths under 5 years of age per 1000 live births
Life expectancy at birth	Average number of years that a newborn is expected to live if current mortality rates continue to apply
Age- and sex-specific death rate	Number of deaths by age and sex per 1000 population in the same sex and age group
Cause-specific death rate	Number of deaths due to specific causes per 100 000 population

Table 1.2 Selected Sustainable Development Goals and targets that require CRVS data[a]

SDG	Goal	Definition
SDG 3 Good Health and Well-being		
	3.1	By 2030, reduce the global maternal mortality ratio to less than 70 per 100 000 live births
	3.2	By 2030, end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1000 live births[b] and under-5 mortality to at least as low as 25 per 1000 live births[c]
	3.3	By 2030, end the epidemics of AIDS, tuberculosis, malaria, and neglected tropical diseases and combat hepatitis, waterborne diseases, and other communicable diseases
	3.4	By 2030, reduce premature mortality from noncommunicable diseases by one third through prevention and treatment and promote mental health and well-being
	3.6	By 2020, halve the number of global deaths and injuries from road traffic accidents
	3.9	By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water, and soil pollution and contamination
SDG 11 Sustainable Cities and Communities		
	11.5	By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations
SDG 16 Peace, Justice, Strong Institutions		
	16.1	Significantly reduce all forms of violence and related death rates everywhere
	16.9	By 2030, provide legal identity for all, including birth registration
SDG 17 Global Partnership		
	17.18	By 2020... increase significantly the availability of high-quality, timely and reliable data disaggregated by income, gender, age, race, ethnicity, migratory status, disability, geographic location and other characteristics relevant in national contexts
	17.19	By 2030... support statistical capacity building in countries

Notes:
[a] For a longer list of SDG targets and indicators related to the CRVS system, please see World Bank (2017) and Secretariat of the Pacific Community (no date).
[b] In view of the high likelihood of misclassification of early neonatal deaths, it is recommended that both stillbirth rates and perinatal death rates are tracked alongside neonatal mortality rates.
[c] SDG Target 3.2 also covers reduction of perinatal mortality rates which comprise stillbirths plus early neonatal deaths.
Source: UNGA, 2017.

Civil registration data, by virtue of their continuity, completeness and coverage of small administrative areas, offer important advantages over the data collected by the decennial census and periodic household surveys such as the U.S. Agency for International Development (USAID) sponsored Demographic and Health Surveys (DHS) and the UNICEF Multiple Indicator Cluster Surveys (MICS), which, in the absence of good quality civil registration data, have been widely used to estimate key fertility and mortality indicators for many LMIC. In addition, data collected within the framework of the civil registration system have legal authority and protection, providing assurance of confidentiality, privacy and security.

In recognition of the critical role that the registration of births and deaths play in enabling SDG monitoring, CRVS is a target in its own right in the SDG framework (Goal 16). It is necessary for monitoring key outcome indicators (Goals 3, 11 and 16); and is a crucial strategy for advancing progress in other SDGs, (e.g. social inclusion, access to education). Target 16.9 is specifically focused on CRVS as the foundational system for the establishment of legal identity. Indicator 16.9.1 measures birth registration as a first step in obtaining a legal identity. Target 17.19, which is focused on building statistical capacity, also requires birth and death data from functional CRVS systems.

Box 2. Real-time mortality data from CRVS systems – key to monitoring the COVID-19 pandemic

The COVID-19 pandemic threw a spotlight on the need for rapidly available and reliable data on deaths and their causes. The daily count of the numbers of deaths, alongside numbers of confirmed cases and hospitalizations, is an important indicator of the epidemic's evolution in countries, cities and administrative areas. Initially, daily death counts were based solely on hospital reporting of deaths of hospital patients identified as positive for COVID-19. However, these counts often do not systematically include those who have died outside of a hospital (e.g. at home, in a social care institution or elsewhere). Reliance on hospital figures alone can lead to an underappreciation of the scale and direction of the epidemic. Many countries have recognized that a better, more complete, source of COVID-19 mortality data is a well-functioning CRVS system that captures all vital events within their borders, including detailed information on all registered deaths, by age and sex, date of occurrence, geographic location and cause of death.

To respond to the demand for quickly available and complete data on mortality, countries have ramped up their statistical reporting systems to quickly provide complete mortality data on a weekly basis, easily visualized in a series of maps and graphs, to periodically estimate "excess mortality", i.e. the gap between the total number of people who died (from all causes) and the historically expected levels of mortality for the same place and time of year (EuroMOMO, 2020b). Enumeration of all deaths, when compared with expected mortality based on historical trends, produces a picture of excess deaths, capturing both the direct burden of the epidemic and its indirect mortality burden caused by disruptions to the access and use of health care services. Excess mortality can be monitored both nationally and at subnational level (e.g. in cities), providing a greater degree of granularity than is available from national level information alone (Economist, 2020). Weekly death counts have been described as "the most objective and comparable way of assessing the scale of short-term mortality elevations across countries and time" (Leon et al., 2020).

Whereas high-income countries are able to publish excess mortality data from the CRVS system within 1 to 2 weeks, many low- and lower middle-income countries cannot produce data as quickly. In this case, a rapid mortality surveillance system may be established to monitor total deaths in a network of carefully selected sentinel sites that have a high probability of seeing cases and can report death data on a regular basis (Bloomberg Philanthropies, 2020). Rapid mortality surveillance can either leverage existing CRVS systems or be absorbed into them, to maximize the likelihood of long-term success and improve the notification and ultimate civil registration of deaths everywhere. Guidance is available to facilitate rapid mortality surveillance as an essential input to the response to disease outbreaks such as COVID-19, including tracking the epidemic's trajectory after tightening or loosening public health and social measures (Vital Strategies and WHO, 2020).

1.4 Current state of civil registration and vital statistics systems globally

Notwithstanding the legal, administrative and statistical benefits, many countries do not yet have a well-functioning system, that is a system that enables the registration and certification of all vital events occurring in a territory, on a continuous basis, as and when they occur. As a result, many people, especially the poorest and most vulnerable, have had neither their births nor their deaths registered and they are born and die without any formal record of their existence. Although birth registration is almost complete in all high-income countries, the lack of progress on civil registration in many lower income countries means that global inequalities in birth registration are now extreme. In 2019, UNICEF estimated that 27% of the world's children aged under 5 years do not have their births registered, with the vast majority of unregistered children living in South Asia (31%) and sub-Saharan Africa (57%) (UNICEF, 2019).

In some settings, children are not routinely registered at birth but are registered later, for example, when they approach school age. This typically occurs where a birth certificate is required for entry into school. This late registration means that infants and very young children remain invisible, and national and local authorities cannot adequately plan for the provision of services that very young children need, such as health care and routine immunizations.

The proportion of deaths that go unregistered is higher than unregistered births. WHO (2017, p. 7) estimates that, in 2015, only 48% of all deaths were registered. The proportion of deaths that are unregistered is greatest in the younger age groups, especially in very young children (Stoneburner and Greenwell, 2017, p. 10). Children whose births are not registered are also extremely likely not to have their death registered. As a proxy for neonatal death registration, WHO estimates that globally, in 2004, less than 5% of neonatal deaths had official cause-of-death certificates (Lawn et al., 2008). The capture of stillbirths is likely to be even lower. This results in serious underestimation of mortality rates during pregnancy, in infancy and early childhood. Furthermore, the incompleteness of birth and death registration in these particularly vulnerable infants impedes the effective formulation and implementation of interventions to reduce child mortality.

In some settings, while the fact of a death is recorded and included in the civil registration system, the cause of that death is not always documented. Even where cause of death is recorded, it may not have been recorded correctly, and in accordance with WHO International Classification of Diseases (ICD) rules and guidelines (2016). This means that public health decision-making is not based on a true picture of the patterns of mortality in the population. WHO data suggest that a very large proportion of the world's population currently live in countries where cause-of-death data quality is considered inadequate to underpin health policy development and to permit monitoring of progress towards achievement of several key mortality-related SDGs (WHO, 2017). Improved cause-of-death reporting would reap considerable dividends, both in terms of more efficient use of available health resources and more accurate charting of progress towards the achievement of the SDGs.

International commitment to CRVS improvement is reflected in a growing number of collaborative arrangements between countries and development partners. This is reflected in the Global Civil Registration and Vital Statistics Group, which was formed in 2014 and brings together international and regional organizations, nongovernmental organizations (NGOs), funds and foundations, to forge strategic alliances and strengthen national CRVS and related systems (UNSD, 2017). Chaired by the UN Statistics Division (UNSD), members include, among others, UNICEF, United Nations Development Programme, United Nations High Commissioner for Refugees (UNHCR), United Nations Population Fund, WHO, the World Bank and regional development banks, the US Centers for Disease Control and Prevention, the Global Fund to Fight AIDS, Tuberculosis and Malaria, the Secretariat of the Pacific Community, the Bloomberg Data for Health Initiative, the Centre of Excellence for CRVS and the UN Legal Identity Expert Group and Legal Identity Agenda (LIA) task force (UNSD, 2020). In addition, two regional CRVS initiatives: "Get everyone in the picture" (with the UN Economic and Social Commission for Asia and the Pacific [UNESCAP] as the Secretariat) and the Africa Programme for Accelerated Improvement in Civil Registration and Vital Statistics (APAI-CRVS), supported by the Economic Commission for Africa (UNECA), have played key roles in providing ministerial level fora during which country leaders in civil registration, vital statistics and health set targets and review progress towards regional and national CRVS goals and targets.

1.5 The health sector as a partner for civil registration and vital statistics strengthening

As a fundamental partner in CRVS development, the health sector is the primary entity responsible for notifying births and deaths. This role is facilitated to the extent that health functionaries are close to, and generally trusted by, the communities they serve. Secondly, institutions within the health sector are required to report routine data, including selected vital statistics, on a regular basis. Furthermore, the reach of the health sector is substantial, as shown by the high coverage of interventions such as antenatal care, delivery care and childhood immunization, even in countries where birth registration rates are low (see Chapter 3). When these roles are not sufficiently established, the CRVS system is undermined.

By virtue of its reach and proximity to the population it serves, the health sector is ideally placed to support the registration of births and deaths where law permits. In the case of events that occur in hospitals and health centres, routinely collected information – patient records, admission and discharge registers, ward registers and laboratory records – will capture much of the information that is needed to register a birth or death. Records kept by community health workers (CHWs) who serve more rural communities – who are often very close to those communities and thus likely to be aware of any births and deaths that occur – can also be partners for the reporting of vital events.

Superimposed on the health sector's broad ability to capture birth and death events, population- and disease-specific programmes routinely collect information that can also be utilized to improve recording of births and deaths, especially cause of death. Maternal and child health programmes, for instance, monitor pregnancy outcomes, document live births and stillbirths, as well as neonatal, infant and under-5 deaths and maternal deaths. Child health programmes that deliver immunization, nutritional supplements and other interventions aimed at prevention and control of diarrhoeal diseases and respiratory infections also monitor causes of death in children.

The health system has its first contact with individuals at birth – most recent data show that 81% of births take place with the support of a skilled health care worker (UNICEF, 2020). The second contact takes place when parents seek care or immunization services for their newborns – 90% of infants

receive the first dose diphtheria–pertussis–tetanus vaccine (DPT1) (UNICEF, 2020b). Adolescent health programmes focus on patterns of mortality in young people, which tend to be dominated by accidents, interpersonal violence and suicide, childbirth and human immunodeficiency virus (HIV) infection. Vertical, disease-focused programmes and disease registries track mortality due to major communicable diseases (e.g. HIV, tuberculosis [TB], malaria), noncommunicable conditions (i.e. cancers, cardiovascular diseases, respiratory diseases and mental disorders) and external causes of death such as road traffic accidents and violence. Moreover, various global disease surveillance programmes actively monitor the occurrence of deaths due to notifiable diseases such as polio, measles and haemorrhagic fever. These programmes and their associated data systems track disease-specific cases and maintain registers of deaths, recorded and coded in accordance with the ICD, the international standard for cause-of-death reporting.

This guidance envisages a scenario in which improvements in the coverage of national CRVS systems, achieved through greater health sector involvement in the process of civil registration, will also deliver considerable health benefits, both at the individual level and at the population level. In other words, the health sector has much to gain from closer collaboration with the CRVS system. Having accurate information about the age of patients will help health care providers deliver the age-appropriate preventive care, diagnosis and treatment. It may also help to protect underage children from early marriage and pregnancies, and/or forced labour. Civil registration data are also pertinent when assessing whether patients are eligible for free or reduced-cost services, this typically being contingent on age and residency status. Being able to correctly identify a patient and to ascertain their age, sex and place of residence, also allows health officials to keep more detailed and accurate medical records, and thus provide continuity of care both over time and across interventions. This is particularly important for the management of chronic conditions such as HIV, diabetes and cancers.

From the population level perspective, there are equally important benefits to be gained. Accurate and disaggregated data on the numbers and characteristics of births and deaths (including stillbirths) enable decision-makers to identify those areas where there is a need to plan for provision of health care and other services (e.g. education, social services, housing, infrastructure). More specifically, timely availability of data on numbers of births in a given location underpins planning of maternal and child health programmes and the provision of supplies to support, for example, immunization services.

1. 6 Target audience and organization of this guidance

While this document will be of interest to those working in the health sector or to those who are tasked with developing and managing civil registration systems, vital statistics, population registers and/or national ID systems, it is principally directed at policy- and decision-makers with responsibility for health services that provide care to people across the life course. It is these health care services, and the health care workers who deliver them who are central to the notification of the occurrence of vital events, along with information about characteristics of the events, to the civil registration authorities. The guidance is also directed to development partners to assist them to invest optimally in the development of CRVS systems, taking account of the pivotal role of health systems therein.

The guidance is organized as follows. Chapter 2 starts by describing the general "ecosystem" for CRVS systems and the role of the health sector within this ecosystem, particularly with regard to the civil registration of live births, stillbirths and deaths, and causes of death. Drawing on the recommendation and standards set out by the UN (UNSD, 2014, para 279; UNSD, 2018) and the "ten milestones" approach to CRVS (see Section 2.2) (Cobos Munoz et al., 2018), the guidance outlines how information collected in the course of the provision of care, can be shared with the civil registration authorities in order to permit the timely registration of live births, stillbirths and deaths. The guiding principle is to make maximum use of information collected from the primary source through health agents by sharing it with designated agents of the civil registration system.

Chapters 3 and 4 describe in more detail the processes whereby the health sector can collect and share information on births and deaths (including stillbirths) with the CRVS system. Although the processes for births and deaths are broadly similar, the information collected is different – as are the opportunities for data collection, which are tied to subject-specific health programmes. Thus Chapter 3 deals specifically with births and Chapter 4 with deaths.

The CRVS system records stillbirths such that they can be tabulated separately from live births. The registration of stillbirths is included in this guidance because statistics on fetal deaths are important for studying health conditions and risk factors that may affect pregnancy outcomes. Furthermore, evidence of an official civil registration record of a fetal death is required for burial purposes. Stillbirth registration is described in Chapter 3 because, in addition to live births, they are a possible pregnancy outcome and the information is

required for legal and statistical purposes. However, stillbirths are, by definition, deaths and so are also covered in Chapter 4.

The concluding chapter discusses the integration of data on live births, stillbirths and deaths into health sector digital health management information systems (HMIS) and the important role this can play in facilitating the optimal sharing of information between CRVS systems and the health sector (Chapter 5).

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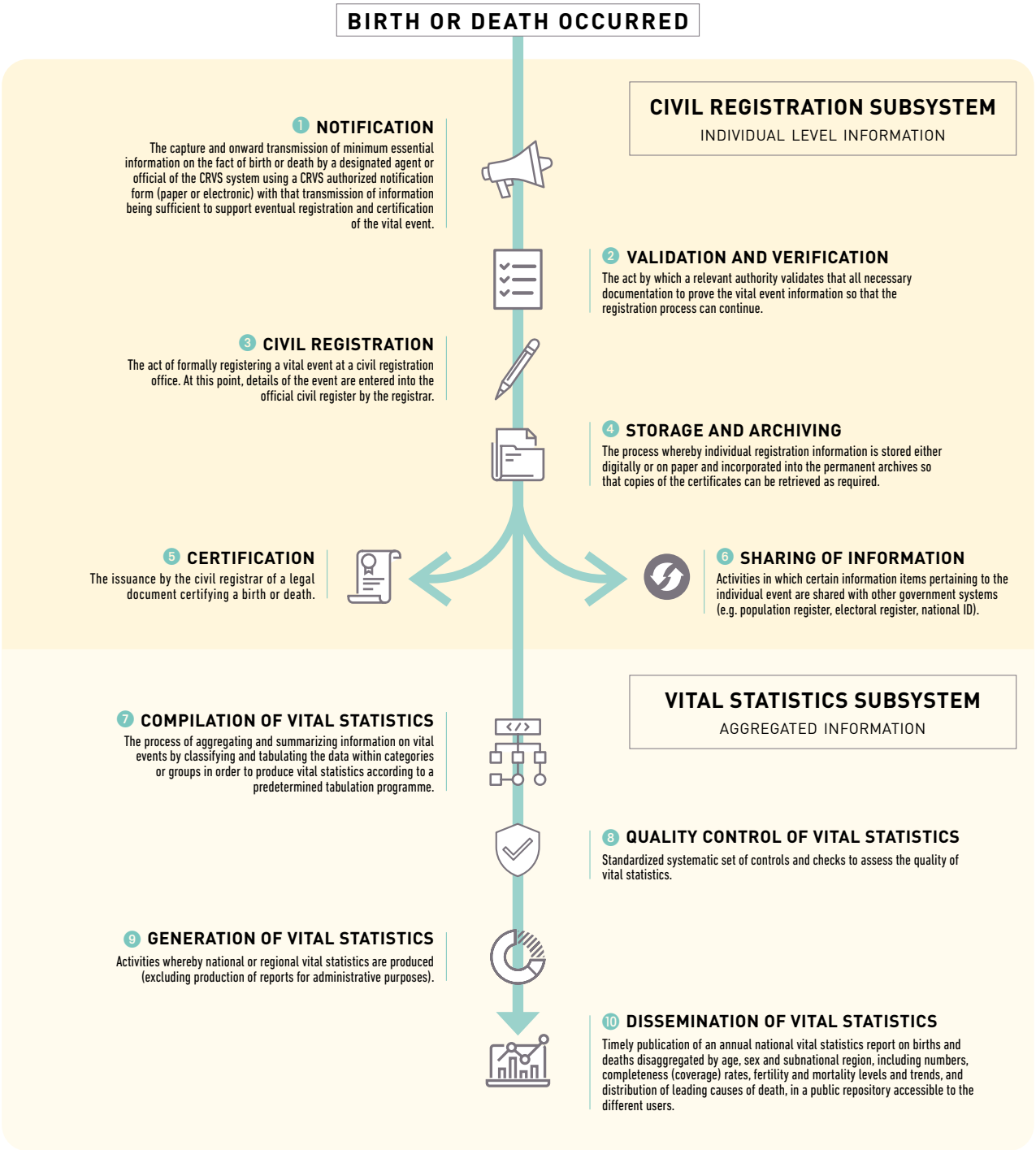
2

ENABLING HEALTH SECTOR CONTRIBUTIONS TO BIRTH AND DEATH REGISTRATION

This chapter lays out the steps that need to be taken and the minimum information items that health programmes need to record in order to provide the civil registrar with a notification that can serve as the basis for an official vital event registration. These ten steps, or milestones, need to be achieved in order to ensure that every birth and every death is registered and thus included in the vital statistics system (Fig 2.1 and Table 2.1). Section 2.1.2 describes the 10 milestones in more detail.

Fig. 2.1 Birth or death occurred flowchart



Source: Adapted from Cobos Munoz et al., 2018.

Table 2.1 The "ten CRVS milestones" framework for CRVS systems

Milestone	Definition	Responsible informants, as designated by civil registration law	
		Births	**Deaths**
1 **NOTIFICATION**	The capture and onward transmission of minimum essential information on the fact of birth or death by a designated informant, agent or official of the CRVS system using a CRVS authorized notification form (paper or electronic) with that transmission of information being sufficient to support eventual registration and certification of the vital event. For deaths in health facilities with a doctor present, the notification form should include the medical cause of death. (For further details on cause of death within CRVS see Chapter 4.) **Active notification:** the notification is sent directly to the local civil registrar for validation and official registration. **Passive notification:** a copy of the notification form is shared with the family who must declare the event at the civil registration office in order for the event to be registered.	• Health administrators • Midwives • Nurses • Parents • Family members	• Health administrators • Nurses • Doctors (for cause of death) • Morticians • Police • Next of kin
2 **VALIDATION AND VERIFICATION**	The act whereby the relevant authority validates all necessary documentation to ensure that all information is available and accurate so that the registration process can continue.	• Civil registrar • Designated notification agents • Family members	
3 **CIVIL REGISTRATION**	The act of formally registering a vital event at a civil registration office. At this point, details of the event are entered into the official civil registry by the civil registrar.	• Civil registration office	
4 **STORAGE AND ARCHIVING**	The process whereby individual registration information is stored either digitally or on paper and incorporated into the permanent archives so that copies of certificates can be retrieved as required.	• Civil registration office • National archives	
5 **CERTIFICATION**	The issuance by the civil registrar of a legal document certifying a vital event.	• Civil registration office	
6 **SHARING OF INFORMATION**	Activities in which certain items of information pertaining to an individual vital event are shared with other government systems, such as the population register, the electoral register, national legal identity system, and the social security register. The civil registrar shares a statistical report on registered vital events with the national statistics office.	• Civil registration office • National population register • National identification agency • Electoral register • National statistics office	
7 **COMPILATION OF VITAL STATISTICS**	The process of aggregating and summarizing information on vital events by classifying and tabulating the data within categories or groups in order to produce vital statistics according to a predetermined tabulation plan.	• National statistics office	
8 **QUALITY CONTROL OF VITAL STATISTICS**	Standardized set of controls and checks to assess the quality of vital statistics.	• National statistics office	
9 **GENERATION OF VITAL STATISTICS**	Activities whereby national or subnational vital statistics are produced (excluding production of reports for administrative purposes).	• National statistics office	
10 **DISSEMINATION OF VITAL STATISTICS**	Timely publication of annual national statistics on births and deaths, including numbers of events (disaggregated by age and sex), key fertility and mortality indicators, and coverage and completeness, in a public repository accessible to users.	• National statistics office	

Source: Adapted from Cobos Muñoz et al., 2018. The application of this framework in countries as diverse as Bangladesh, Ghana, Namibia, Philippines, Rwanda and the United Republic of Tanzania has exposed a number of shortcomings and bottlenecks common to many CRVS systems, which previously had not been fully recognized. In particular, the formal notification of vital events was identified as a step in which the health sector could potentially play an important role in improving the overall functioning of CRVS systems (Mikkelsen et al., 2018).

2.1 Strengthening civil registration and vital statistics systems

Operationally, every CRVS system encompasses multiple subsystems that deal with legal identity, civil registration, vital statistics and information technologies. Every day, each of these subsystems performs hundreds of activities which together contribute to the continuous registration of vital events, certification, creation of registration archives and the production of vital statistics. Understanding the respective roles and responsibilities of the different actors and how their activities could be made to work collectively is key to strengthening the overall performance of the CRVS system.

2.1.1 Governance and leadership

Although CRVS systems around the world share common objectives, in practice their organizational structures vary considerably, reflecting the diverse historical, political and administrative conditions in which they function (UNSD, 2018). Country CRVS systems differ in terms of their governance, accountability to multiple ministries – such as justice, security, local government and health – institutional set up, organization, implementation, processes, scale, partners and capacities.

In most settings, responsibilities for civil registration functions are distributed across different ministries and agencies (UNSD, 2018). Registration offices are often positioned within a ministry of the interior, ministry of justice or local government; many national statistical offices are positioned within a ministry of planning. However, other entities in the public and private sector can have major contributions to make to CRVS systems, such as the national identification agency (if there is one), the information technology sector and the police, as well as the health sector. In large federated countries, CRVS systems may be organized in different ways in the various states (UNSD, 2014).

Many countries have recognized the pivotal importance of a high-level national coordinating committee, with convening power across multiple sectors including health, for achieving an effective CRVS system. In some settings, this group is based within the cabinet office or the prime minister's office to ensure strong leadership and ability to bring together CRVS stakeholders across multiple sectors (UNESCAP, 2014; APAI-CRVS, 2020). An "all-of-government" commitment, with strong political leadership at the highest levels, facilitates the development of a multisectoral, nationally owned, scalable, sustainable and cost-effective context for CRVS strengthening that ensures access to registration services at reasonable cost.

CRVS systems can only work effectively when there is a sound legal framework that assigns roles and responsibilities for CRVS functions to specific bodies (UNSD and Vital Strategies, 2019). Given the legal implications and functions of civil registration, it is important that the legal framework be reviewed at intervals to ensure that it is appropriate and relevant, especially in the context of rapidly changing circumstances, such as increasing use of digital technologies to manage civil registration; securely archive registration records; and manage and analyse vital statistics based on civil registration. A sound legislative and regulatory framework is needed both in relation to the processes of birth and death registration and certification, and also to the integrity of the entire system in terms of sharing information and data with agreed governmental agencies, as well as protection of registration records, individual privacy and data security.

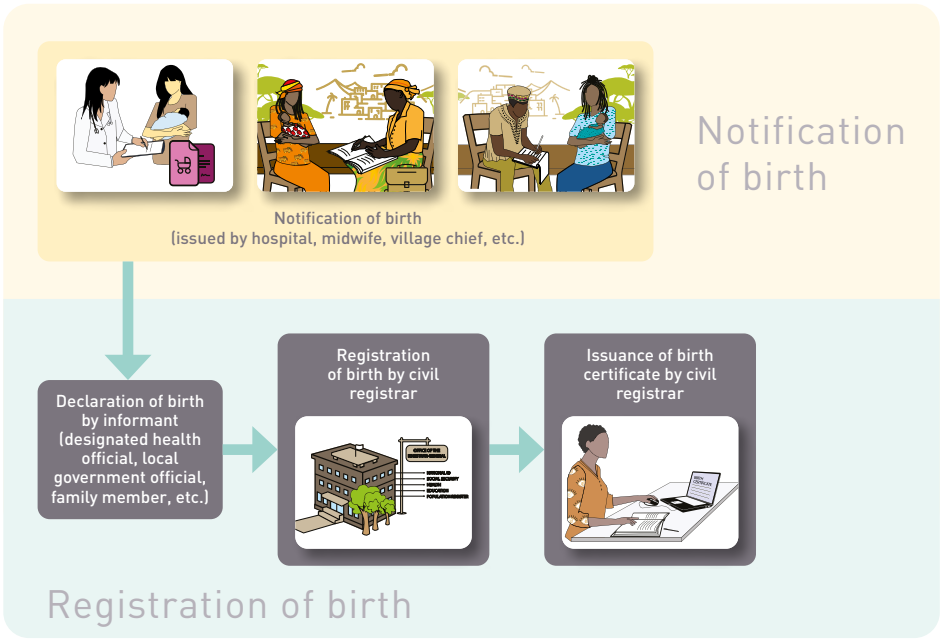
2.1.2 The "ten CRVS milestones" framework

The ten CRVS milestones framework is designed to help policy-makers, programme managers and development partners better understand how CRVS systems function as a whole, from beginning to end, by focusing on ten key steps or "milestones" that must be accomplished by any CRVS system. The framework suggests a simplified sequence of actions that needs to be completed in order to ensure that every birth and every death is reported, recorded, certified and incorporated in a country's vital statistics (Cobos Munoz et al., 2018). These 10 essential steps or "milestones", which are aimed at improving the reporting of vital statistics – thus addressing one of the most pressing needs in many low-resource countries – are shown in Table 2.1. Note that full definitions of the terms used in this framework are provided in Annex 1 (Glossary).

2.1.3 The critical importance of notification

The first step in the ten CRVS milestones is the notification of a vital event to the civil registrar. The current norm in many settings is that family members are responsible for declaring the occurrence of a birth or a death to the civil registrar. However, this approach is associated with a significant risk that the event will not be registered. The family may find it difficult to make the trip to the registration office to declare the event due to the distance and costs of travel involved.

Fig. 2.2 The process of vital event notification



Source: Adapted from UNICEF, 2019.

If multiple visits are required to complete the registration formalities the risks of delayed or even non-registration increase.

To reduce this risk, local agents, or health workers who may have been involved in care provision prior to the birth or death, can be designated to notify the civil registrar thus alleviating the burden on families. This approach is shown in Fig. 2.2 and described in more detail in Chapter 3 for births and in Chapter 4 for deaths.

The information to notify an event must include that pertaining to the occurrence and characteristics of the birth or death in sufficient detail to support eventual registration of that event (see Annex Tables A2.1 and A4.1). For deaths that occur in health facilities, a doctor completes the Medical Certificate of Cause of Death (MCCD), which includes all the information required for the civil registration of the event, as shown in Fig. 2.2. The MCCD is described in more detail in Chapter 4.

Health institutions and staff – including trained personnel working in hospitals, health centres and in the community – are well placed to take on active notification of births and deaths to the civil registrar. This approach, whereby information is collected once from the primary source and thereafter used multiple times at different stages of the CRVS process, reduces redundancy and duplication, enhances efficiency and maximizes accuracy. The underlying principle is to move information not people.

2.1.4 Leveraging health service data systems to improve civil registration

Successful notification of births and deaths implies leveraging existing data collection systems in the health sector and sharing the information with the civil registration authorities (WHO, 2014; UNECA, 2015). A major advantage of drawing upon health sector staff for the notification of vital events is that they have legal responsibilities for the collection and management of medical information on patients and are bound by rules of confidentiality that apply to patient records (see also Chapter 5). Moreover, in many settings, health workers already collect much of the core information that is needed to register a birth or death. Thus only relatively small adjustments would need to be made to existing data collection practices in order to furnish the civil registrar with the necessary details pertaining to a birth or a death. However, in order to facilitate a more proactive approach to notification, whereby the information is shared directly with the civil registrar, provision must be made in civil registration law to designate health institutions as official notifiers of the occurrence and key characteristics of a live birth, stillbirth or a death to the civil registrar.

In some LMIC settings, civil registration offices have been established within health facilities, an approach that is most likely to be feasible in large institutions and hospitals. Where this is the case, it is recommended that the health facility be designated as the official notifier of a vital event. This means that all the information needed to convert the notification into an official registration can be forwarded directly to the civil registrar, who can then issue the relevant certificate and give it to the family before they leave the health facility (see Chapter 3). For vital events that do not occur within formal health facilities, it is possible to draw on these widespread networks of community-based health care providers that exist in many countries. Indeed, the UN suggests that the use of informal notifiers of vital events can be useful as an interim measure where the level of completeness of vital events registration is very low, particularly in rural and remote areas (UNSD, 2018, para 137).

Alongside the notification function, the health institutions can do much to facilitate registration and certification of both births and deaths, including, for example:

- supporting families to register birth and deaths by raising awareness about the importance of civil registration and its benefits;
- assisting families to complete relevant forms when needed;
- providing registration and certification services where the law permits;
- helping families obtain documents required for permission to dispose of the body;
- informing families how to obtain copies of birth and death certificates when required;
- providing family members with written confirmation of the occurrence of a birth or death and its characteristics;
- providing a Medical Certificate of the Cause of Death (in settings where doctors are available);
- supporting advocacy and awareness-raising activities for CRVS within health facilities; and
- contributing to the generation of vital statistics on live births, stillbirths, deaths and causes of death.

2. 2 The enabling environment: the key role of intersectoral collaboration

The accurate collection of information and sharing with the civil registrar presupposes a high degree of intersectoral and cross-programme collaboration. In particular, in order to facilitate increased involvement of the health sector as a strategy to improve the civil registration of birth and deaths, the following structures and arrangements ideally need to be in place:

- A formal memorandum of understanding between the health ministry and the national registrar that provides for the exchange of information on individual live birth, stillbirth and death records.

- Designation by the CRVS legal and regulatory framework of health institutions and other agents as legally recognized informants of the occurrence of live births, stillbirths and deaths to the civil registrar, as recommended in the UN *Principles and recommendations for a vital statistics system* (UNSD, 2014, paras 349–353, 486–490).

- Agreement that individual live birth and death registration information may be shared not only with the CRVS system itself but also with other entities legally entitled to use information from CRVS to update their records, for example, population registers (and related registers such as electoral rolls), national identity systems and social security agencies.

- Mechanisms to avoid duplication of live birth or death notifications/registrations. These include identifying duplicate records by matching key variables such as the date and place of occurrence, identity of informants or notification agents, and on parents (for births and child deaths) or next of kin (for deaths in adults).

- Consensus around information and data sharing protocols that protect individual confidentiality and privacy and ensure data security while also enabling efficient sharing of information or at least interoperability among key agencies.

- The use of common definitions, classifications, forms and software platforms across all health programmes. This will help avoid parallel data "siloes" that restrict the possibility of information sharing across programmes and between health and CRVS entities.

- Capacity-building for community- and facility-based health workers so they are empowered and trained to complete standard notification forms for live births, stillbirths or deaths that include the information needed for the events to be officially registered.

- Acknowledgement that the live birth, stillbirth and death information collected by the health sector and shared with civil registration must be accurate and reliable at the individual level because it will serve as the basis for an entry into the civil or stillbirth register and the subsequent issuance of a certificate.

- Where local civil registration law stipulates that family members are the informants, health agents should provide documentary evidence of the occurrence of the event (e.g. copy of the notification form) and be trained to support families to complete any necessary forms and reduce the costs and challenges of attending registration offices (UNSD, 2014, para 354).

- A standard template is available for the notification of live births and stillbirths and deaths and is compatible across the health, CRVS agencies, for both paper-based and electronic systems.

- Standard notification forms draw information from health records that is needed to officially register the event and issue the associated birth, stillbirth or death certificate.

- Consensus on the need for software platforms, such as the District Health Information System 2 (DHIS2), that have the capacity to interoperate with other systems to facilitate data analysis and data linkage across, for example, live birth and death records, thus improving the capture of vital events and compilation of aggregation birth and death data (see Chapter 5).

Although the health sector can play a key role in CRVS strengthening, it is essential to avoid complex and burdensome processes that risk overwhelming busy health care workers and result in missing information, incorrect entries or other errors. Therefore, the focus should be on accurately recording the minimum information items needed to enable the official registration of a birth or a death, and ideally streamlining data collection tools as much as possible. Health sector reporting to the civil registration system should not be seen as an additional burden but, rather, as an extension of the recording and reporting that the health sector conducts routinely as part of the provision of care. Indeed, any additional data collection will pay handsome dividends in terms of improved health for all.

Steps to integrate the collection of information needed for civil registration purposes into the routine health data collection are already being taken in some countries and areas. For example, the WHO guidance on reproductive, maternal, newborn and child health care (RMNCH) includes access to civil registration (WHO, 2010). Successful examples of such an approach come from countries as diverse as Botswana, Ghana, Malawi, Mali, Namibia, Philippines, Rwanda, United Republic of Tanzania (see Box 3) and Zimbabwe.

The United Republic of Tanzania provides an interesting example of a "whole-of-government" approach to strengthening CRVS. In 2015, the country had one of the lowest birth registration rates on the African continent, with only 11.5% of newborn infants having had their births registered (IDRC, 2020). The main reasons were identified as cost – US$ 1.52 to register a birth plus the cost of travel to the registration office (median household income is US$ 2.11 per day). Distance was also an inhibiting factor, resulting from a highly centralized CRVS system which meant that people, particularly those living in rural areas, had to make several trips across long distances to register a birth. There was also a lack of awareness among parents of the need for or benefits of birth registration. Vulnerable and disadvantaged groups, particularly women and girls, were least likely to be able to overcome social, cultural, economic and legal obstacles to register a birth (IDRC 2020).

In response, the United Republic of Tanzania's Registration, Insolvency and Trusteeship Agency (RITA) launched an initiative in partnership with UNICEF and the telecommunications company Tigo to address the core issues of distance and cost as barriers to birth registration (IDRC, 2020). Financial obstacles were reduced by waiving registration fees and giving parents the first copy of the birth certificate for free. Distance challenges were addressed by declaring health facilities and ward offices across the 18 regions as registration points. Parents can now register their child's birth at one of 7430 locations compared with the previous 11. Mobile technology also played a big part in making this decentralized system possible. Health workers are able to send birth registration details to a central database via their mobile phone.

Box 3. National stakeholder contributions to the implementation of a national CRVS strategy: a case study from the United Republic of Tanzania

The United Republic of Tanzania developed its national CRVS strategy for mainland Tanzania in 2015. The strategy includes decentralizing birth and death registration services in line with the government's decentralization policy that devolves and simplifies the birth registration system that started in 2013. The strategy took into account findings from the CRVS comprehensive assessment carried out under the aegis of APAI-CRVS in 2014.

Successful implementation has required the coordinated efforts of a wide range of stakeholders, working across all the different levels of government, as summarized below:

DUTY BEARERS:

Registration Insolvency and Trusteeship Agency (RITA) is the lead government agency at national level responsible for implementation, oversight and coordination of the CRVS system in mainland Tanzania.

Ministry of Constitutional and Legal Affairs (MOCLA) is RITA's parent ministry responsible for policy formulation and standard setting on matters relating to the registration of vital events. Specifically, MOCLA reviews the legal framework including policies and other instruments governing civil registration.

President's Office for Regional Administration and Local Government (PORALG) is responsible for coordinating local government authorities and for implementing, coordinating, monitoring and supervising the new birth registration system at the regional and district council levels.

Ministry of Health, Community Development, Gender, Elderly and Children (MOHCDGEC) facilitates the provision of basic health services that are good quality, equitable, accessible, affordable and sustainable, and gender-sensitive. Health facilities providing RMNCH services function as registration centres by integrating birth registration services in maternity wards and at immunization desks. Additionally, the ministry provides technical support for the training of physicians/clinicians on ICD-10.

Prime Minister's Office (PMO) is responsible for cross-cutting and multisectoral coordination of CRVS among key ministries. It manages the cooperation and collaboration and is responsible for convening the High-Level Coordinating Committee (HLCC) on all CRVS issues.

Box 3. National stakeholder contributions to the implementation of a national CRVS strategy: a case study from the United Republic of Tanzania continued

President's Office for Public Service Management (PO-PSM) coordinates public service, training, recruitment and improved efficiency and effectiveness of delivery of public services. It undertakes organizational restructuring, recruitment and capacity building to cater to the new CRVS system.

Ministry of Finance and Planning (MOFP) regulates the flow of funds from donors, evaluates the budget of RITA and the local government agencies, and ensures timely disbursement of funds to them for the scale-up of the new birth registration system.

Ministry of Foreign Affairs and East African Cooperation (MOFAEAC), per the 2019 amendment to the Birth and Death Registration Act, ensures that the United Republic of Tanzania's embassies register deaths of Tanzanians who die abroad. A provision for the registration of births is not yet available.

Ministry of Education and Vocational Training (MOEVT) creates demand for birth and death certificates by integrating the CRVS concept into education curricula. In select district councils, schools facilitate the (delayed) registration of birth of children aged 5–17 through ad hoc campaigns.

National Bureau of Statistics (NBS) is mandated with the production, analysis, interpretation and dissemination of vital statistics for socioeconomic purposes and helps RITA prepare and disseminate statistical reports based on birth registration data.

Local government authorities (LGAs) oversee the direct implementation of the registration of vital events at designated health facilities and ward executive offices.

e-Government Agency (eGA) has a central role in coordinating the establishment of government information systems and ensuring adequate linkage and interface of government data.

RIGHT HOLDERS:

Parents/primary caregivers of children under 5 are primarily responsible for ensuring that the birth of their child gets registered. They are at the heart of the new birth registration system as beneficiaries and contributors.

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3

OPERATIONAL GUIDANCE FOR THE HEALTH SECTOR ON BIRTH REGISTRATION

As described in Chapter 2, health institutions and associated health workers occupy a unique position with respect to the collection of data on vital events and, by extension, to the process by which these data are included in the civil registration system. In this chapter, we focus on the contribution that the health sector can make to the registration of births. This contribution largely revolves around the notification of a birth to the civil registration authorities.

This chapter starts by identifying points of contact with the health care system which provide the opportunities for health workers and health administrators or programme managers to collect the information that is needed to notify a birth, an essential step that enables a birth to be officially registered and a certificate to be issued. Processes which facilitate the flow of information between health and civil registration systems, given various scenarios, are presented in the form of "process maps". While the focus of these process maps is the initial milestones – notification, registration and certification – this chapter goes on to explain how improved data flows contribute to and strengthen the entire process of civil registration up to and including the generation of national-level vital statistics, in accordance with UN guidance and recommendations for vital statistics systems (UNSD, 2018).

In terms of the objectives of this guidance, maternal health services and routine immunization programmes may be singled out as providing the greatest opportunities for collaboration and information sharing with the civil registration systems and authorities. RMNCH programmes are well placed to track a range of pregnancy outcomes, and thus represent opportunities for improving the civil registration of not only live births, but also other vital events such as fetal deaths.[1] Immunization services, particularly the administration of the DPT vaccine, also provide opportunities to facilitate the registration of live births that have not been registered immediately after delivery (see Table 3.1). This guidance seeks to harness the major information collection effort that accompanies RMNCH programmes to facilitate improvements in the notification and civil registration of vital events, in particular live births. The civil registration of stillbirths is covered in detail in Chapter 4.

[1] The UN recommends that stillbirths (late fetal deaths) be recorded in the civil registration system, primarily for statistical and public health purposes. In some countries a register of abortions, where early fetal deaths and miscarriages are recorded, will also be kept by the civil registrar.

3.1 Opportunities for improving birth notification and registration

The health sector is actively involved in the provision of care to women of reproductive age, and routinely collects detailed information on the health status of women and their young children. In particular, RMNCH services provide care to women of reproductive age and their babies across a continuum of care, from pre-pregnancy, to pregnancy and childbirth, and throughout early childhood. Interventions during this period include family planning, antenatal, delivery and postnatal/postpartum care, immunization, child growth and monitoring and care for sick or injured children. The increasing level of RMNCH service coverage, especially for immunization (Table 3.1) and antenatal care (Fig. 3.1), is testament to the success and reach of these programmes globally.

Table 3.1 Percentage of target population vaccinated, by antigen, 2019

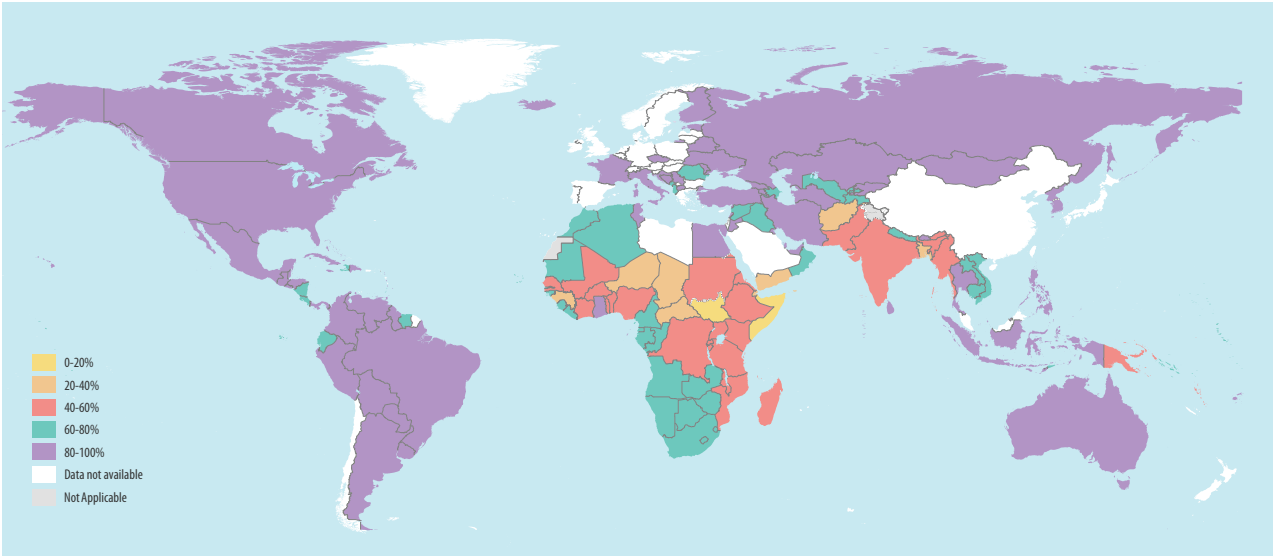
WHO region	BCG	DPT1
African Region	80	81
Region of the Americas	83	90
South-East Asia Region	93	94
European Region	92	97
Eastern Mediterranean Region	87	89
Western Pacific Region	96	95
Global	**88**	**90**

Note: BCG – Bacille Calmette–Guérin. BCG is not widely used in North America (United States and Canada); DPT1 – diphtheria–pertussis–tetanus first dose.
Source: WHO, 2020a (regional summaries and global summary).

In many LMIC settings, RMNCH interventions are often delivered by the same health workers at key stages of the reproductive cycle. This presents a unique opportunity for the health sector to play a key role in improving rates of birth registration, as well as for several other vital events, including stillbirths and maternal deaths. However, there is good evidence from several countries to suggest that such opportunities are regularly being missed.

Analysis of DHS and MICS data from 72 LMIC, for example, has revealed large disparities between BCG immunization coverage (which is routinely administered at birth by the birth attendant) and birth registration rates. The gaps between BCG immunization coverage and the rates of the issuance of birth certificates are greater still, especially in countries in Africa and Asia (Rahman et al., 2019). This discrepancy between

Fig. 3.1 Antenatal care coverage – at least four visits (%), latest available data from 1996 through 2019



Source: WHO, 2020b.

BCG immunization and birth registration rates is indicative of the significant potential for increasing birth registration rates by capitalizing on health sector contact at the time of delivery.

A similar picture of missed opportunities to strengthen birth registration is provided by the data presented in Fig. 3.2. This figure compares the proportions of women and children under the age of 5 years whose births have been registered and the proportions who received various RMNCH services such as antenatal care, institutional delivery, DPT1 and BCG immunization in selected countries. In every case, the proportion of children whose birth is registered lags behind DPT1 coverage and maternal health service utilization. In Ethiopia, for instance, while 85% of children received

Fig. 3.2 Missed opportunities for increasing the registration of live births: coverage of key indicators for women and children under 5 years, selected countries, most recent available year

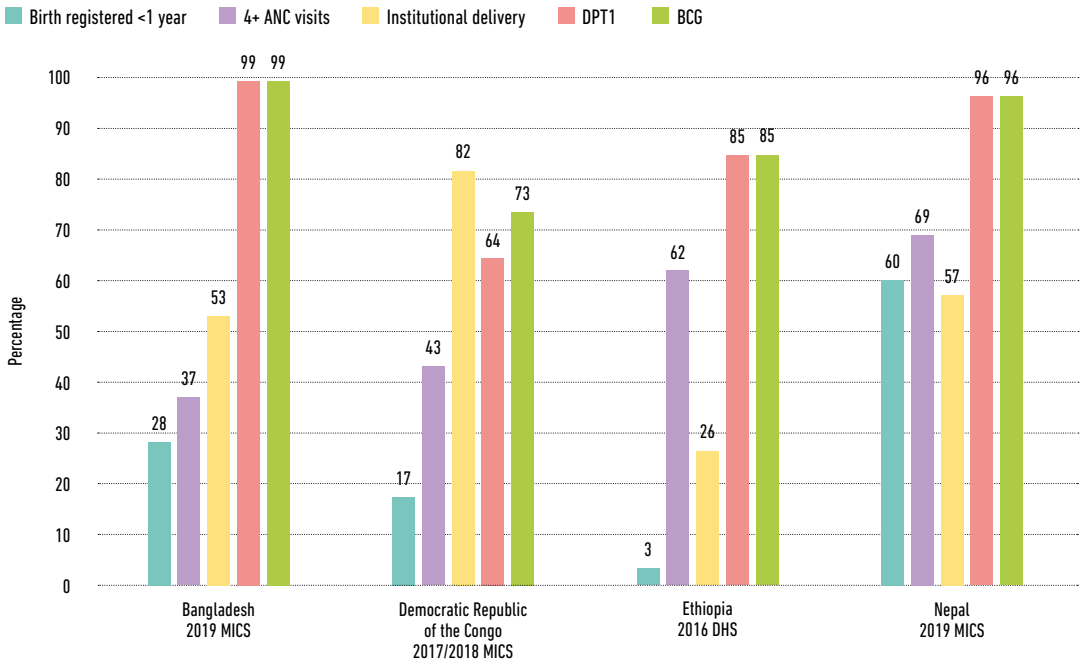


Fig. 3.3 Opportunities for live birth and stillbirth registration across the continuum of care provided as part of RMNCH programmes

DPT1 (generally given at around 2 months of age), only 3% of these children had been registered by their fifth birthday (UNICEF, 2019; UNICEF 2020b). Kenya has adopted an "active" notification strategy, whereby the health facility is the designated notifier for all live births occurring within the facility, an approach that is proving to be instrumental in increasing the proportion of live births in health institutions that are registered (Kenya Citizens and Foreign Nationals Management Services and USAID, 2013).

Fig. 3.3 summarizes the range of opportunities that arise for live birth and stillbirth registration at different points of time across the continuum of care provided as part of RMNCH programmes. As previously noted, many RMNCH interventions are delivered by the same health workers at key stages of the reproductive cycle. The presence at the same time and place of both mothers and children presents critical opportunities for the civil registration of several vital events – including live births as well as neonatal and maternal deaths.

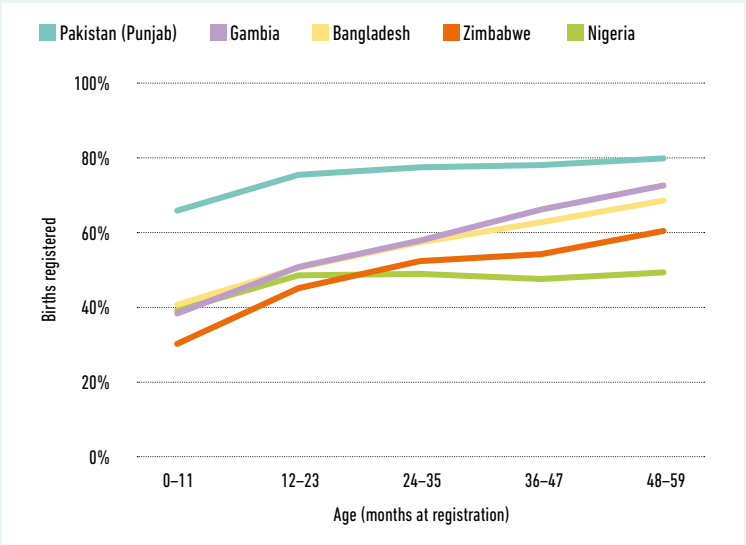
- During antenatal care, health workers can engage in interpersonal communication with prospective mothers about the importance and modalities of birth registration so that they are better informed about the documentation that is required to register a birth, ideally immediately after birth or at least

Box 4. Promoting timely registration of live births: why it matters

In principle, live births should be registered as soon as possible, ideally within 30 days or thereabouts. The sooner a birth is registered, the more likely it is that the registration system will record all the associated information accurately, thus contributing to reliable documentation and accurate vital statistics.

Many countries have introduced incentives to encourage timely birth registration, for example, by requiring evidence of registration before parents can access child benefits or the child can go to school. However, because some incentives, such as access to schooling, arise some considerable time after birth, many births are registered several years after the event, as evidenced by the data in the graph. Late and delayed registration leads to inaccurate information reporting, which in turn adversely affects the quality of vital statistics. Moreover, should the child die prior to the birth being formally registered, the death may not be reported either, resulting in an underestimation of infant or child mortality.

Percentage of children under age 5 whose births are registered, by age (in months)



Source: Data compiled from most recent MICS (2017–2019) (UNICEF, 2020a).

within the legally mandated time period (generally within 3 months after birth).

- At the time of delivery, health workers should notify the occurrence of a live birth to the civil registration office and encourage the parents to complete registration and collect the birth certificate.

- In the case of a stillbirth, the health worker should notify the event to the civil registration authorities for inclusion in the stillbirth register.

- During postnatal/postpartum care, including routine immunizations, health workers should enquire whether the infant's birth has been registered and if the parents have a copy of the birth certificate.

- If the infant's birth has not been registered within the prescribed time period, the health worker should collect the basic information required for notification. The health worker advises the family to visit the civil registrar with any additional information needed for registration.

Making use of these opportunities provided in the course of routine RMNCH care would help to identify hitherto unregistered children and improve the completeness and quality of civil registration and the resulting vital statistics (see Box 4 and Section 3.6).

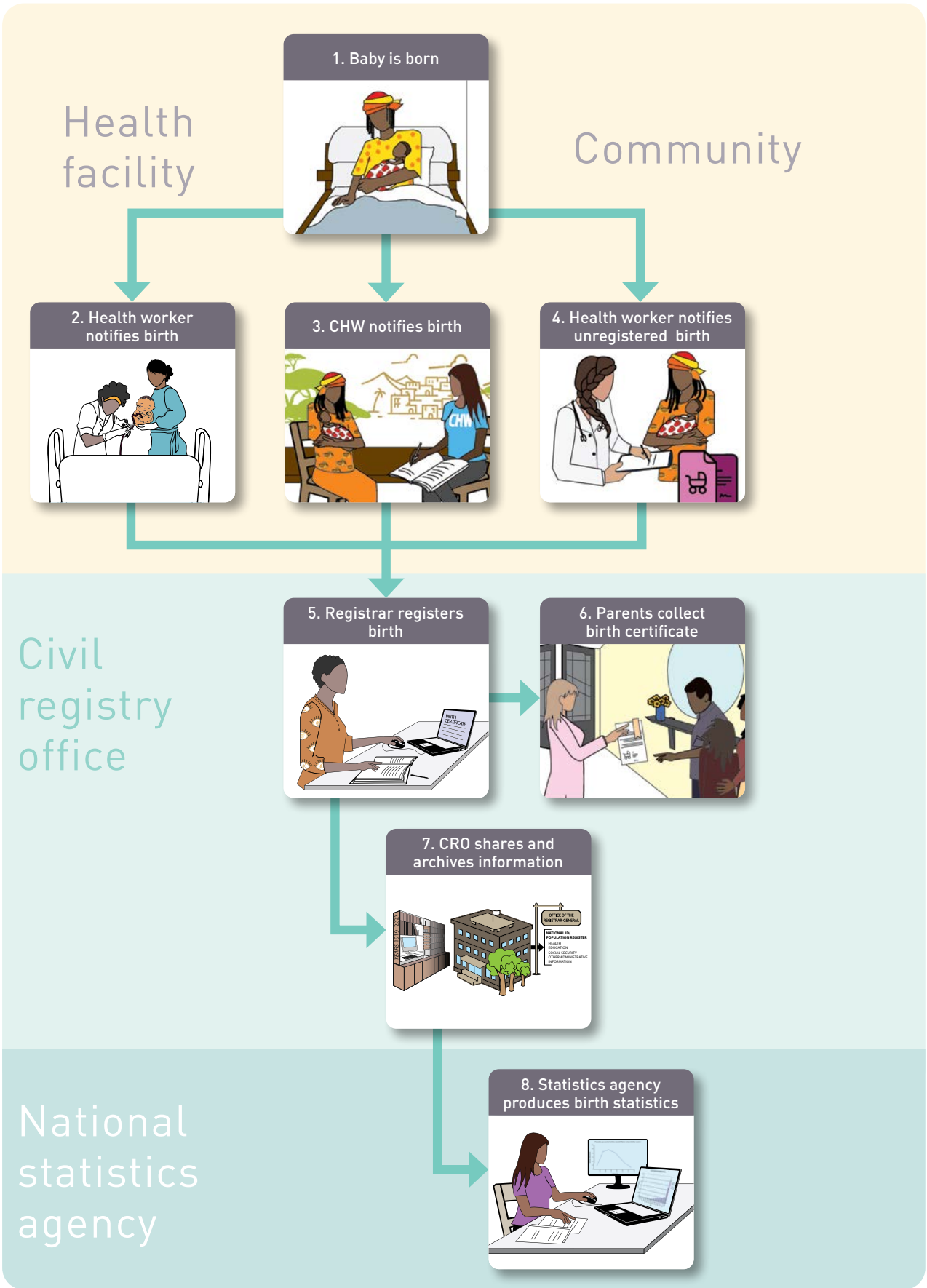
3.2 Generic birth registration processes

In this section we introduce the generic process for the notification, registration and certification of births and their inclusion in the vital statistics system. We distinguish between **active notification**, in which the responsibility for informing the civil registrar of the occurrence of a live birth or stillbirth falls on the health sector, and **passive notification**, whereby responsibility for declaring the event to the civil registrar falls directly on the parents or other family members. Reliance on passive notification is problematic because experience shows that there is a high probability that the family will not attend the civil registry in a timely way due to time and cost implications. In both active and passive notification processes, the health sector can also play an important role in counselling and encouraging families to visit the civil registration office in order to sign the register and obtain a copy of the birth or stillbirth certificate.

Fig. 3.4 summarizes the generic version of the live birth registration process from occurrence, to the notification to the civil registrar, the inclusion of the details of the live birth in the civil registration record, issuance of a birth certificate and the inclusion of the live birth in the vital statistics system. The first step in this process – notification – is key and the health sector plays a crucial role in collecting the information associated with each live birth and sharing it, as required for civil registration, with the civil registrar.

Process maps, which show the flow of records and information between health and civil registration systems, as well as the individuals/offices involved in the civil registration process, can help to generate a better understanding of possible approaches that can be adopted to leverage RMNCH programmes for improving coverage of live birth and stillbirth registration.

Fig. 3.4 Generic process for the registration of live births



Below is explanatory text for the steps illustrated in Fig. 3.4.

1. Babies are born in a range of settings – in a health facility, at home, or elsewhere in the community – and with different types of birth attendants – family members, traditional birth attendants, CHWs, midwives, nurses, doctors and obstetricians.

2. Many live births occur in health facilities with the support of a health worker who is able to collect information required for birth notification.

3. Other live births occur in the community, without medical support, but become known to the health sector by way of CHWs who have been trained to conduct regular household visits to provide basic reproductive health care to women and antenatal and postnatal/postpartum care to infants and mothers. Where the law permits, CHWs may collect the information needed to notify the birth to the civil registrar.

4. In settings where the birth occurred without assistance from a health worker, the majority of infants are taken for their first immunization within a matter of weeks of the birth. This provides an important opportunity to enquire about the registration status of the infant. Whatever the circumstances of the birth, it may be an opportune moment for the health worker to collect the essential information required for registration and share with the civil registrar, preferably electronically.

5. The civil registrar validates the notification, and checks for completeness, and enters the event in the register and prepares to issue the birth certificate.

   In many countries, the child is not named immediately after birth and the registration laws do not allow registration of birth without a name. This often results in delayed registration or non-registration. In such circumstances, where the law permits, the child can be registered under the name of the mother or father and the name can be revised following the naming ceremony.

6. The parents or family members can be informed when the certificate is ready for collection, either directly by a message from the registration office or through the health sector. At this stage, the parents should visit the registration office to sign and legalize the registration and collect a copy of the birth certificate.

7. The civil registrar shares information on the live birth with key government agencies such as social security, which is responsible for the allocation of maternity and child benefits, the national ID agency, and the population register.

   The civil registrar archives the information on each birth so that eligible family members can obtain copies when needed.

8. The national registrar anonymizes information on births shares with the national statistics agency, which is responsible for the production and dissemination of national and local birth statistics.

In practice, each country may have variations on this generic process. Here we present three typical scenarios for the registration of live births and one for the registration of a stillbirth, namely:

- **Scenario 1:** registration of live births occurring in a health facility
- **Scenario 2:** registration of live births occurring in the community with the support of RMNCH programme staff
- **Scenario 3:** opportunities for registration of live births during immunization visits and other contact with health services
- **Scenario 4:** notification and registration of stillbirths.

These scenarios reflect, in an abbreviated manner, the different circumstances within which live births and stillbirths may occur, highlighting the contributions of the health sector with regard to the collection of key information on each vital event, the sharing of the minimum information required to permit the official registration of the event with the civil registrar, and in supporting family members to attend the registration office to collect a copy of the birth certificate.

Scenario 1:
Live births occurring in a health facility

Around the world, the proportion of births that take place in health facilities is increasing. Fig. 3.5 shows the process for notifying and registering these births, describing both a “passive” and an “active” notification process. As previously indicated, (see Section 2.1) “active notification” is the preferred approach, working on the principle, "move information, not people".

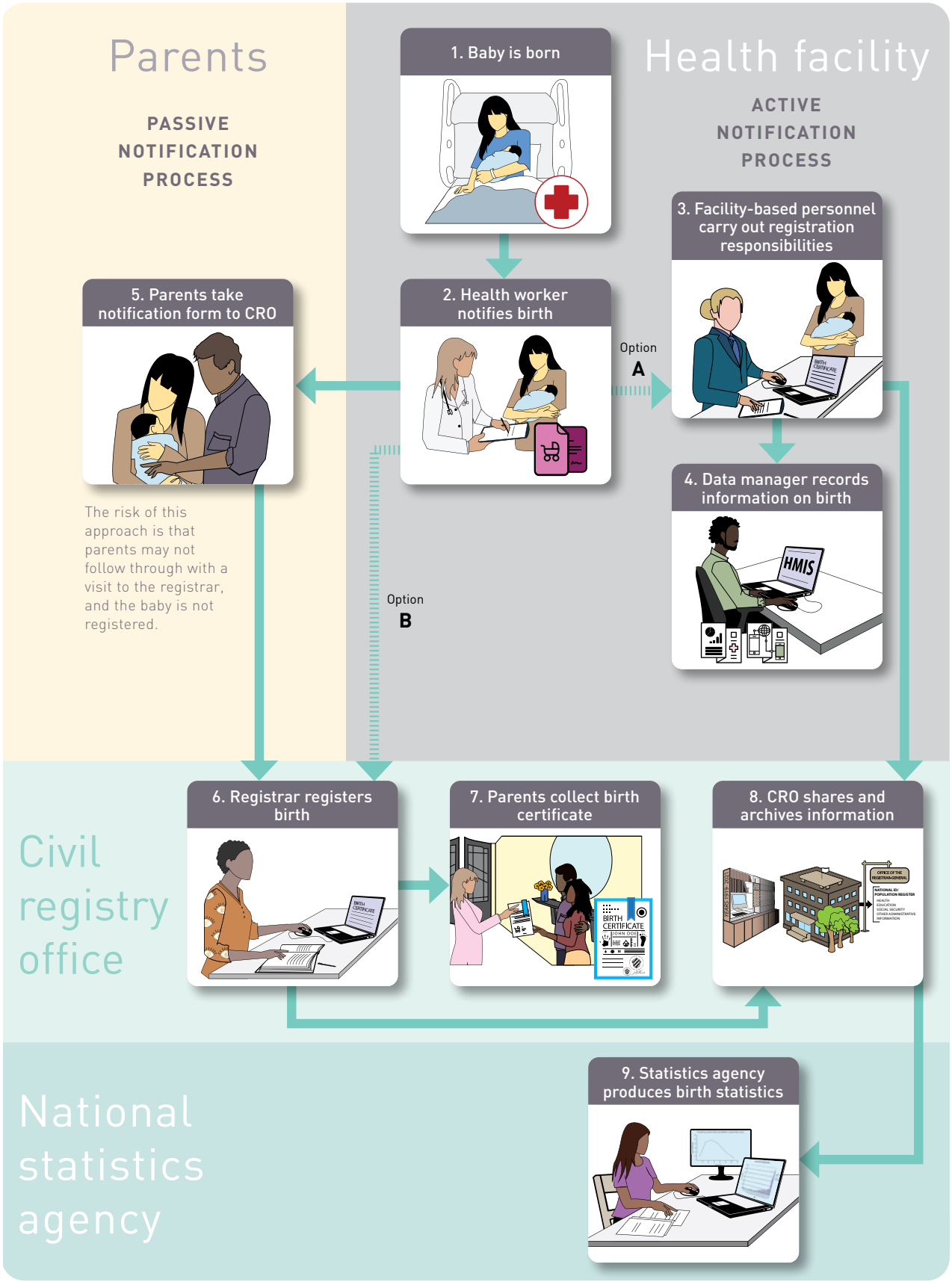
In the active approach, the health sector is designated by law to take on the responsibility of collecting the information needed for birth registration and notifying the event to the civil registration office/registrar. The aim is to reduce to a minimum the number of in-person visits that a mother or father must make to register the birth of their child. The more visits needed to complete the process, the less likely it is that the birth will be registered in a timely way because families will have to overcome barriers of distance and cost on multiple occasions.

At the time of the birth, and drawing on available medical records and information supplied by the parents, health facility staff complete the birth notification form which includes the key information and data required for the civil registration of the birth. A copy of the completed form is then given – either transmitted electronically or as a paper copy – to the civil registrar. Using the information supplied by the health sector on the notification form, the civil registration authorities can then proceed with the formal registration of the birth and issue the birth certificate. The family is required to go only once to the civil registry to sign the register and collect the birth certificate.

This approach will be particularly successful in settings where, in addition to local registrars, the registrar general locates registrars in health facilities, especially in those settings where many births take place. Some countries have located local registration services within their larger health facilities and therefore can make arrangements to register the birth and give the birth certificate to a mother before she is discharged from the facility, thus avoiding the need for an in-person visit to the civil registration office.

Where an active approach is not possible, health facility staff can still complete a notification form detailing the occurrence of the birth and its key characteristics. However, instead of sharing the notification form directly with the civil registrar, the health facility gives a copy of this completed notification form to the parents as evidence of the occurrence of the birth. It is then the responsibility of the parents or other family members to take this form to the local designated civil registration office in order to declare the birth and provide the details needed to enable the birth to be officially registered. This “passive” notification approach runs the risk that the family will not take the notification form to the local registration office within the official time limit due to barriers such as distance, cost and inadequate understanding of the value of birth registration. As a result, the birth may be registered late or with considerable delay, for example, when a copy of the birth certificate is needed for school attendance. But, in many instances the birth may remain unregistered.

Fig. 3.5 Processes for the notification and registration of live births occurring in a health facility



Below is explanatory text for the steps illustrated in Fig. 3.5.

❶ When a baby is born the birth attendant or health administrator completes a live birth notification form, drawing upon information available from the parents and in the antenatal and delivery records (see Annex 2).

❷ The health worker gives a copy of the notification form to the mother/father as evidence of the occurrence of the event and to enable the parent to check that the information is correct.

Option A: Health worker notifies civil registrar in health facility (no. 3).
Option B: Health worker notifies civil registrar (no. 6).

Active notification process

❸ If a civil registration agent is positioned within the health facility, the birth is registered immediately and a copy of the certificate is provided to the mother/father prior to discharge. The family is not required to make an in-person visit to the civil registry.

If designated civil registration agents are not available within the health facility, the notification form is sent directly to the civil registration office, preferably electronically, and the health staff advise the family to visit the registration office, sign the register and collect a copy of the birth certificate.

❹ The information is also archived by the health institution, either in paper format or saved in the national HMIS to be compiled in an electronic format, such as DHIS2.

Passive notification process

❺ A copy of the notification form is given to the parents who are instructed to visit the registration office to declare the event. A second visit to the local registrar may be needed to sign the register and collect a copy of the birth certificate.

The risk of this approach is that parents may not follow through with a visit to the registrar, and the baby is not registered.

❻ The civil registrar validates the information provided in the notification form or provided directly by the family members, and registers the event.

❼ The family signs the register and collects a copy of the birth certificate.

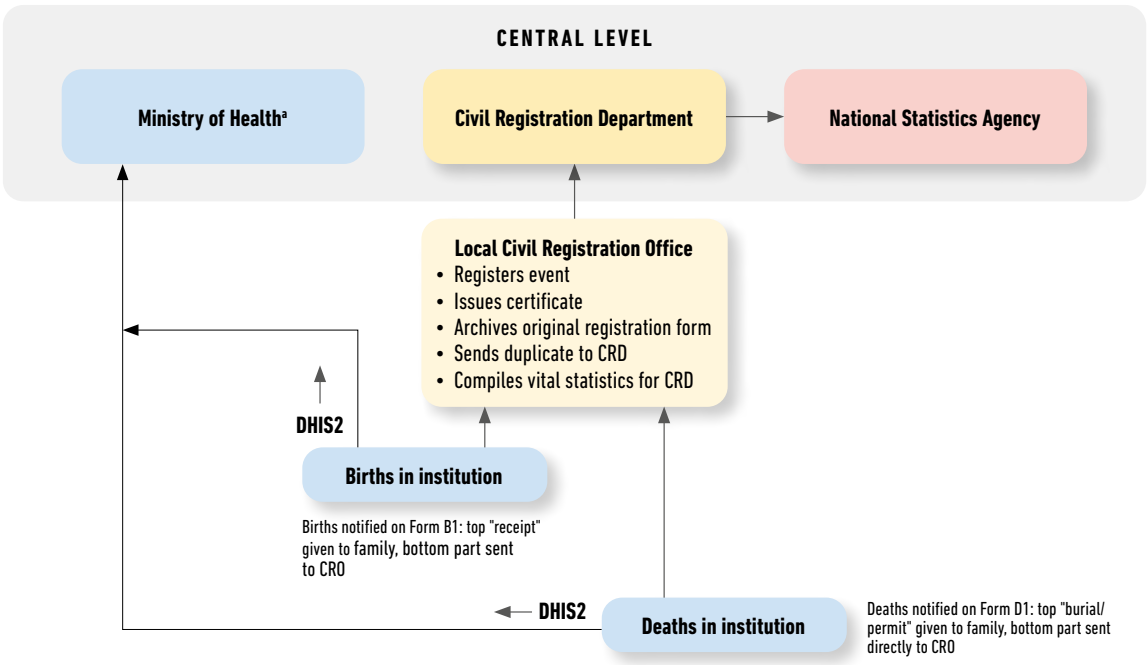
❽ The registration record is included in the local and national archives so that family members can obtain copies of birth certificates when needed.

The civil registrar shares the information about the birth with designated government institutions, for example, the population register, the national ID system and agencies responsible for the distribution of entitlements such as child benefits.

❾ The civil registrar sends statistical data to the national statistics agency which conducts quality assessment checks and collates the information to produce mortality statistics which are used to inform public health decision-making.

Countries that have adopted the active approach include Kenya (see Fig. 3.6) and Rwanda. In Rwanda, the web-based CRVS application connects health facilities to the local registration offices through web interfaces so that information on all births (and deaths) is recorded and automatically transferred to the respective civil registration offices for validation and registration. The system also permits the automated transfer of registration data from the local registration office to the national identity database and to the national statistics office (NISR, 2020).

Fig. 3.6 Active birth and death notification process in Kenya



[a] No formal data exchange with CRD at central level

DHIS2 = District Health Information System 2; CRD= Civil Registration Department; CRO= civil registration office

Source: Government of Kenya, Citizens and Foreign Nationals Management Services and USAID (2013).

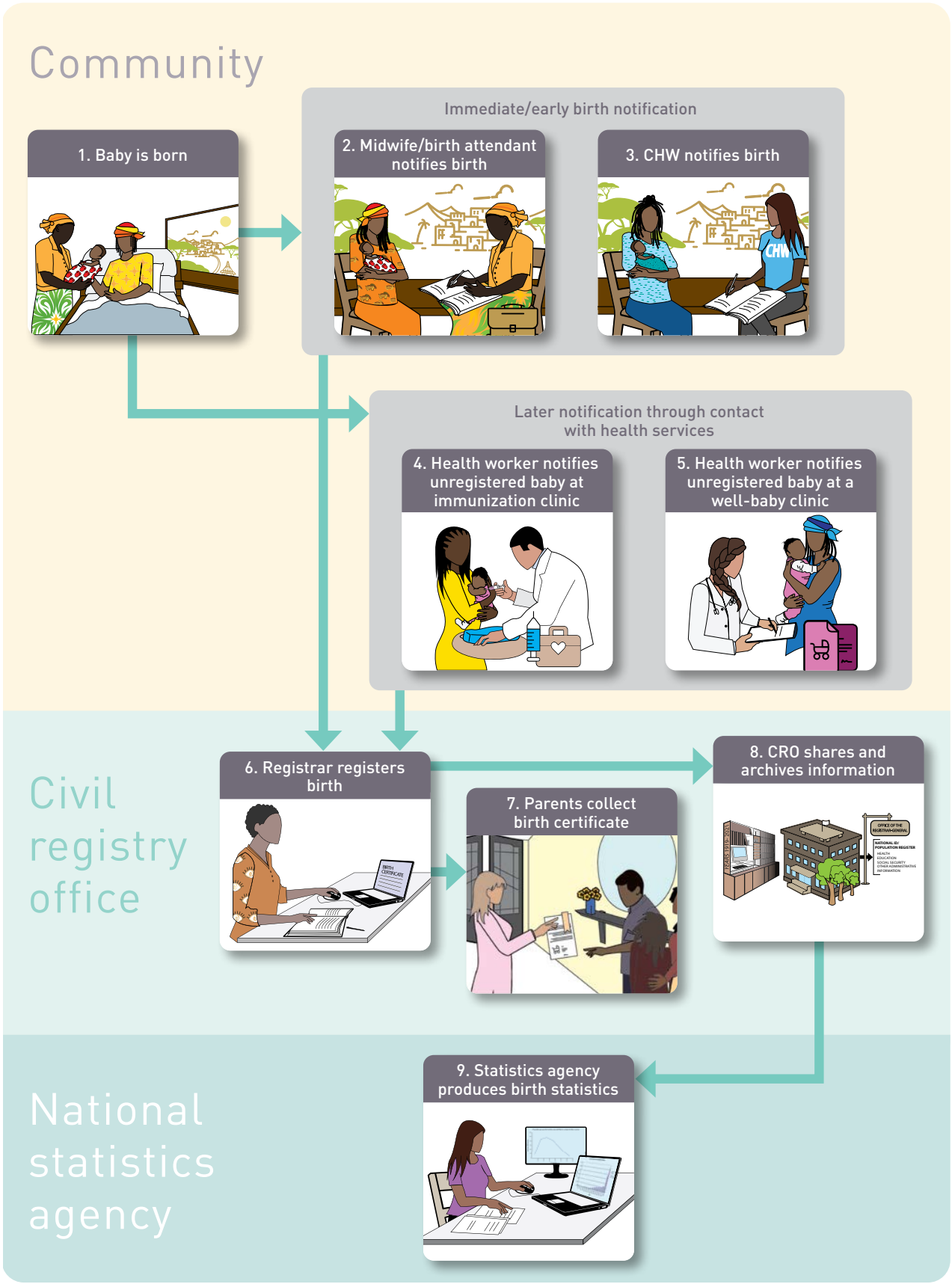
Scenario 2:
Live births occurring in the community with the support of RMNCH programme staff

When a birth occurs at home without the assistance of a health care worker, it is common for a community-based RMNCH health care provider to provide postpartum care during routine visits to the family. In these circumstances, an active approach to birth registration may be possible if there are protocols in place whereby CHWs are designated as official notification agents for births and are able to provide the information needed to enable the civil registrar to register the birth.

In this scenario, as shown in Fig. 3.7, the potential for active notification depends on the ability of the health sector and the local civil registration office to share information. Where these communication links are well-established and the necessary legal frameworks are in place (including informed consent, data confidentiality and data protection), CHWs who attend women after delivery can complete the notification form and send it directly to the local civil registrar, who can then complete the validation checks before registering the birth.

Where direct information sharing is not possible, the notification form can be provided to the parents and, to facilitate registration, the community workers can be trained to encourage and support parental declaration to the civil registrar by providing advice on the importance of timely registration, describing the necessary steps, and assisting in the completion of a notification form as required by the civil registrar.

Fig. 3.7 Process for the registration of a baby born at home with support of a health worker



Below is explanatory text for the steps illustrated in Fig. 3.7.

❶ In some settings, babies are mostly born at home.

❷ In many cases where the home birth was attended by a community nurse or midwife, and information sharing protocols are in place, the key information needed for registration can be shared with the local civil registration office through electronic means.

❸ In some settings, the CHW can be designated as an official notification agent and share the completed notification form directly with the civil registrar.

❹ There are additional important opportunities for birth registration during childhood immunization visits, many of which typically occur within a few weeks of birth (see also Fig 3.8). If the infant has not previously been registered, the health worker can collect the information needed for the birth to be registered and share directly with the civil registrar for late or delayed registration.

❺ Infant and child growth monitoring sessions, well-baby clinics, and visits to health centres when infants and children are sick can also be used as opportunities for catch-up registrations. The health care worker can ask whether or not the infant has been officially registered, probing to ensure that the responses relate to official registration rather than to the issuance of a notification form provided to the family at the time of delivery. If the infant has not previously been registered, the health worker can collect the information needed for the birth to be registered and share directly with the civil registrar for late or delayed registration.

❻ The civil registrar validates the information and enters the information into the registration record.

❼ A family member pays an in-person visit to the civil registry to sign the register and collect a copy of the birth certificate. In some settings, the CHW may collect the copy of the birth certificate on behalf of the family. This depends on local administrative and legal structures.

❽ The registration record is included in the local and national archives so that family members can obtain copies of birth certificates when needed.

The civil registrar shares the information about the birth with designated government institutions, for example, the population register, the national ID system and agencies responsible for the distribution of entitlements such as child benefits.

❾ The civil registrar sends a statistical report to the national statistics agency which conducts quality assessment checks and collates the information to produce birth statistics which are used to inform public health decision-making.

The designation of CHWs as notification agents to the civil registrar is the model being implemented in Bangladesh. It has helped in achieving high levels of notification and registration in a very short period of time. The process can also be digitized at immunization centres (Uddin et al., 2019).

In many countries, the child is not named immediately after birth and the registration laws do not allow registration of birth without a name. This often results in delayed registration or non-registration. In such circumstances, where the law allows, the child can be given a name of the mother or father and the registration can be finalized following the naming ceremony. In such cases, the validation step will be particularly important to avoid errors and possible fraud.

In recent years, countries such as Mozambique, Uganda and the United Republic of Tanzania have made full use of advances in communications technologies and have set up systems whereby CHWs can use their mobile phones to electronically transmit birth notifications to the local registrar (Box 5) (UNICEF, 2020b). Necessary provisions have to be made in the civil registration rules to accommodate this procedure and in authorizing the CHW to play the assigned role (see also Section 5.2).

Box 5. United Republic of Tanzania – digital solutions aiding timely birth registration

On the mainland, the civil registration system is the responsibility of the Ministry of Justice and Constitutional Affairs through the Registration, Insolvency and Trusteeship Agency (RITA). RITA and the Ministry of Health, Community Development, Gender, Elderly and Children, as well as the local government authorities, have been working together to address barriers and determinants of the persistent low coverage and completeness of birth and death registration.

Since 2013, the United Republic of Tanzania has embarked on revamping its birth registration business process through decentralization and the adoption of a "one-stop" process – one step, one visit – with the motto "moving information and not people". The country streamlined birth registration by introducing a form with a 10-digit UIN as well as allowing parents to obtain children's birth certificates right after registration at the point of registration. Data entered on the registration form are electronically captured via a smartphone device and instantly transferred to RITA headquarters. Where mobile network coverage is not available, the application allows for storing of collected data and their transmission once the mobile device is within the network range. In addition, the birth registration form is scanned and uploaded into the RITA server for data validation and archiving.

The United Republic of Tanzania achieved tremendous results, with eight out of every ten children under 5 years registered and certified on the mainland in 2018. One of the essential advantages of integrating the digital solution with the decentralization process is that it allows for near real-time monitoring of the registration progress down to each registration point. Data analytics tools and dashboards enable RITA to monitor near real-time progress across registration points, and programme managers to make appropriate decisions.

The digitalization of civil registration in the United Republic of Tanzania is an excellent example of public-private partnerships implemented between RITA, TIGO (one of the largest Tanzanian mobile operators) and UNICEF. This partnership includes:

- provision of free of charge access to the mobile communication infrastructure for digital data transmission;
- procurement and distribution of mobile smart devices used at the registration points;
- development of the mobile application for digitization and data transfer;
- awareness-raising campaigns.

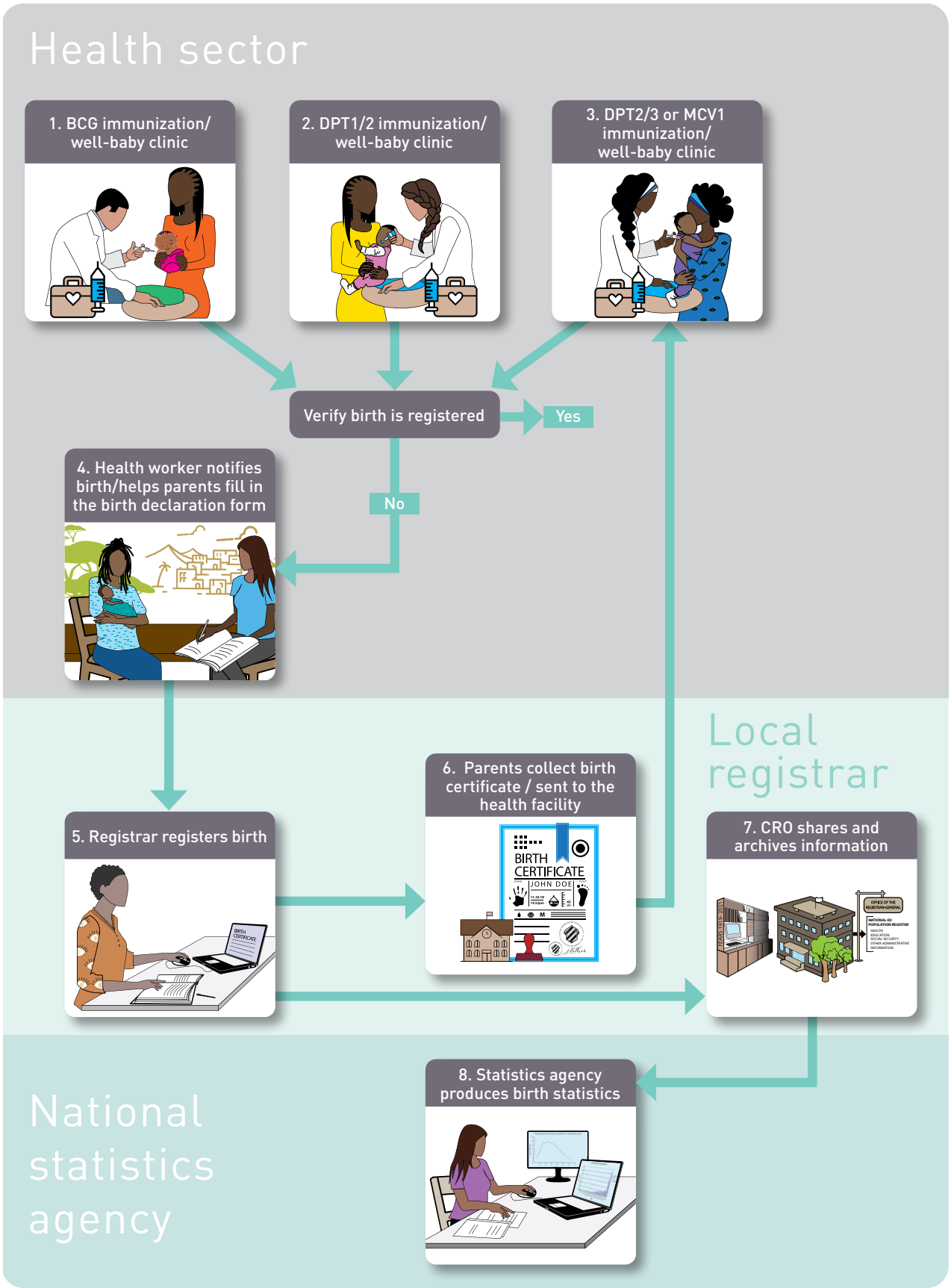
Source: UNICEF, 2020b.

Scenario 3:

Opportunities for registration of live births during immunization visits

In some settings, the first contact between a mother and infant and the health sector occurs during immunization visits. As noted at the beginning of this chapter, the proportion of infants receiving immunizations such as DPT1/3, polio and BCG, has increased considerably in all countries and often far exceeds the proportion of infants whose births have been registered. Therefore, immunization represents an important opportunity to ensure that all births are registered as soon as possible. Fig. 3.8 shows how immunization visits can be used to enable late registration when the child was not registered immediately after birth. Immunization visits (particularly BCG vaccine and DPT1) provide an opportunity to help parents complete the formalities required for birth registration. The local health facility or the health worker providing the immunization service can ask about the registration status of the infant (see Box 6), complete a notification form and transmit to the civil registrar manually or digitally (if permitted) for registration. Alternatively, they can support the parents and guide them to the appropriate registration office. Fig. 3.8 shows the process for harnessing immunization and other postpartum care visits to health facilities to ensure that births are registered.

Fig. 3.8 Opportunities for birth registration during contact with health services in the course of immunization and postnatal care



Below is explanatory text for the steps illustrated in Fig. 3.8.

❶ Live birth occurred at home without the support of a trained birth assistant. The birth is not registered and the first contact with the health sector is during the BCG vaccination or well-baby clinic.

❷ Live birth occurred at home and the infant's birth has not been registered by the time of DPT1 or DPT2 immunization, or well-baby clinic.

❸ Live birth occurred at home and the birth has not been registered by the time of the DPT3 or first measles-containing vaccine (MCV1), or well-baby clinic.

In the course of these contacts, the health worker can ask a few questions to assess whether or not the birth has been registered (see Box 6).

❹ If the parents report that the infant's birth has not been registered, the health worker assists the family to complete the formalities for registration, such as completing a birth notification form if required. The family is instructed to take the notification form to the local civil registration office in order to declare the birth. Where the regulations permit, the health worker may share the notification form directly with the civil registrar.

For late registration, the health worker helps fill in the birth declaration form and asks parents to visit the local registrar office for registration.

❺ The civil registrar validates the information and completes the registration.

❻ Parents collect a copy of the birth certificate. Or, it may be possible for the CHW to give the birth certificate to the family during a follow-up immunization visit.

❼ The registration record is included in the local and national archives so that family members can obtain copies of birth certificates when needed.

The civil registrar shares the information on the birth with designated government agencies such as the population register, the national ID system and social security and health agencies.

❽ The civil registrar sends a statistical report to the national statistics agency which conducts quality assessment checks and collates the information to produce birth statistics.

Box 6. Capturing unregistered infants in the course of immunization care

The immunization register includes a record of immunizations given and date of immunization and date of birth. Immunization sessions offer opportunities to collect information on the registration status of infants and can function as a safety net to identify unregistered children and facilitate birth registration, including late or delayed registration. The health care worker can ask key questions about the child's registration status and provide guidance to the family on the actions needed to complete birth registration, for example:

- Has the child's birth been registered or not?
- Have the parents completed and signed a birth declaration form?
- Has the declaration form been forwarded to the local registrar for registration?
- Has the registrar completed the registration?
- Has the birth certificate been received at the immunization centre?
- Has the birth certificate been delivered to the parents?

Depending on the responses, the following additional processes will be necessary if the child has not yet been registered:

- Notify the local civil registration of the occurrence of the birth and the core details required for registration purposes.
- Facilitate declaration of the birth by the parents at the time of the immunizations sessions.
- Submit the birth declaration form to the local registrar.
- Provide parents with birth certificates received from the local registrar.

Scenario 4:
Notification and registration of stillbirths

Experiencing a stillbirth or the death of a baby in the final stages of pregnancy or during labour is a silent tragedy for mothers, fathers and families globally. There were an estimated 2 million stillbirths in 2019. Many stillbirths are preventable with high-quality, evidence-based interventions delivered before and during pregnancy, during labour and childbirth (UNICEF, 2020a). Countries are increasingly aware of the importance of collecting data that will enable the burden of stillbirths to be more accurately estimated. The CRVS system can play an important role by ensuring that all stillbirths are included in the vital statistics system and, when the stillbirth occurs in a health care setting with a doctor present, that stillbirths have a medically certified cause of death in the same way as other deaths (see Chapter 4).

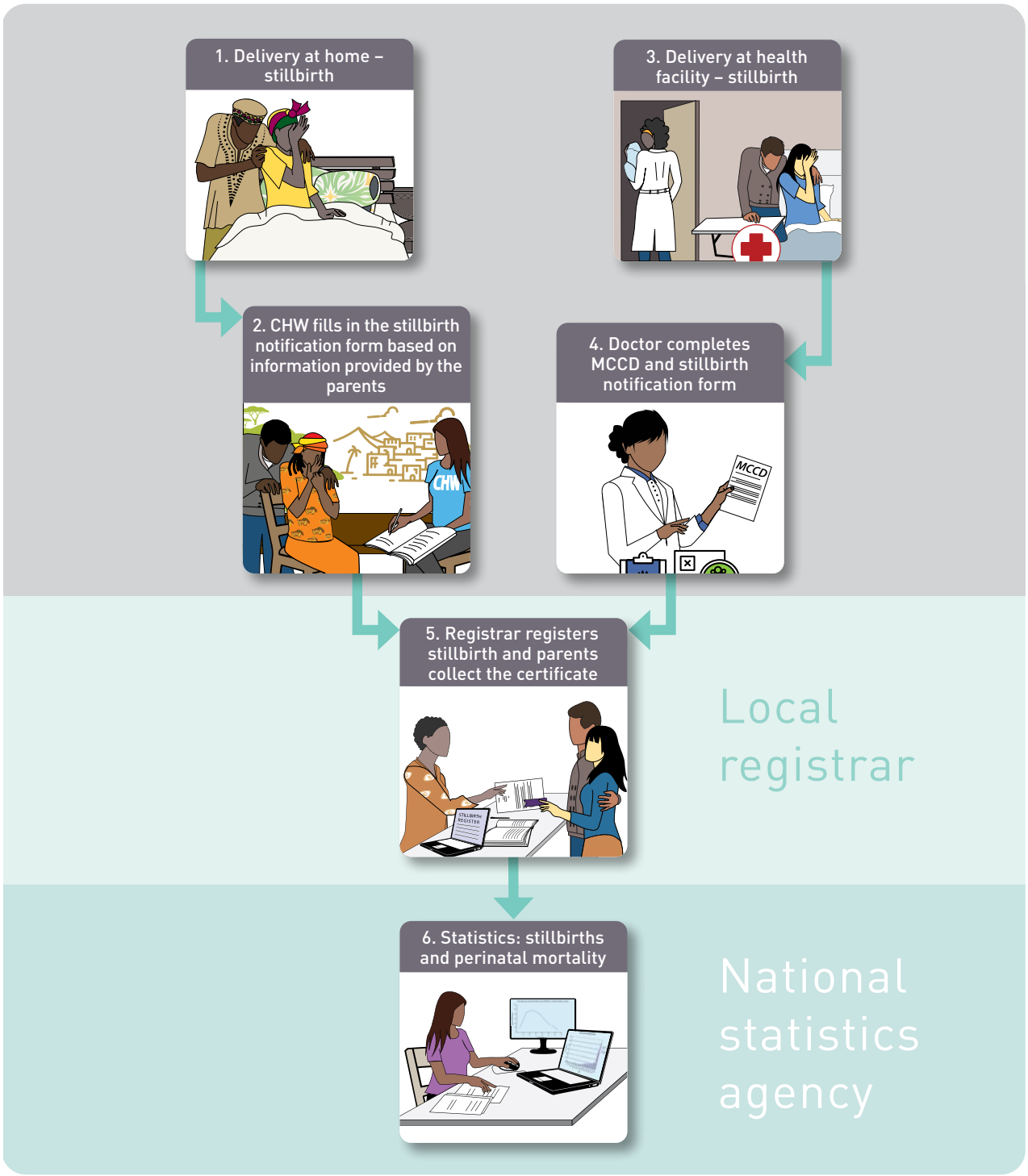
The intrapartum period is potentially the most dangerous for both mothers and their babies, and 43% of stillbirths occur during this period (UNICEF, 2020a). When stillbirths occur in health facilities or at home with a midwife or other health care provider present, the responsibility for notification of these events to the civil registrars should lie with health sector and not with the parents. This is to alleviate the stress for families and also because unless there is a legal requirement for a stillbirth certificate for burial purposes, the family has no incentive to register; the major users of information on stillbirths are the CRVS system and the health sector.

Community health workers should be trained to identify and report stillbirths occurring in the community to the local health institution so that they can be notified to the civil register in the same way as live births. If a stillborn child has not been named, it can be identified through other characteristics such as the names of parents and date of occurrence. However, provision for inclusion of the name of the stillborn child when one is given should be allowed.

Local civil registrars should record stillbirths based on notifications from health facilities or CHWs. They should include stillbirths in the regular statistical reports submitted to the national statistics agency (WHO, 2016).

On completion of stillbirth registration, the civil registrar may provide the parents with a stillbirth certificate which is a relevant extract of the stillbirth registration. Usually, certification of stillbirth is not required by the law. However, proof of registration can be produced if required by parents to obtain permission for disposal of the body, to allow official recognition of the birth or to access maternity benefits.

Fig. 3.9 Generic process for registration of stillbirths



Below is explanatory text for the steps illustrated in Fig. 3.9.

1. Stillbirth occurs in a community setting.

2. The CHW or other officially designated person notifies the occurrence of the stillbirth to the civil registration office in the same way as a live birth occurring in the community. The CHW completes the notification form based on information provided by the parents. Core information requirements are shown in Annex 4 Table A4.2.

3. Stillbirth occurs in a health facility.

4. The attending doctor completes the MCCD, Frame A and Frame B, as well as the administrative information needed to include the event in the stillbirth register.

5. The information provided by the health facility is shared with the local civil registrar who enters the information pertaining to the event in the civil register or stillbirth register as appropriate. The civil registrar conducts the process of validation in the same way as that followed in the case of live births occurring in health facilities. The civil registrar can, in case of doubt, initiate an enquiry with the local health office or local administration to satisfy themselves about the veracity of the information.

   The registrar may issue evidence of stillbirth registration if required for disposal of the corpse, allow official recognition of the stillbirth, or to access maternity benefits. For example, in the United Kingdom, the Royal College of Obstetricians and Gynaecologists provide guidance for registering a stillbirth and providing certification for a fetal death.

6. The civil registrar sends a statistical report to the national statistics agency which conducts quality assessment checks and collates the information to produce stillbirth and perinatal statistics which are used to inform public health decision-making.

3.3 Key elements common to all birth registration scenarios

3.3.1 Minimum information required for notification and registration of births

WHO recommends the following minimum information, based on UNSD (2014), be recorded for the registration of a live birth or stillbirth:

- date of occurrence
- place of occurrence
- sex of infant
- name of infant (if available)
- name of mother (ID if available)
- name of father (ID if available)
- place of usual residence.

It is essential that the information recorded in the registration record is accurate and complete (see Box 7). In addition, other information is generally collected in most civil registration systems, including, for example, educational status of the parents and marital status. However, the absence of such information should not prevent the event from being registered. Other variables are collected for the purposes of computing vital statistics on the population, many of which are of great importance for the health sector. These may include, for example, birth weight, birth order and attendant at delivery – information that is important for public health purposes and for vital statistics, but not a prerequisite for the registration of the live birth or stillbirth.

Annex 2 lists the minimum information needed to complete a birth notification form, for the infant, the informant, and the official issuing the notification form. It describes the purpose for which each of these is required for CRVS and explains the key issues that need to be considered. The data items are categorized as legal, statistical, or both, and the source documents from where the data will be collected is indicated. The items recommended for inclusion in the vital records of births and deaths constitute the minimum set necessary for the generation of legal documents as well as core statistical items. There is considerable overlap between these items and the minimum perinatal indicators recommended by WHO to be collected for all births and perinatal deaths for health purposes (WHO, 2016) (see Annex 3).

3.3.2 Validation of information on births

Given the legal importance of civil registration, whether the registration system is manual, or partially or fully digital, it is important to incorporate a validation step in the process whereby the civil registrar, before registering the birth, completes a series of checks to ensure the veracity of the information received and/or the completed notification form is free from clerical errors or missing information. This would entail checking the spelling of the name of the child, the date of birth and the identity of the parents. In case of doubt, the civil registrar may refer the matter back to the health facility to verify the accuracy of the information provided. Where there are online and real-time registration systems with a centralized database, the system should be able to alert the user if there are any discrepancies, for example, if the child appears to have already been registered.

Box 7. The critical importance of accurate recording of information

As already noted, the information collected by health workers as they deliver maternal and child services is not generally used for legal purposes and therefore, health functionaries working in health facilities as well as in communities may not realize the importance of accuracy when completing various forms. Minor errors in completing forms at the time of information collection may not seriously affect delivery of services to mothers and children but can have serious implications when used to populate the forms required for birth registration. For example, minor spelling mistakes in recording the name of a child in the delivery care register will not matter so long as the child is correctly identified for providing child care services. However, inconsistencies in name spelling between the health care forms and those for notification and registration may result in the issuance of a birth certificate with an incorrect name, causing major problems for the parents as changes to an entry in the civil register can be cumbersome and costly. The validation milestone is an important step as it offers an opportunity to correct any errors before the live birth or stillbirth is officially registered.

Where unique IDs are not in widespread use, particular attention must be paid to the accurate recording of individual identification information, such as name, address, date of birth/death, health insurance number, etc. In the case of both live births or stillbirths this should include information on the mother and birth number in cases of multiple births.

Validation is an important requirement as any correction of mistakes after the registration is complete (except for obvious clerical errors) can involve a lengthy legal and/or administrative process with potentially high associated financial costs. Details are also validated following statistical edit checks, which can either be done manually or using computer-based edit checks during data processing at local or national levels.

Following validation, the civil registrar enters the relevant details about the birth in the prescribed live birth register. The registrar will then "sign" the register, either by adding their seal (if a paper one) or, for automated registration systems, by signing a printed, computer-generated register. In countries where the registration law permits, and/or the necessary digital infrastructure exists, the registrar concludes the registration process by adding a digital signature to the electronic birth register. Once registration is complete, the civil registrar can issue an official birth certificate.

3.3.3 Issuance of the birth certificate to the family

Once the birth has been registered, the next milestone is the issuance of a birth certificate (Fig. 3.10). It is important to ensure that the family can readily access a copy of the birth certificate as this will, in many settings, be required to facilitate access to health and social services. Absence of a birth certificate should not impede access to care on the principle of the rights of the child to essential care. However, the birth certificate can facilitate such access and can help service providers in planning for future service provision.

Fig. 3.10 Birth certificate – example from United States

STATE OF NEW JERSEY

CERTIFICATE OF BIRTH

NAME OF CHILD

DATE OF BIRTH

TIME OF BIRTH
08:59 AM

SEX
MALE

MAIDEN NAME OF MOTHER

NAME OF FATHER

PLACE OF BIRTH
NEWARK CITY

COUNTY OF BIRTH
ESSEX

DATE FILED WITH REGISTRAR:

STATE FILE NUMBER

IF AMENDED, DATE AMENDED:
NONE

DATE ISSUED:
02/20/2018

ISSUED BY:
NEWARK CITY MUNICIPALITY (ESSEX COUNTY)

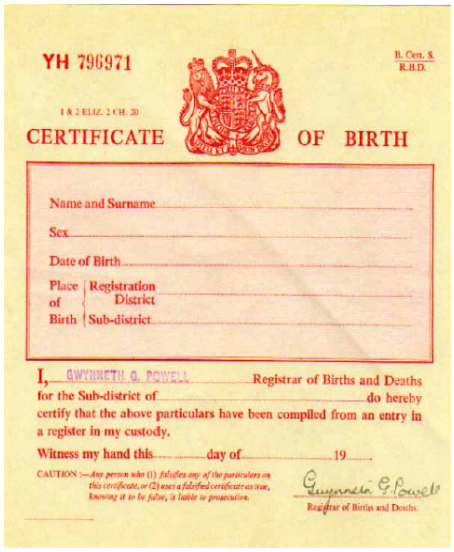
This is to certify that the above is correctly copied from a record on file in my office. Certified copy not valid unless the raised Great Seal of the State of New Jersey or the seal of the issuing municipality or county, is affixed hereon.

State Registrar
Office of Vital Statistics and Registry

THIS DOCUMENT HAS MULTIPLE SECURITY FEATURES TO DETER FRAUD. VOID IF ALTERED.

Source: Anonymized US birth certificate.

Fig. 3.11 Short form birth certificate – example from United Kingdom of Great Britain and Northern Ireland


YH 796971

B. Cert. S. R.B.D.

1 & 2 ELIZ. 2 CH. 20

CERTIFICATE OF BIRTH

Name and Surname

Sex

Date of Birth

Place of Birth: Registration District / Sub-district

I, GWYNNETH G. POWELL Registrar of Births and Deaths for the Sub-district of do hereby certify that the above particulars have been compiled from an entry in a register in my custody.

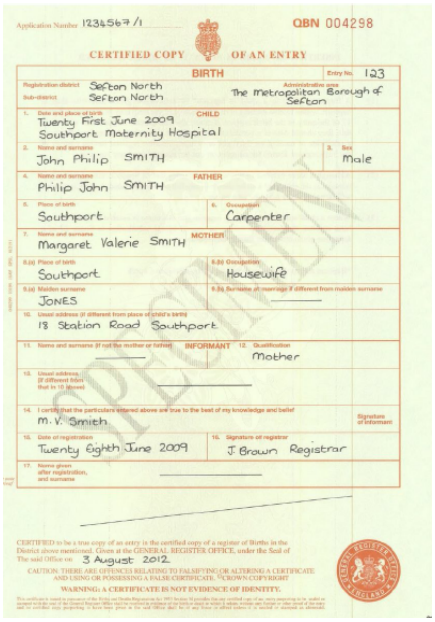
Witness my hand this day of 19

CAUTION :—Any person who (1) falsifies any of the particulars on this certificate, or (2) uses a falsified certificate as true, knowing it to be false, is liable to prosecution.

Gwynneth G Powell
Registrar of Births and Deaths

Source: Evergration, 2018.

Fig. 3.12 Long form birth certificate – example from the United Kingdom of Great Britain and Northern Ireland


Application Number 1234567/1

QBN 004298

CERTIFIED COPY OF AN ENTRY

BIRTH Entry No. 123

Registration district Sefton North
Sub-district Sefton North
Administrative area The Metropolitan Borough of Sefton

1. Date and place of birth: Twenty First June 2009, Southport Maternity Hospital — CHILD
2. Name and surname: John Philip SMITH — 3. Sex: Male
4. Name and surname: Philip John SMITH — FATHER
5. Place of birth: Southport — 6. Occupation: Carpenter
7. Name and surname: Margaret Valerie SMITH — MOTHER
8. Place of birth: Southport — 9. Occupation: Housewife
9. Maiden surname: JONES
10. Usual address: 18 Station Road Southport
11. Name and surname if not the mother or father — INFORMANT — 12. Qualification: Mother
13. Usual address, if different from that in 10 above
14. I certify that the particulars entered above are true to the best of my knowledge and belief: M. V. Smith — Signature of informant
15. Date of registration: Twenty Eighth June 2009 — 16. Signature of registrar: J Brown Registrar
17. Name given after registration, and surname

CERTIFIED to be a true copy of an entry in the certified copy of a register of Births in the District above mentioned. Given at the GENERAL REGISTER OFFICE, under the Seal of the said Office on 3 August 2012.

CAUTION: THERE ARE OFFENCES RELATING TO FALSIFYING OR ALTERING A CERTIFICATE AND USING OR POSSESSING A FALSE CERTIFICATE. ©CROWN COPYRIGHT

WARNING: A CERTIFICATE IS NOT EVIDENCE OF IDENTITY.

SPECIMEN

Source: Deed Poll Office, 2020.

In health facilities where on-the-spot registration is available, the parents can be provided with a copy of the birth certificate prior to discharge. In most instances, this first certificate is an extract or "short form" which may not include full details of the parents but is generally sufficient as proof of legal identity and access to health and social services and schooling (Fig. 3.11). Families can apply later for the complete or "long form" certificate (Fig. 3.12) which includes details about the parents and location of the birth, and is required for official purposes such as obtaining a passport.

In settings where a CHW plays the role of conduit of registration information, the same community worker can help deliver a copy of the birth certificates to the family. The birth certificates can also be transmitted to the parents during immunization sessions, particularly during the second or later immunizations. Depending on local conditions, the family may be contacted by the civil registrar (by telephone or online) to collect the birth certificate. In some settings, the certificate can be sent back to the health facility for distribution to the family or the process may occur electronically.

Whatever the mechanism for ensuring the family receives a copy of the birth certificate, it is essential there is a system in place for protecting the privacy and confidentiality of information on vital records and associated statistical reports.

3.3.4 Sharing information on births within government

In countries where administrative systems are linked and appropriate legal frameworks are in place, once a birth has been registered, information can be shared across government agencies, especially those involved in the provision of services and allocations to which children and parents are entitled. This information is essential for effective targeting of resources and assistance to individuals and populations in need. Sharing of information on birth registration with the national identification agency enables a child to receive a personal identification number (PIN) which will be converted, at an appropriate age, to an individual legal identity document used across multiple governmental agencies, including health, education, employment, taxation and electoral participation.

The UN advises that individual vital statistics records may be provided to certain users for research purposes, under a user agreement on confidentiality and the use of data between the statistical agency and users. Usually, identifying information is removed from the file to protect the privacy of individuals (UNSD, 2014, para 269).

Sharing of birth registration information must comply with strict rules on confidentiality of personal information, both in relation to microdata (individual records) and associated statistical reports. The UN *Principles and recommendations* affirm that confidentiality "should be safeguarded to an extent consistent with the intended uses of these records for specific administrative and statistical purposes." The confidentiality principle is based on the right of the individual to expect that information given in confidence to the registrar or interviewer will be used only for authorized statistical or administrative purposes. In turn, the national authority that collects vital event data with a promise of confidentiality should expect that the data reported by individuals are full and accurate, regardless of the sensitivity of the information (UNSD, 2014, paras 36–37).

It is essential that there is a system in place for protecting the privacy and confidentiality of information on birth records and associated statistical reports (see Box 8).

3.4 Integrating live birth and stillbirth registration into RMNCH programmes

Using health sector encounters to improve the coverage of the civil registration of births (live births and stillbirths) is made possible by the fact that health workers providing maternal and child care services keep records of events and the services (and in some countries, digital records) provided in the period before and after the occurrence of a birth (see Fig. 3.13). The information is primarily intended to support

Box 8. Ensuring privacy and confidentiality of registration information

In some settings where it is customary to include information on the marital status of the mother in the registration record and associated statistics, live births or stillbirths may be labelled "born out of lawful wedlock" or "illegitimate" if the mother is not married at the time of delivery. The UN *Principles and recommendations* emphasize that since birth records are legal documents which are preserved and used over long periods of time and must be presented to others for a wide variety of uses during the lifetime of the registrant, such stigmatizing information should be treated as statistical information only and should not be part of the legal document (UNSD, 2014, para 115).

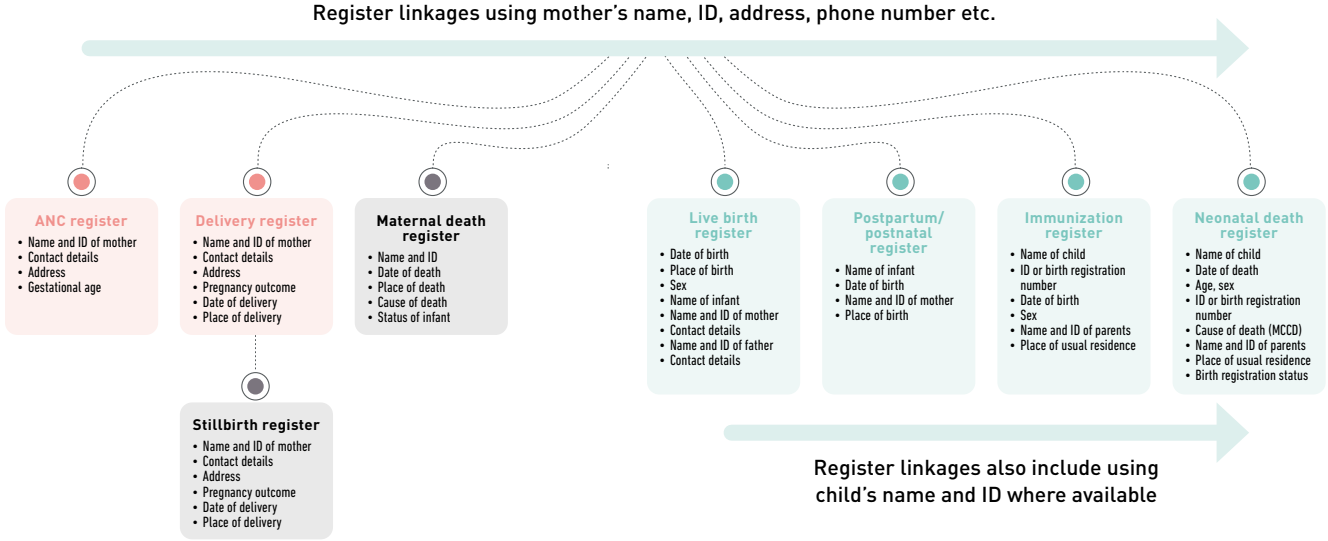
If local CRVS law requires that sensitive information such as marital status of the mother be included on the legal portion of the birth certificate consideration should be given to providing a "short form" which attests to only the basic details associated with the event, such as, names, dates, geographical locations etc. (see Fig. 3.11). The short form might, routinely, be the form of choice for providing copies, except in circumstances where the entire form is required for a particular legal or administrative use (UNSD, 2014, para 119).

care provision. However, some of the information collected can be used for the notification and registration of births.

It is essential to be aware that the recording of an event such as a birth within these health registers does not constitute formal civil "registration". These concepts can be misunderstood, particularly by family members when asked if a birth (or death) event has "been registered". These registers contain the information needed for notification of the event to the civil registrar but do not in themselves constitute a formal notification.

The most effective way of improving services is to link these registers through a link variable that seamlessly helps in tracking pregnancy-related services and outcomes in an integrated and holistic way. This could also be used to track individual pregnancies and children from pregnancy registration to completion of the childhood immunization schedule, enabling identification of missing outcomes. The most efficient link variable is a parental unique ID (or of the infant in settings where ID is allocated at birth) but details of the parents' names, place of usual residence and dates of birth can also be used.

Fig. 3.13 Registers maintained in the RMNCH programme and the information they can provide to facilitate the integration of live births and stillbirths in the CRVS system



The **antenatal care register** commonly contains information on the expected date of delivery; name of the mother; national ID number of the mother; mobile phone number, address and/or location of usual residence of the mother; date of birth of the mother; pregnancy outcome and gestational age (if available in antenatal care registry).

The **delivery care register** includes information on birth outcome (live birth/stillbirth); date of birth; place of delivery; name and sex of the child; type of attendance at delivery; birth order; mode of delivery; birth weight; names of the mother and father; national ID numbers of the parents; mobile phone numbers of the parents; address and location of usual residence of the mother; date of birth of the mother and father. The administrative information contained in this register is a key input to the birth notification. The delivery register should feed information into separate registers for stillbirths and for live births, the latter also linking to postpartum and postnatal care registers and to an immunization register.

The **immunization register** includes information on the name of the child; date of birth; sex of the child; the child's national ID number or birth ID number (if the child is already registered); the names of the mother and father; national ID numbers of the parents; mobile phone numbers of the parents; address and location of usual residence of the mother.

The **stillbirth register** is generally derived from the delivery register and includes information on the date of stillbirth, place of occurrence, sex of the child, gestational age, birth weight, associated maternal conditions; names of the mother and father; national ID numbers of the parents; mobile phone numbers of the parents; address and location of usual residence of the mother; dates of birth of the mother and father. This information permits the notification of the stillbirth to the local civil registrar.

The **neonatal death register** covers the period from birth to the first 28 days of life and contains information on the date of death of the child; date of birth of the child; name of the child (if any); child's national ID/birth ID (if the child has already been registered); sex of the child; name of the mother; cause of death ascertained by completing the international MCCD form, as described in Chapter 4. If the infant's birth was registered prior to death, its death should be notified to the civil registrar as described in Chapter 4 on death registration. If the infant's birth was not registered prior to death, both the birth and the death should be registered simultaneously. The failure to register both births and deaths occurring in the neonatal period results in a gross underestimation of the levels of infant and child mortality.

The **maternal death register** contains information on the date of death of the mother; name of the mother; cause of death of the mother ascertained by completing the international MCCD form, as described in Chapter 4; number of completed weeks of pregnancy; fetal outcome (early/late fetal death, live birth); date of birth and/or death of the infant; name of the child (if any); child's national ID/birth ID (if the child has already been registered); sex of the child. This information enables the death of the mother to be notified to and registered in the civil registration system.

3.4.1 Data sharing between RMNCH and civil registration and vital statistics systems

There are important considerations that authorities have to keep in mind before embarking on this process of integrating RMNCH and CRVS systems, including:

- The CRVS strengthening strategy should include consultation with stakeholders in the redesign of notification and registration forms and processes.
- New procedures for notification and registration may require amendments in laws, rules and regulations.
- Registers should be standardized and simplified to capture only essential data elements; staff should have the knowledge and support they need to accurately input the data on births that are required for civil registration purposes (Shamba et al., 2021).
- Revised standard operating procedures (SOPs) should be developed for efficient implementation of the new system.
- New SOPs will require training strategies to be devised and implemented for relevant health workers and civil registration officials (preferably joint training).
- Formal coordination mechanisms, including at the local level, should be established.
- Quality assurance, monitoring and review mechanisms should be set in place.

The design of an integrated approach to live birth and stillbirth registration involving the health sector should not in any way infringe upon or dilute any of the provisions of the civil registration law in the country. All the milestones of a civil registration process (notification, validation etc) have to be completed according to the rules and regulations laid down under the existing civil registration legal framework and by legally authorized informants and officials. As countries work towards strengthening birth registration coverage and take advantage of the new possibilities presented by leveraging the RMNCH programme, both for increasing registration completeness and also for enhancing the efficiency of registration service delivery, it may be necessary to amend CRVS laws and regulations. Any amendments should clearly define the roles and responsibilities for the health sector in the registration process.

Rwanda and the United Republic of Tanzania provide examples of countries that have recently amended their laws to extend the role and responsibility of the health sector in facilitating vital event registration and also in the provision of registration services at the health facility level. In 2020, a Rwanda Ministerial Order vested health facility staff with civil registration powers (Rwanda 2020).

In some countries, such as Mongolia and Ethiopia, the civil registration offices and health ministries have signed a memorandum of understanding for smooth sharing of information and improved coordination. An important aspect that affects the integrated approach is the organizational structure for the civil registration system vis-à-vis that for implementation of the RMNCH programme in various geographic or administrative areas in a country. For example, in some countries, the local registration office may be located at the district/province level, while the RMNCH programme is invariably implemented through CHWs at the village level. Leveraging the RMNCH programme for facilitating notification of a live birth or stillbirth occurring at local level and ensuring that these events are registered at the appropriate civil registration office at district/province level will need solid institutional mechanisms for coordination, management of records, confidentiality and data security. It is critical that there is a clear mapping of the organizational structure of the RMNCH delivery points with the office of the local registrar to avoid any confusion with regard to the flow of information and management of records. In some countries, health districts may not be coterminous with administrative districts and hence the mapping exercise is also crucial for smooth operation of the integrated approach.

The DHIS2 software currently being used in many countries for the management of RMNCH programmes allows aggregated data to be entered at the district/province level although DHIS2 modules able to record individual information on individual records are now being introduced. Many countries are working to build individualized digital registers for improved management, follow up and monitoring of services. Mobile phones and tablets are being increasingly used at the community level for case management across the continuum of care services in the programme. With a carefully designed process, the existing platform can be used to transmit notifications of live births and stillbirths to the civil registrar for registration and certification. There are also countries, such as Mozambique, where mobile phones are already being used to notify live births that occur in the community and transmit the information to the central server, which is accessed by the designated civil registrar who completes the registration and certification (Box 9).

Box 9. Mozambique – e-CRVS

Mozambique has introduced a new digital e-CRVS system, in which mobile birth notification is an essential element. The new e-CRVS system is an example of good public-private partnership practice, which allows the government to have access to unstructured supplementary service data (or instant messaging) at a reduced cost, and parents to receive free text messages sponsored by the telephone companies. The new platform allows:

- Registration authorities at national and district level to monitor in real time all requests for registration made outside of the district office.
- Registration officers at *postos administratives* (subdistrict level) to initiate data entry in the system using instant messaging via mobile phone to the national database.
- Parents and registration officials to receive the UIN of the registered child, which is generated by the national system upon receipt of the instant message.
- Parents to receive timely notification that the birth certificate is ready for collection. Parents can obtain the child's birth certificate at any district office by presenting the UIN of the child.

The implementation of e-CRVS further decentralized CRVS by increasing the number of geographic locations where birth registration can be initiated; as such, it also helped to address issues related to accessibility. In addition, vital event notification can be performed with partial information, to be updated later within the legal period.

Source: UNICEF, 2020b.

The RMNCH programme in Mozambique, however, is still managed and monitored through paper-based registers so could benefit if such information is automatically transferred to the local health workers for follow-up services for mothers and children. For more detail on digitization and linkage of CRVS and HMIS, see Section 5.2.

3.5 Monitoring the health sector contribution to notification and registration of live births and stillbirths

The effectiveness of the health sector's involvement in the notification of births to the civil registration authorities should be monitored using a set of process indicators. Health functionaries facilitating the notification of births occurring in health facilities or in the community should systematically record actions taken in this regard. This continuous recording of action taken and follow up can form the basis for monitoring through a set of process indicators, which is crucial for successful implementation of this approach.

Examples of process indicators include (see Annex 3):

- Number of live births notified by health facilities to the civil registrar within the legally mandated time period after birth by sex.
- Percentage of births in the health facility notified to the civil registrar, within a defined period, by sex and age, among total births in the health facility.
- Number of live births notified through CHWs within the legally mandated time period after birth by sex.
- Number of stillbirths notified by the health facilities to the civil registrar within the legally mandated time period.
- Percentage of stillbirths in the health facility notified to the civil registrar, within a defined period, among total stillbirths in the health facility.
- Number of stillbirths notified through CHWs within the legally mandated time period after birth.
- Number of children reported to be unregistered at the time of immunization (BCG and DPT1) for whom the parents filled in the notification/declaration form for civil registration (separately for BCG and DPT1).

For their part, national civil registration authorities should monitor the number of notifications of live births and stillbirths received from the health sector and report back to the health sector on the numbers of notifications registered. This two-way flow of information between the health sector and the civil registration authorities will help to identify any discrepancies or quality issues, thereby maintaining accuracy and correctness.

This implies frequent and systematic sharing of information between civil registration and the health sector at local level and necessitates a well-functioning formal coordination mechanism guided by a memorandum of understanding and/or clear SOPs.

3.6 Production of statistical reports on birth registration

It is essential that the information on live births and stillbirths provided by the health sector to the civil registrar should be accurate, complete and timely because it will be the basis for the development of vital statistics used by national authorities for monitoring, resource allocation, planning, policy and programme development.

Once a live birth or stillbirth has been registered and a certificate issued, the civil registrar prepares a statistical report for each event registered and usually forwards it to the national statistical agency responsible for the compilation of vital statistics. This should be done periodically (monthly or quarterly) and should involve checking and verifying the completeness and accuracy of the reported data in each record, explaining when particular information items may not be available. This statistical report should accurately report both the date of occurrence of the birth and the date of registration.

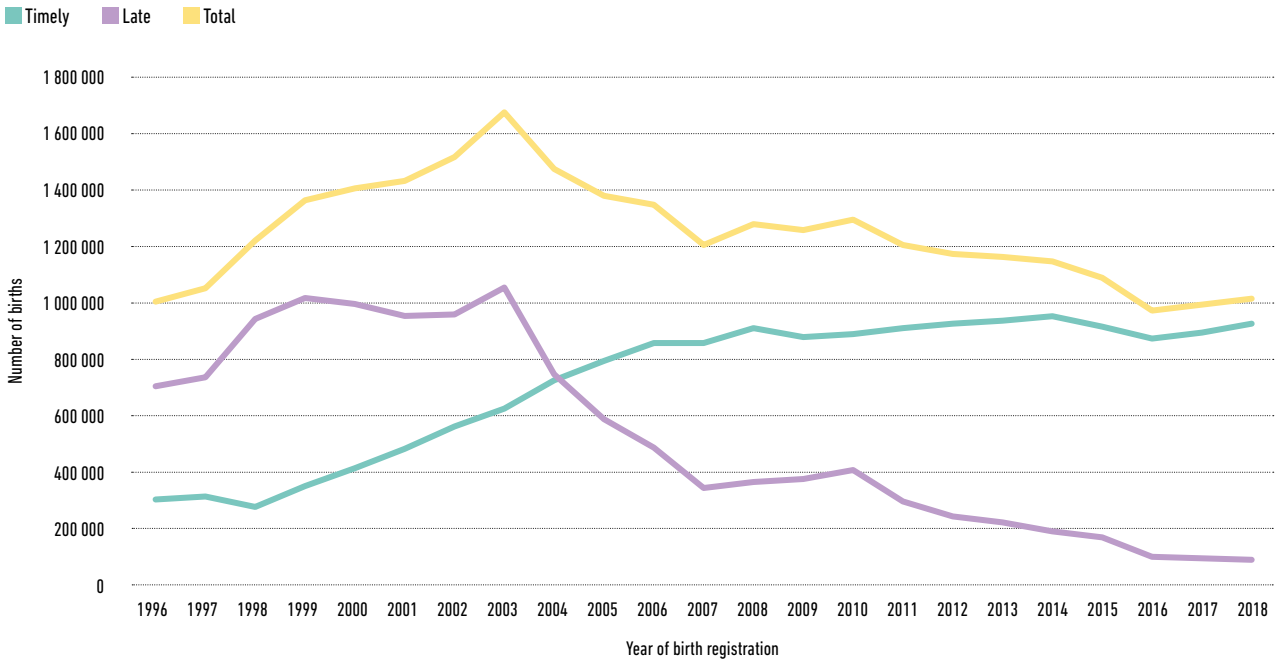
Civil registrars should produce and share with the national civil registration office and statistics agency reports of the total numbers of live births and stillbirths registered by sex, local administrative area, time period (monthly or quarterly), and other information to produce standard tabulations (UNSD, 2014, 157–159). Registrations should be divided into those that are timely or current (completed within the legal set deadline); those that are late (registered after the legally specified time period but within a grace period, usually within 1 year of birth); and those that are delayed (registered after the grace period has expired) (UNSD, 2014, 369–370).

Tabulations should be produced on:

- Numbers of live births registered within the legally mandated time period following birth, disaggregated by sex and place of birth (hospital, health centre, community) and place of usual residence.
- Numbers of late registrations of live births (registrations occurring after the legally mandated time period but within 1 year of birth) by sex.
- Numbers of delayed registration of live births (registrations occurring more than 1 year after birth) by sex.
- Numbers of stillbirths reported for registration within a specified number of days after birth, by place of birth (hospital, health centre, community).

Monthly and quarterly bulletins should be compiled at national and subnational levels (administrative regions

Fig. 3.14 Birth registration by status of registration, South Africa 1996–2018



Source: Statistics South Africa, 2019, p. 7.

for civil registration) and issued regularly. The regular presentation of selected indicators alerts responsible officials on a relatively contemporaneous basis of unusual changes in birth registration trends. Such reports are of great importance for quality assessment and for early detection of missing data.

As part of CRVS system strengthening, the number and percentage of timely, late and delayed birth registrations should be reported separately. By continuous measurement of the delay between birth occurrence and registration, it is possible to infer whether the operation of the CRVS system is improving or deteriorating. Experience from countries that have achieved improvements in birth registrations over time shows that initially, a large proportion of all birth registrations occur among older children or adults who require a birth certificate in order to demonstrate eligibility for particular services. Over time, however, the proportion of timely registrations increases in response to easier registration procedures, reduced costs, improved service access and quality, and increased public awareness of the benefits of birth registration. Eventually, when the CRVS is working optimally, the proportion of late or delayed registrations will fall to a minimum. These developments are illustrated for South Africa in Fig. 3.14.

Following registration, information from the individual records is compiled and analysed to produce vital statistics. The UN *Principles and recommendations* (UNSD, 2014, chapters IV and V) provide detailed information on the tabulations and key indicators to be prepared from civil registration records and on the presentation and dissemination of these statistics.

Guidance for the production of a national vital statistics report has been developed by the United Nations Economic Commission for Africa (UNECA), United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) and Statistics Norway (Brunborg and Nielsen, 2017).

For live births, tabulations should include live births by year and sex; sex ratio at birth; live births by maternal age; live births place of usual residence and place of occurrence. The guidance also shows how to calculate key fertility indicators such as crude birth rate; age-specific birth rate; general and total fertility rates.

National vital statistics reports are of direct programmatic relevance to the health sector, especially in relation to the health status and health care utilization of pregnant women and their children. Indicators that are of particular relevance to RMNCH programme planning include birth weight; number of pre-term live births; number of prenatal care visits; average birth interval and various other perinatal health indicators (see also Annex 3). Annex 3 Table A3.4 shows formulas for calculating key perinatal indicators.

The guidance is based on the "minimum list of tabulations" on live births in the UN *Principles and recommendations* (UNSD, 2014) but recognizes that not all variables will be available in some countries, especially for births that occur outside health facilities. It proposes a set of tables considered most essential, especially in the first vital statistics report(s) for a country. This set of essential tables is based on information usually available on birth notifications, registration sheets or birth registers. Key tabulations are shown in Annex 7.

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4 OPERATIONAL GUIDANCE FOR THE HEALTH SECTOR ON DEATH REGISTRATION

In this chapter we focus on the contribution that the health sector can make to the civil registration of deaths by notifying their occurrence, and the key circumstances surrounding their occurrence, to the civil registration authorities. Note that while the notification of stillbirths was addressed in Chapter 3, here the emphasis is on the registration of a stillbirth and determination of cause of death.

This chapter sets out the opportunities which health workers and health administrators have to collect information on deaths. As a legally designated informant, the health institution is responsible for notifying deaths to the civil registrar, thus enabling official registration, and for the death certificate to be issued. The chapter outlines the core data items required for civil registration purposes and the processes for facilitating the information flow between health and civil registration systems.

We describe key components of the registration of deaths, including the rules and guidelines for certifying and coding causes of death. Subsequently, we present a series of scenarios to illustrate the flow of information between health and civil registration systems using the "ten milestones" approach (see Section 2.1.2) (Cobos Munoz, 2018) and UN standards (UNSD, 2018).

While the focus of these process maps is on the first step, whereby a death is notified to the civil registration office and the local registrar validates the information prior to registration and certification, this chapter explains how improved data flows contribute to and strengthen the entire process of civil registration up to and including the generation of national-level vital statistics, in accordance with UN guidance and recommendations (UNSD, 2018). We end with a discussion on strategies that countries can adopt for integrating death notification into health and other administrative programmes.

This guidance is predicated on the assumption that health facilities, as legally designated informants in many countries, routinely submit notifications of death to the civil registration authorities in order to initiate complete and timely registration and certification of deaths. As is the case for births, "active notification" is the preferred approach, but this requires the designation, in civil registration law, of health institutions as official notifiers of the occurrence of a death (including stillbirths).

Where deaths occur outside health institutions, health officials and CHWs can facilitate the registration process by providing guidance and advice to families on where and how to register the death of a family member and assisting families to complete the required forms. In some settings, community-based health workers are designated to assist in the notification of deaths. Once the death notification is delivered to the civil registration office, and the death is registered, arrangements can be made for the family to obtain the death certificate.

4.1 Opportunities for improving death notification and registration

All countries have a HMIS that routinely collects information on health events – including deaths – during the provision of care or at the time of discharge. Drawing on individual patient records, admissions and discharge registers, ward registers and records of health interventions delivered in communities, the HMIS tracks the delivery and outcomes of clinical interventions and treatments for both acute conditions and for those that require long-term follow up and monitoring of treatment compliance and health outcomes. The HMIS, and especially patient discharge records, are potentially a major source of information on deaths that could be harnessed to improve the completeness of death registration. The WHO has defined core all-cause and cause-specific mortality indicators that should be collected through the HMIS (WHO, 2018a).

Many health programmes collect data on mortality and causes of death. For example, deaths occurring during pregnancy and childbirth are often notifiable events to be reported and audited as part of a maternal and perinatal death surveillance and response (MPDSR) strategy (WHO, 2020a). This involves a national policy for the notification of maternal or perinatal deaths and the establishment of national and subnational maternal/perinatal death review committees. Over 60 countries in Africa, Asia and the Pacific, and Central and South America have MPDSR policies in place, yet linkages to the CRVS system are very rare (WHO, 2020b). These MPDSR audits are opportunities to ensure that the death is registered, and an updated medically certified cause of death, if available, is included in the civil registration record.

While health care workers engaged in the delivery of RMNCH services are particularly well placed to contribute significantly to birth registration, deaths occur in a much wider variety of institutional and programmatic settings, including hospitals, residential long-term care facilities, as well as in the community. Staff working in the delivery of disease-specific health programmes and services, such as for HIV/AIDS, TB,

malaria, cardiovascular diseases and cancers, are among those that are most likely to be aware if not actually present in the event of a death and thus in a position to document the circumstances of that death. Yet, information about these deaths is often not shared with the civil registration system.

Deaths that occur in health facilities, and in hospitals or long-term residential institutions in particular, will likely be attended by a doctor or trained health care professional. In these circumstances, health sector personnel are usually able to assume responsibility for the notification of that death to the civil registrar, as well as its key characteristics – including ascertainment and recording of the cause of death using the MCCD form (see Box 10). In this particular context, it is important to note that while health sector staff have the legal authority to collect information on patients, they are bound by rules of confidentiality as they apply to patient records. Privacy and confidentiality are especially important with regard to cause-of-death data where there may be stigmatization associated with certain causes (see Section 4.4.1 Box 13, where confidentiality is discussed in more detail).

For deaths that occur outside medical settings (which is the majority in many LMIC settings), CHWs are often among the first outside of the family and kinship circles to know that a death has occurred. As for births, and where the legal framework permits, community workers operating under the auspices of a health institution can be designated as notifiers of a death to the civil registrar. The law may designate other community-based agents, such as local administrative officers, village chiefs, funeral attendants and religious authorities, as notification agents. However, as current UN guidance observes, in determining who can notify vital events, it is essential to ensure that there is clear legal guidance and that notifiers have the knowledge and skills to accurately and sustainably supply the facts surrounding a death and to complete the administrative formalities required by the CRVS system. The UN guidance acknowledges that the use of informal notifiers of deaths might be useful as an interim measure, especially in some rural and remote areas where the level of completeness of death registration is currently still very low (UNSD, 2018, para 137).

Health workers at all levels of the health system – hospital, health centre, community – routinely collect information on deaths from government-run facilities, non-profit, for-profit, faith-based facilities and from service delivery sites such as prisons, schools, workplaces and communities. The information is collected in hospital wards, emergency departments and community outreach services. It follows that there are opportunities for greater involvement of the health sector in the death registration process. This guidance describes the processes and the minimum information items that health functionaries should record and share in order to provide the civil registrar with a notification that can serve as the basis for an official death registration.

Box 10. The importance of mortality and cause-of-death information in CRVS systems

Deaths should be registered as soon as possible after occurrence, ideally within a few days of death in order to permit timely disposal of the corpse. Indeed, in some countries, the issuance of a burial permit is dependent on the death having been registered or, at a minimum, notified to the civil registration authorities. The sooner a death is registered, the more likely it is that the registration system will record all the associated information accurately, thus contributing to reliable documentation for individuals and surviving family members, and accurate vital statistics.

In addition, when the registration of the fact of death is accompanied by information on cause of death, it is possible to track high-priority indicators, such as maternal mortality and deaths associated with specific causes such as HIV/AIDS and other infectious diseases; noncommunicable diseases such as cancer, cardiovascular diseases and diabetes; and external causes of deaths such as road traffic accidents and injuries. This detailed cause-specific information is essential for tracking epidemiological transitions and modifying health strategies accordingly.

The health sector has the responsibility for the ascertainment of medical cause of death. The international standard for doing so involves the completion by a doctor of the Medical Certificate of Cause of Death – MCCD – as described in Section 4.2. When death occurs at home and/or a doctor is not available to complete the MCCD, community-based health workers or trained enumerators can apply methods for ascertaining probable cause of death using verbal autopsy (VA) in order to generate statistics on causes of death in the community (see Section 4.2.3).

During the COVID-19 pandemic, public health decision-makers urgently needed information on mortality and causes of death. Countries with well-functioning CRVS systems were able to quickly identify excess mortality – rapid and unexpected increases in mortality beyond those normally observed over similar periods of time. Excess mortality has been used to draw attention not only to total deaths due to COVID-19, but also to increased mortality due to non-COVID-19 causes. This can arise because during the pandemic people with potentially fatal conditions do not seek health care for fear of becoming infected (Malone, 2018) or because of reluctance to add to the pressures on health care services. Increased deaths may also reflect shifts in the pattern of causes of mortality, such as increases in deaths due to suicide or violence during extended periods of lockdown measures.

4.2 Cause-of-death information in civil registration and vital statistics systems

Throughout this chapter we distinguish between the recognition that a death has occurred – the pronouncement of death – and the MCCD. Health care providers such as doctors, nurses, medical assistants and paramedics can pronounce a death, i.e. declare that life has ceased based on a physical assessment of the corpse in accordance with country policies and procedures. They can also collect key information items such as the name, age and sex of the decedent, which are essential for the civil registration of the death and also enable the compilation of vital statistics on mortality by age and sex. In this section, however, the focus is on methods for obtaining cause-of-death information which requires specific medical training and skills.

Reliable and timely statistics on mortality and cause of death are essential for the development of national health and population policies and underpin the ability of countries to respond to emerging health threats and epidemics. As noted in Chapter 1, the SDGs call for monitoring several targets that are defined in terms of cause-specific mortality, including: maternal mortality; mortality due to infectious diseases such as HIV/AIDS, TB and malaria; noncommunicable diseases such as cancer, diabetes and cardiovascular conditions; and external causes of death such as traffic accidents, suicide and violence.

There are two main approaches for determining cause of death:

- **Medical Certificate of Cause of Death (MCCD)** by a trained doctor using the international MCCD form (WHO, 2016a). The cause of death identified from MCCD is determined for each individual.

- **Verbal autopsy (VA)** using a standard instrument; this is usually done for deaths that occur outside of a health facility and where there is no doctor able to complete the MCCD. Probable causes of death attributed from VA are not used at the individual level but do provide valuable information on cause-of-death patterns in the community as a whole.

In high-income countries, most deaths occur in health care settings where a doctor is able to provide a MCCD, using information from the decedent's health care records, supplemented by diagnoses established by way of a postmortem examination where necessary.

Sudden unexpected deaths and those due to external causes may require more detailed forensic examination and police investigation to determine the cause of death accurately. In all cases, the doctor completes the MCCD.

It is essential to be clear about the distinction between the death certificate – which is issued by the civil registrar – and the MCCD – which is the responsibility of the health sector. The MCCD includes the personal details of the decedent and administrative information that the civil registrar needs in order to register the death. However, the death certificate does not always include detailed information on cause of death; in settings where a doctor-certified MCCD is not available, the notification of death form should contain the minimum administrative information required to legally register the death, as shown in Annex 4.

In many countries, significant proportions of deaths occur at home and the decedent may not have received medical care. For example, it is estimated that in Bangladesh, only 15% of deaths occur in a health institution (Uddin et al., 2019).

Where deaths occur at home, or under circumstances that make it impossible for a doctor or medico-legal person to certify a death using the MCCD form, VA is the WHO-recommended method to ascertain the probable cause of death and generate statistics on cause of death distributions in the community.

We describe these approaches in more detail in the following sections.

4.2.1 WHO Medical Certificate of Cause of Death

The proper procedure for certifying the cause of death is a doctor completing the MCCD form, reproduced in its entirety in Fig. 4.1. This is the internationally agreed form for recording and reporting deaths, including cause of death. This standard form, last revised in 2016, can be used to document all deaths, including stillbirths, and has two main sections:

- **Frame A** calls for detailed medical information relating to the immediate, intermediate and underlying causes of death.

- **Frame B** is for reporting additional medical data that may be relevant to the manner of death, and among other things, calls for information on where the death took place, and details of external causes of death.

Box 11. Definitions of key terms used in relation to cause of death

Immediate or direct cause of death: The disease, injury, or complication that directly results in death. It is the ultimate consequence of the underlying cause of death.

Manner of death: The circumstances in which a death occurred. The International Classification of Diseases (ICD) classifies manner of death as disease, accident, intentional self-harm, assault, legal intervention, war, pending investigation, unknown, or "manner undetermined". Determination of manner of death is typically determined through the legal system, by a coroner, medical examiner, police or similar officials.

Mode of dying: Comprises conditions such as heart failure, cardiac arrest, shock, brain failure, hepatic failure, and renal failure, which do not usually occur without an initiating or precipitating cause.

Underlying cause of death: The disease or injury which initiated the train of morbid events leading directly to death or the circumstances of the accident or violence which produced the fatal injury.

Source: WHO, 2016a.

The first section is for administrative data, i.e. the administrative and legal information that is required for death notification and registration such as the name; sex and date of birth of the decedent; unique ID, if available; place of usual residence of the decedent; as well as the name and contact details of the declarant or official notifier. Minimum information items are required with regard to the decedent, the declarant reporting the event to the civil registrar, and details of the official issuing the notification form – see Annex 4.

In principle, the information provided in Frame A (which has two parts) together with that in Frame B should allow the selection of the underlying cause of death. This is defined as the disease or injury which initiated the train of morbid events that led directly to death or the circumstances of the accident or violence which produced the fatal injury. This initiating cause should not be confused with the "mode of dying", such as heart failure, cardiac arrest, shock, brain failure, hepatic failure and renal failure. These events do not usually occur without an initiating or precipitating cause. If only the mode of dying is reported on the death certificate (e.g. heart failure), a potentially wide range of different underlying causes will be missed, which will result in significant proportions of deaths being classified as "ill defined". This renders the resulting cause-of-death statistics of little value for health decision-making. It is the underlying cause of death that is amenable to preventive health interventions. Therefore, it is extremely important that the underlying cause of death is properly selected when analysing causes of death in the population.

Completion of the MCCD form generates comparable data on deaths and causes of death but can only be done effectively in circumstances where deaths occur in health facilities and/or under medical supervision. The duty of the attending doctor to accurately complete the MCCD is generally enshrined in CRVS and health legislation. For example, in the United Kingdom, this is stipulated in both civil registration law and in a doctor's employment contract.

Where civil registration law permits, the completed MCCD form can serve dual purposes, i.e. as permission for the disposal of the corpse and as notification of the death to the civil registrar (ONS, 2020, p. 2).

In many countries, only the personally identifiable information and administrative data are shared with the family; the information on medical cause of death is treated as confidential information and is shared only with the civil registrar. In settings where cause-of-death information is considered to be strictly confidential, cause of death does not appear on the death certificate, but an anonymized database of cause of death is shared with the national statistics agency, under strict conditions of confidentiality, for the purposes of the compilation of cause-of-death statistics. In other jurisdictions, the underlying cause of death as determined by the doctor's diagnosis is specified on the death certificate.

In settings where cause of death is deemed to be confidential information, this section of the MCCD should be treated with the same degree of confidentiality as a patient's medical record. In principle, therefore, it should not be directly shared with the family. However, when cause of death is due to a notifiable disease, the health sector should be informed so that it can intervene on public health grounds to prevent the further spread of the disease to family members and the community. In some cases, for example, when the cause of death was due to congenital conditions that may be passed on to the next generation, a health professional may also be permitted to share the information with the family and provide counselling.

Fig. 4.1 Medical Certificate of Cause of Death

Administrative data (should be further specified by country)
Should include the information on the decedent, the declarant, and the official issuing the notification form as shown in Annex 4.

Sex ☐ Female ☐ Male ☐ Unknown

Date of birth (day/month/year) ..... **Date of death** (day/month/year) .....

Frame A
Medical data: Part 1 and 2

Part 1 Report disease or condition directly leading to death on line **a**	Cause of death		Duration (time interval) from onset to death
	a.		
Report chain of events in due order (if applicable)	**b.**	Due to:	
	c.	Due to:	
State the underlying cause on the lowest used line	**d.**	Due to:	

Part 2
Other significant conditions contributing to death (time intervals can be included in brackets after the condition):

Frame B
Other medical data

Was **surgery** performed within the last 4 weeks?
☐ Yes ☐ No ☐ Unknown

If yes, please specify date of surgery (day/month/year) .....

If yes, please specify reason for surgery (disease or condition):

Was an autopsy requested? ☐ Yes ☐ No ☐ Unknown

If yes, were the findings used in the certification? ☐ Yes ☐ No ☐ Unknown

Manner of death

☐ Disease	☐ Assault	☐ Could not be determined
☐ Accident	☐ Legal intervention	☐ Pending investigation
☐ Intentional self-harm	☐ War	☐ Unknown

Fig. 4.1 Medical Certificate of Cause of Death continued

If external cause or poisoning, date of injury (day/month/year) .....

Please describe how external cause occurred (if poisoning please specify poisoning agent):

Place of occurrence of the external cause

- ☐ At home
- ☐ Street and highway
- ☐ Residential institution
- ☐ Trade and service area
- ☐ School, other institution, public administrative area
- ☐ Industrial and construction area
- ☐ Sports and athletics area
- ☐ Farm
- ☐ Other place (please specify) .....
- ☐ Unknown

Fetal or infant death

Multiple pregnancy? ☐ Yes ☐ No ☐ Unknown

Stillborn? ☐ Yes ☐ No ☐ Unknown

If death within 24 hours, specify number of hours survived .....

Birth weight (in grams) .....

Number of completed weeks of pregnancy .....

Age of mother (years) .....

If death was perinatal, please state conditions of mother that affected the fetus and newborn:

For women, was the deceased pregnant? ☐ Yes ☐ No ☐ Unknown

- ☐ At time of death
- ☐ Within 42 days before the death
- ☐ Between 43 days up to 1 year before death
- ☐ Unknown

Did the pregnancy contribute to the death? ☐ Yes ☐ No ☐ Unknown

Frame A: The death notification and registration forms approved by national authorities may look different in different countries, but Frame A of the MCCD, is the same worldwide. Frame A has two parts, including a section to record the interval between the onset of each condition and the date of death.

Part 1 is used for diseases or conditions that form part of the sequence of events leading directly to death. The immediate (direct) cause of death is entered on the first line, Part 1 line a. There must always be an entry on Part 1 line a, and this may be the only condition reported in Part I of the certificate. If there are two or more conditions that form part of the sequence of events leading directly to death, each event in the sequence should be recorded on a separate line. In any case, it is essential to record the disease, injury, or external cause that resulted in the death.

Duration is the time interval between the onset of each condition entered on the certificate (not the time of diagnosis of the condition) and the date of death. Duration information is useful in coding certain diseases and provides a useful check on the order of the reported sequence of conditions.

Part 2 is used for conditions that do not belong in Part 1 but whose presence contributed to death.

Frame B: Some detail is frequently forgotten in Parts 1 and 2 (Frame A). Separate questions ask for details such as previous surgeries, mode of death and place of death. It is important to record additional information in Frame B to ensure that all available information is provided so as to allow for the correct ascertainment of the underlying cause of death. For example, there is a question in Frame B on whether the deceased woman was pregnant, which would help improve reporting of maternal deaths. Similarly, information on surgery and reasons for the surgery would help in ascertainment of underlying cause of death.

Source: WHO, 2016a, p. 203.

4.2.2 Coding deaths according to the International Classification of Diseases

Once a medically trained person has correctly completed the MCCD form, the cause of death must be coded correctly according to international rules and standards laid out in the International Classification of Diseases (ICD). The ICD groups similar diseases into mutually exclusive categories using an alphanumeric code to facilitate interpretation and analysis of cause-of-death data. ICD coding involves assessing the chronology and intervals of diagnoses recorded on the MCCD form then applying ICD hierarchical coding rules to the medical diagnoses. The correct and consistent application of ICD standards and rules ensures that cause-of-death patterns can be compared for different populations or over time in the same population.

Accurate coding and correct selection of the underlying cause of death according to ICD rules and procedures is a specialized task that requires training and skills development. When done manually, ICD coding is generally centralized in the ministry of health or the national statistics office. In some settings, coding is done in hospital medical records departments but this is less efficient than centralized coding as to maintain good coding skills requires training coders in every hospital which is demanding in terms of resources and not sustainable. However, in setting where data are compiled electronically, coding can be done using automated methods such as Iris (FIDMD, 2020) simultaneously with the electronic certificate being completed. This may be decentralized at the subnational or facility level.

Countries with existing ICD coding capacity can benefit from the introduction of the Iris automatic system for coding multiple causes of death and for the selection of underlying cause of death (FIDMD, 2020). For countries with limited capacities for ICD coding, WHO has developed a startup mortality list (SMoL) based on the universal list of ICD diagnoses (WHO, 2018b). The underlying causes of death generated from the SMoL can be used to inform the setting of public health priorities and to track progress toward national and international targets and goals such as the SDGs.

Commonly encountered problems in mortality coding mainly relate to coding practices, coder qualifications and training, and the quality of death certification (see Annex 1 Fig. A1.2).

The ICD 10th Revision has been in use since early 1990s and WHO has developed an interactive, self-learning tool to facilitate the use of the system. WHO is currently transitioning to the ICD 11th Revision and WHO Member States will start reporting using ICD-11 from 1 January 2022 (WHO, 2020c). The update comes with an automated coding tool and guidance materials and has been designed to accommodate the needs of multiple use cases and users in recording, reporting and analysis of health information and will be easier to use, including in electronic environments.

4.2.3 Verbal autopsy

When deaths occur at home without medical supervision it is not possible to apply the MCCD to determine the cause of death. In fact, globally this is the situation for the vast majority (over 90%) of deaths occurring in low- and lower middle-income countries. The resulting lack of data on patterns of causes of death is problematic for the health sector because decision-makers do not have the information needed upon which to base policy decisions. This has driven the development of VA, a method designed to generate acceptable quality cause-of-death data in such circumstances (see Box 12) (WHO, 2016b).

Verbal autopsy consists of an interview with family members of the deceased person in order to obtain signs and symptoms experienced prior to death and to gather information on any medical care received shortly before death. The interview is conducted using a standardized questionnaire on paper or a handheld device and the responses analysed using automated techniques or, in some instances, by review by a doctor.

The outcome of the analysis is a *probable* underlying cause of death. This is not comparable to the underlying cause of death of an individual determined by a doctor using the MCCD and does not have a similar legal status. Therefore, the VA data should be clearly differentiated from MCCD data during statistical analysis.

Verbal autopsy methods have been widely used to determine cause-specific mortality in populations where most deaths occur outside the health system and MCCD is not possible. A well-known example is the Sample Registration System in India (Office of the Registrar General & Census Commissioner, India, 2020). However, in this approach, the term "registration" does not involve the civil registration of deaths; rather it is a method for enumerating deaths within a defined sample population and applying VA in order to generate cause-specific mortality distributions. More recently, there is emerging experience in integrating the VA component into the routine

Box 12. Verbal autopsy: determining cause of death when there is no doctor able to complete the MCCD

Many deaths, especially in low- and lower middle-income countries, occur at home or in facilities where there are no doctors to medically certify the cause of death. The lack of cause-of-death data impedes evidence-based public health decision-making. In some settings, "lay reporting" of cause of death by family members or even health workers is common but highly problematic. Non-medically trained persons do not have the knowledge and skills required to determine cause of death and this approach results in misleading information, due to vague and non-specific causes that are of limited utility for public health. In response, researchers have developed the VA tools to generate a probable cause of death and produce cause-of-death distributions for a given area or country (Lopez et al., 2011).

The VA questionnaire consists of a short, structured and retrospective interview inquiring about the signs and symptoms experienced by the deceased before death, generally administered by community-based personnel to family members of the deceased or others who were present shortly before death. The VA interview is ideally performed within 3 months after death and comprises questions on the demographic characteristics of the deceased, as well as the signs and symptoms that they experienced (and their duration) in the period before death.

The analysis of the VA interview responses can be done either by doctors (physician-certified verbal autopsy [PCVA]) or by the application of automated algorithms for diagnosing and coding the probable underlying causes of deaths. The use of doctors for the analysis can be time consuming and burdensome as well as taking them away from their clinical responsibilities. By contrast, automated methods can be completed quickly, at little expense, immediately after the VA interview and can generate a cause list mapped to ICD-10 statistical categories.

It must be emphasized that VA-determined cause of death is not comparable in terms of accuracy at the individual level to the cause of death resulting from the MCCD. Instead, the aim of VA is to generate estimates of cause-specific mortality fractions at the population level to be used for population-level analysis and policy development.

civil registration system. In this approach, which is being applied in Bangladesh, the notification and civil registration of a death is the trigger for the implementation of VA by a community-based interviewer on a sample of registered deaths (Uddin et al., 2019). Linking CRVS and VA ensures that deaths are registered while also producing an ongoing stream of data on all-cause mortality and cause-specific mortality distributions. This system-wide approach requires a supportive legal and administrative framework, clear and efficient business processes, defined roles and responsibilities of all stakeholders, and an operational approach that is fully integrated into the operational architecture (including IT) of the health and CRVS systems (de Savigny et al., 2017). Resources are required for training CHWs to conduct the interview and for data analysis. It is also important to ensure community understanding of the process and the purposes for which the information will be used.

4.3 Generic death registration processes

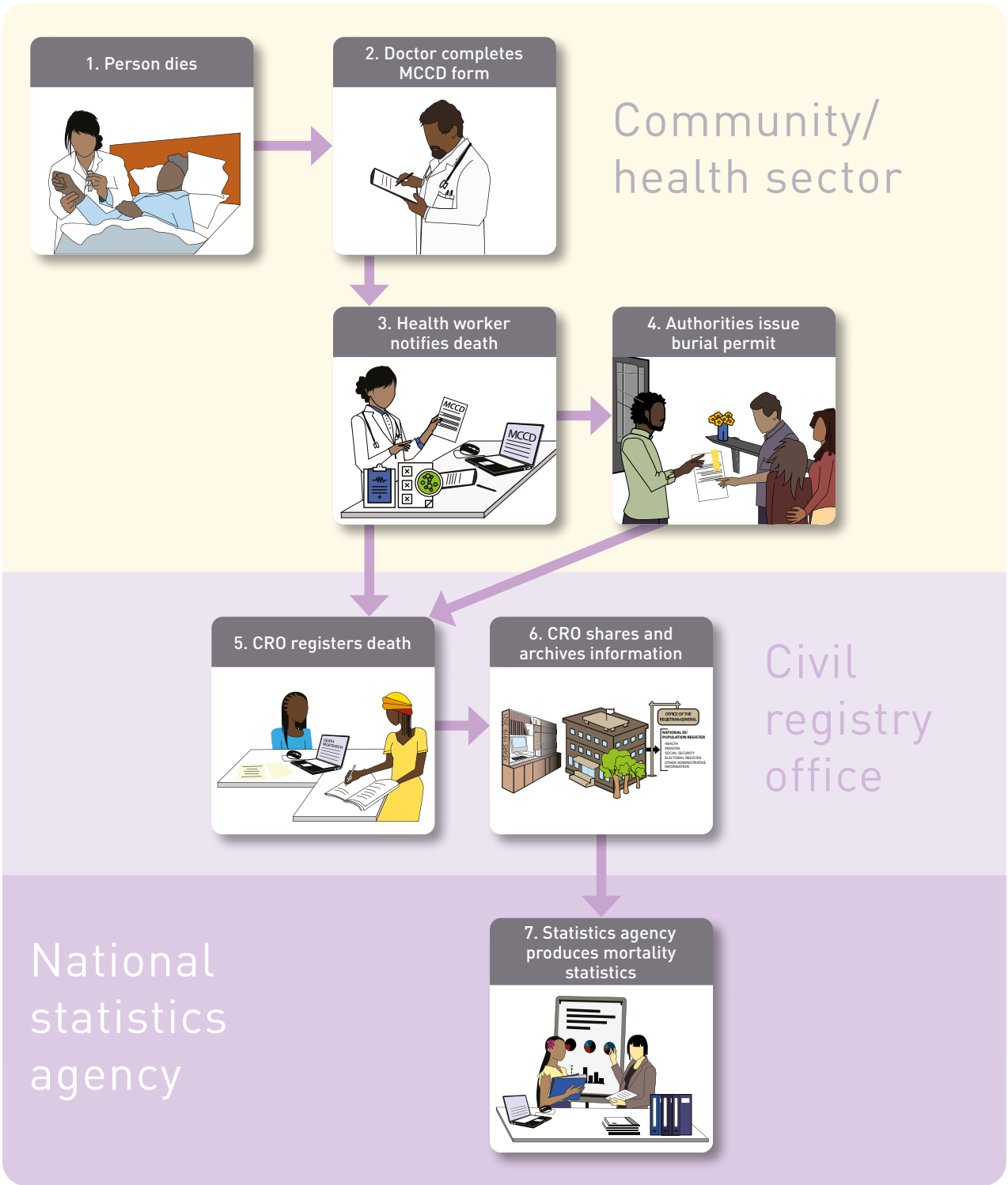
In this section we introduce the overall process for the notification, registration and certification of a death and its inclusion in the vital statistics system. We present seven specific scenarios reflecting the different circumstances in which deaths may occur, highlighting the contributions of the health sector with regard to:

- Notifying a death and key characteristics of the decedent directly to the civil registration authorities – this is described as an **active notification** process because the responsibility of informing the civil registrar of a death falls on the health sector.
- Providing the completed notification to the next of kin or parents as evidence of the occurrence of the event – this is described as a **passive notification** process because the burden of informing the civil registrar falls on the family and there is a high probability that the family will not do so in a timely way due to the time and costs involved in attending the civil registration office.
- Counselling and supporting families to visit the civil registration office in order to register a death and obtain a copy of the death certificate.
- Ascertaining cause of death when a doctor completes the MCCD.
- Supporting the implementation of VA to determine probable cause of death in settings where a doctor is not available.
- Collaborating with civil registrars and the statistical agencies to ensure the quality of mortality and cause-of-death statistics.

Fig. 4.2 describes a generic version of the death registration process from the occurrence of a death, the determination of cause of death, the notification to the civil registrar, the inclusion of the details of the death in the civil registration record, issuance of a death certificate and the inclusion of the death in the vital statistics system.

The first step in this process – notification – is key, yet it is one that is often surrounded by complexity. Aside from the emotional impact of a death and the demands of ascertaining cause of death, from the perspective of a family, at least, the uppermost concern is to make the necessary arrangements for the funeral and burial of the corpse. Differing legislation and social traditions mean that what happens in the event of a death, and the procedures and social norms that need to be followed, differ between countries. In most countries and societies, both legal requirements and religious or traditional practices have to be observed. Legal requirements pertain to the safe disposal of the corpse as well as to determine whether or not the death necessitates a police investigation, for example, in cases of external causes of death i.e. injuries due to accidents or violence.

Fig. 4.2 Generic death notification, registration and certification process



Below is explanatory text for the steps illustrated in Fig. 4.2, which shows a generic sequence.

The precise steps to be undertaken when a death occurs will depend on the legal framework in the country, the place of death (whether in a health facility or in the community), the availability of skilled staff, and the circumstances of the death.

1. When a death occurs, a health worker records the fact of death and notes the date and time of occurrence.

2. The attending doctor – preferably one who had previously cared for the decedent – completes all sections of the MCCD: the administrative information required for the death to be registered – name, sex and age of the decedent; date and place of occurrence; place of usual residence (see Section 4.4 and Annex 4); Frame A on the medical cause of death; and Frame B on other medical information.

   The doctor may request an autopsy, including clinical and toxicology tests, in order to reach a conclusion regarding the underlying cause of death. Should the doctor suspect that the death was due to unnatural or external causes, such as an accident, violence or suicide, the case should be referred to a medico-legal enquiry.

   For deaths where there is no doctor able to complete the MCCD, a community-based health worker, local official or other officially designated informant, can complete the minimum information required for registration purposes.

3. The health institution, or other officially designated informant, transmits a notification form including all the information required to register the death to the relevant civil registration office – active notification.

4. The medical informant provides the next of kin with a general receipt, or other documentary evidence, that serves as a medical declaration of death. In some jurisdictions, this permits the issuance of a burial permit. The next of kin is advised to visit the civil registry to declare the death, sign the register and collect a copy of the death certificate. Should the family fail to visit the registration office due to time and cost constraints, there is a risk that the death will not be registered.

5. Based on the completed MCCD or on the notification form from the designated informant, the civil registrar validates the information and enters the information into the registration record.

   Countries have different formats for the death certificate. In some settings, it includes information on the underlying cause of death. Elsewhere this information is not provided directly to the family on grounds of confidentiality. However, most systems permit the release of cause-of-death information to family members upon request.

   Next of kin review the information and sign the register in order to legalize it. The registrar gives the family a copy of the death certificate for administrative and legal purposes. In settings where death registration can be done online and electronic signatures are permitted, the death certificate is delivered to the family electronically. This scenario eliminates the need for an in-person visit to the registration office by the family, thus speeding up the process and reducing the burden of travel for family members.

6. The civil registrar shares information on the fact of death with entitled official agencies so that they can update their records, for example, the population register, the national ID agency, pensions, social security and health insurance agencies, the taxation authorities and the electoral register.

   The registration record is stored in the vital records archives so that family members can obtain copies of death certificates when needed.

7. The civil registrar sends a statistical report to the national statistics agency which conducts quality assessment checks and collates the information to produce mortality statistics.

For all scenarios, it is important to take into account local regulations and customs regarding disposal of the corpse. In some settings, for example, in the Philippines, Namibia and Sri Lanka, the family must first declare the death to the civil registrar who registers the death and issues a death certificate. Only then is the permit for disposal of the corpse granted. In other countries (e.g. South Africa, United States of America), morticians, funeral directors or cemetery managers complete a death notification form based on information received from the family along with the doctor-completed MCCD and send the notification to the local registrar for registration and issuance of a burial permit. This approach is effective where there are strictly enforced laws regarding burial permits and the use of cemeteries. In other settings, the permit can be delivered by a local administrative officer (Rwanda), a health administrator (United Republic of Tanzania) or the police (Namibia). In some settings, there is no official requirement for a permit (e.g. Bangladesh) and burial can take place without any official trail.

Although permission to dispose of a corpse is not a legal requirement in all settings, it is nonetheless gaining in importance as more people live in urban areas where public health regulations regarding the safe disposal of corpses are enforced. The unprecedented outbreak of Ebola viral disease in West Africa in 2014 focused attention on the importance of safe disposal of bodies. The minimum information and data items needed for formal permission to dispose of a corpse should be the same as those required for notification purposes.

In settings where traditional or religious requirements stipulate rapid disposal of the corpse, it is essential to ensure that there is a system in place for the notification of deaths and that registration services are available and accessible on a continuous basis. In the Philippines, for example, registration offices are available 24 hours a day and 7 days a week. However, while this enables rapid registration of the fact of death, it may not be possible to ensure an accurate MCCD because of the time needed to conduct postmortem examinations and histological tests. This may result in poorly defined causes of death, as has been shown to be the case in the Philippines and Sri Lanka (Mikkelsen, 2009; Phillips et al., 2014).

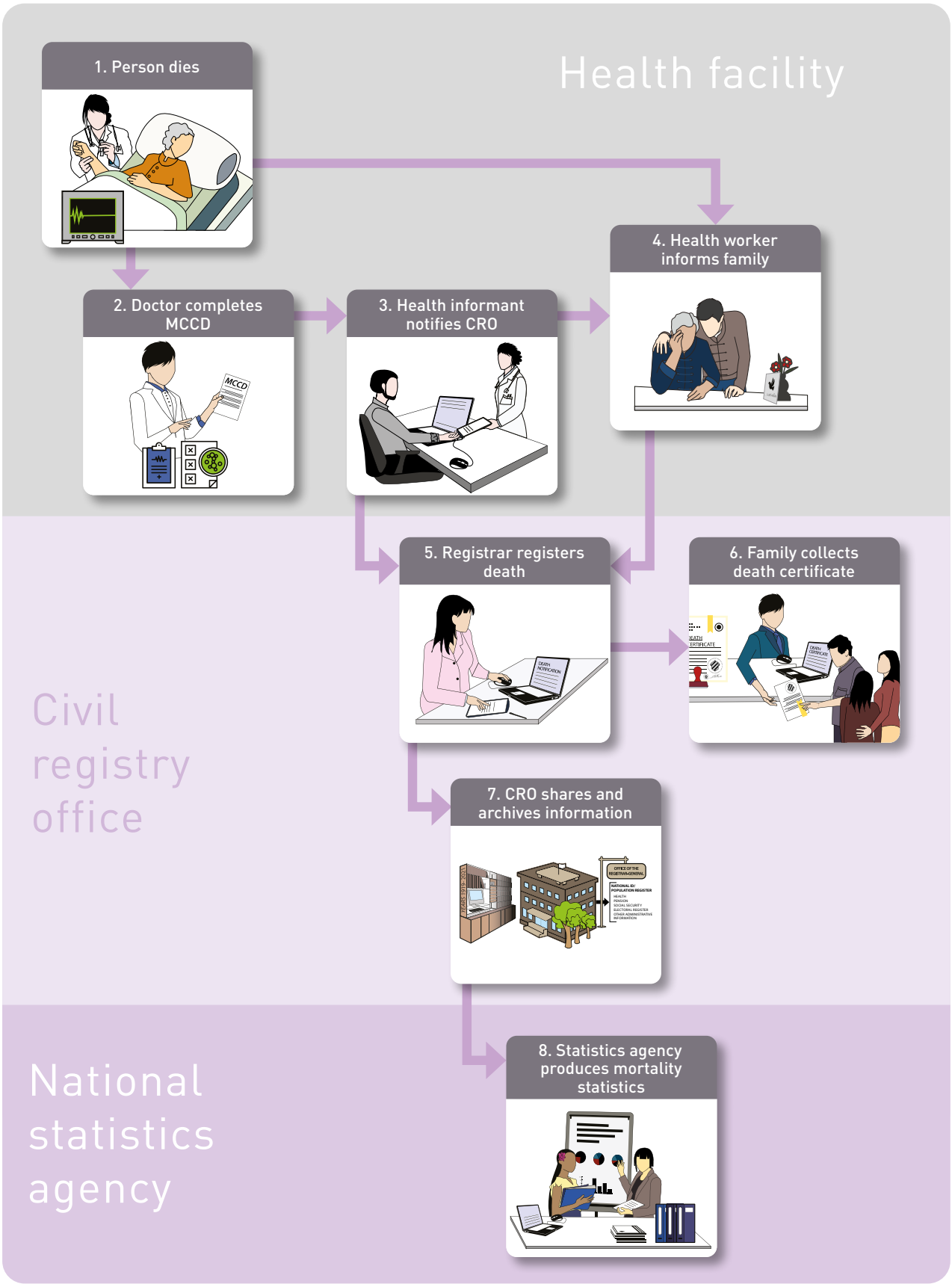
The following sections of this chapter describes seven separate scenarios for the death notification, registration and certification process as follows:

- **Scenario 1:** Death in a health facility where a doctor is present.
- **Scenario 2:** Death in a health facility due to natural causes where no doctor is present.
- **Scenario 3:** "Dead-on-arrival" case when a doctor is present.
- **Scenario 4:** Death in the community when no doctor present.
- **Scenario 5:** Death in the community when no doctor is present but where a verbal autopsy is conducted.
- **Scenario 6:** Death due to unnatural causes involving a medico-legal inquiry.
- **Scenario 7:** Stillbirth occurring in the community or in health facilities.

Scenario 1:
Death in a health facility where a doctor is present

Fig. 4.3 shows the notification process in cases where a death occurs in a health care setting and a doctor able to complete a MCCD according to international standards is present. This represents the best case scenario because the administrative section of the MCCD form includes all the personal information about the deceased (name, age, sex, marital status, place of usual residence) needed to register a death as well as the cause-of-death information (Frame A) and the additional medical information (Frame B) required for public health and statistical purposes.

Fig. 4.3 Process for death notification and registration when death occurs in a health facility with a doctor available



Below is explanatory text for the steps illustrated in Fig. 4.3.

In this scenario, death occurs either in a health facility or an institution where a doctor is available, including care homes for older adults, centres for palliative care and institutions providing mental care.

❶ A health worker confirms that death has occurred; family members are informed.

❷ The doctor on duty completes the MCCD form, including the administrative information. Based on the medical records, results of toxicology and other diagnostic tests and knowledge of the case, the doctor completes Frame A, both Parts 1 and 2, and Frame B of the MCCD in accordance with WHO standards and as described in Section 4.2. The doctor describes the sequence of events leading directly to the death, with the underlying cause of death on the lowest line, indicating the condition that started the chain of events leading to death.

In some jurisdictions, if death was due to natural causes, the completed MCCD form is required to permit funeral arrangements to be made. If an autopsy or postmortem is required, the corpse cannot be buried until the findings are available.

❸ The hospital administrator or data manager ensures that all the needed administrative information about the deceased is available, such as name, sex, date of birth or age (see Annex 4), before transmitting a notification form, which includes all the information required to register the death by the civil registration office. If this information is not available (it may not always be included in a patient's medical records) (see Section 4.4) the next of kin will be able to provide the necessary details.

❹ The health facility shares with the family evidence that the death was notified to the civil registrar. This may be needed to prepare for the disposal of the corpse or when collecting the death certificate from the civil registration office. The evidence of notification provided to the family does not include the MCCD cause-of-death information if this information is deemed confidential. In a passive notification process, the family is required to take the notification form to the registration office to register the death and claim a copy of the death certificate. The risk of this passive approach is that the family may not follow through with a visit to the registrar, and the death is not registered.

❺ The health facility administrator sends the MCCD form directly to the civil registrar, preferably electronically, for registration. This is an active notification process. The civil registrar conducts the validation step in the standard way and registers the death.

❻ The registrar informs the next of kin that the death certificate is available for collection. The family visits the registration office, signs the register and collects a copy of the death certificate.

In settings where death registration can be done online and electronic signatures are permitted, the death certificate is delivered to the family electronically. This scenario eliminates the need for an in-person visit to the registration office by the family, thus speeding up the process and reducing the burden of travel for family members.

❼ As described in Fig. 4.2, the civil registrar shares the information about the death with designated government institutions, for example, the population register, the national ID system, and agencies responsible for the distribution of benefits such as pensions, insurances etc.

The registration record is included in the national archives so that family members can obtain copies of death certificates when needed.

❽ The civil registrar sends a statistical report to the national statistics agency which conducts quality assessment checks and collates the information to produce mortality statistics which are used to inform public health decision-making.

If there is a suspicion of unnatural death (for example, the death was due to an accident, injury or medical mishap), the doctor or hospital administrator should request a postmortem and a medico-legal inquiry is triggered. Under these circumstances, the death may be notified and registered without a final determination of cause of death pending the results of the inquiry (see also Scenario 6).

If a deceased person is "brought in dead" or is declared "dead on arrival" at a health facility, the doctor can confirm that death has occurred and may be able to make a clinical assessment as to whether the death was due to natural or unnatural causes (e.g. accident, suicide or homicide). If the doctor is unable to make a determination of cause of death, they can request a postmortem or forensic autopsy to determine the cause. However, the fact of death should be notified and registered with the cause of death labelled as "pending"' (see also Scenario 3).

In the case of stillbirths and early neonatal deaths in a hospital setting, it is recommended that the health administrator completes the MCCD to the extent possible and notifies the event directly to the civil registrar. This helps reduce the stress on the family and ensures that these events of major public health importance are included in the civil register and the vital statistics system.

Scenario 2:

Death in a health facility due to natural causes where no doctor is present

Fig. 4.4 describes the scenario where death occurs in a health care setting but there is no doctor with the training and skills necessary to complete the MCCD and identify the underlying cause of death. In this case, death can be pronounced by a nurse or medical assistant and the focus switches to collecting the basic information on the date and place of death and the identity and key characteristics of the decedent – name, sex, date of birth (age), ID and place of usual residence.

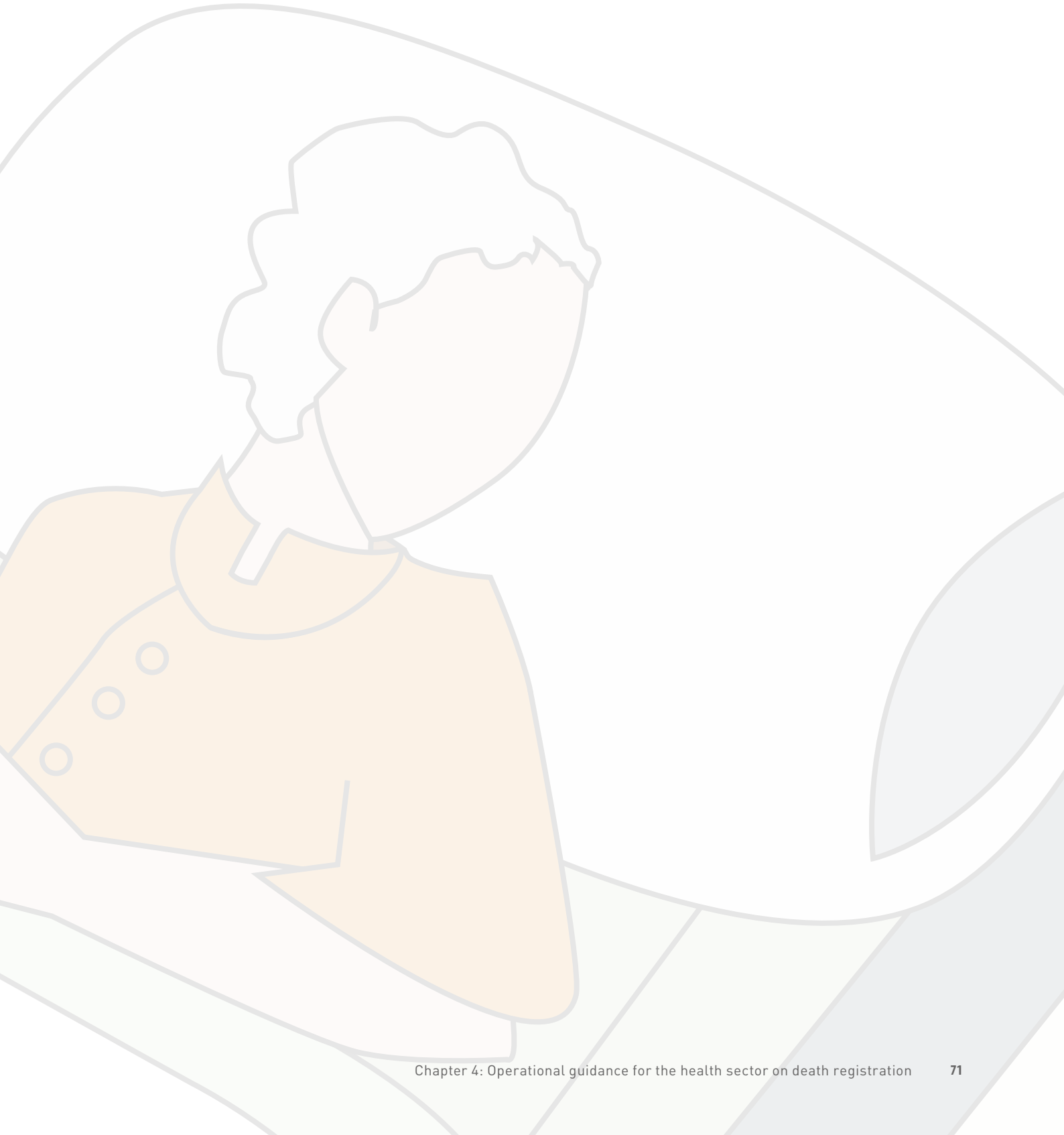
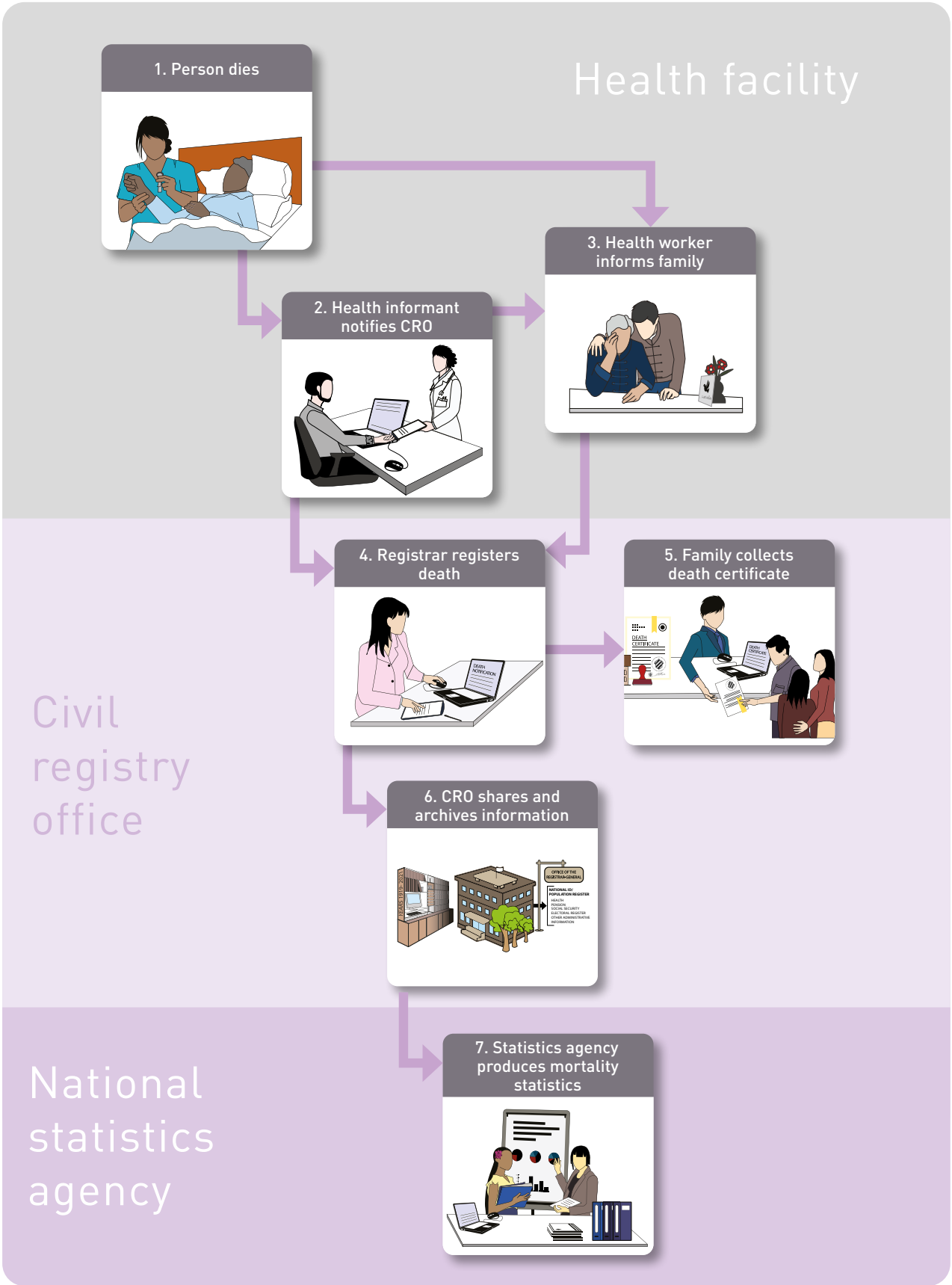


Fig. 4.4 Process for death notification and registration when death occurs in a health facility due to natural causes, no doctor present



Below is explanatory text for the steps illustrated in Fig. 4.4.

❶ The administrative section and Frame B of the MCCD form are completed by a health administrator, medical assistant, nurse or other health care worker. Frame A of the MCCD form should be left blank or marked as "not available". Some of the required administrative and personal information may be available from an admissions register or from the family.

❷ In the active notification process, the MCCD form is shared with the civil registrar, preferably electronically, who should conduct the validation step in the standard way, as described in Scenario 1.

It is essential to complete and share the MCCD form with the civil registrar even if Frame A cannot be completed and cause-of-death information is not available. In this way, the fact of the death can be recorded, documented and registered and the family can be provided with a legal document attesting to the death. If civil registration law requires the inclusion of cause of death, that section can be marked as "pending" or "unavailable." When aggregated across populations, the statistics generated on deaths by age, sex, date and location are of significant value for public health purposes even when there is no information on medical cause of death. This scenario applies specifically to deaths due to natural causes. Should there be any suspicion that the death was due to external causes, the death should be reported to the police or judicial authorities for a medico-legal investigation (see Scenario 6).

❸ In the passive notification approach, the informant may give the family a receipt, or summary of the personal and administrative data, needed to register the death and obtain a death certificate at the civil registration office. As noted previously, there is a risk that the family may not be able to visit the registration office and that the death will remain unregistered.

❹ The civil registrar validates the information in the standard way and registers the death.

❺ Next of kin are informed that the death has been registered and are encouraged to collect the certificate.

❻ The civil registrar shares the information about the death with designated government institutions, for example, the population register, the national ID system, and agencies responsible for the distribution of benefits such as pensions, insurances etc.

The registration record is included in the local or national archives so that family members can obtain copies of death certificates when needed.

❼ The civil registrar sends a statistical report to the national statistics agency which conducts quality assessment checks and collates the information to produce mortality statistics which are used to inform public health decision-making.

Scenario 3:

Death on arrival at a health facility (brought in dead)

It is not uncommon for a corpse to be brought to a health facility or for a person to die very shortly after arrival. In these circumstances, the attending doctor or mortuary attendant still completes the MCCD form based on existing medical or circumstantial information and a clinical examination of the corpse. Fig. 4.5 outlines the process to be followed in such cases.

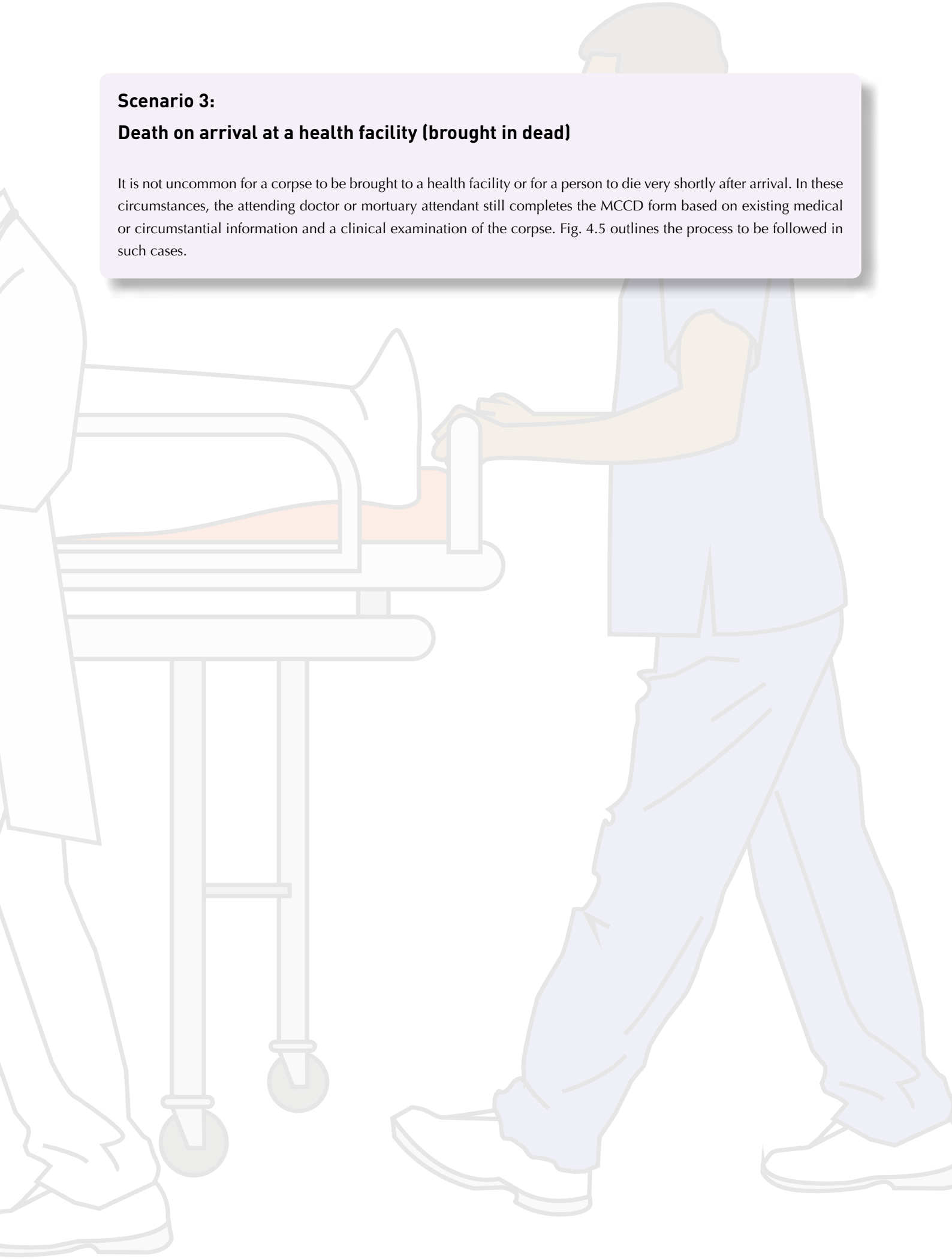
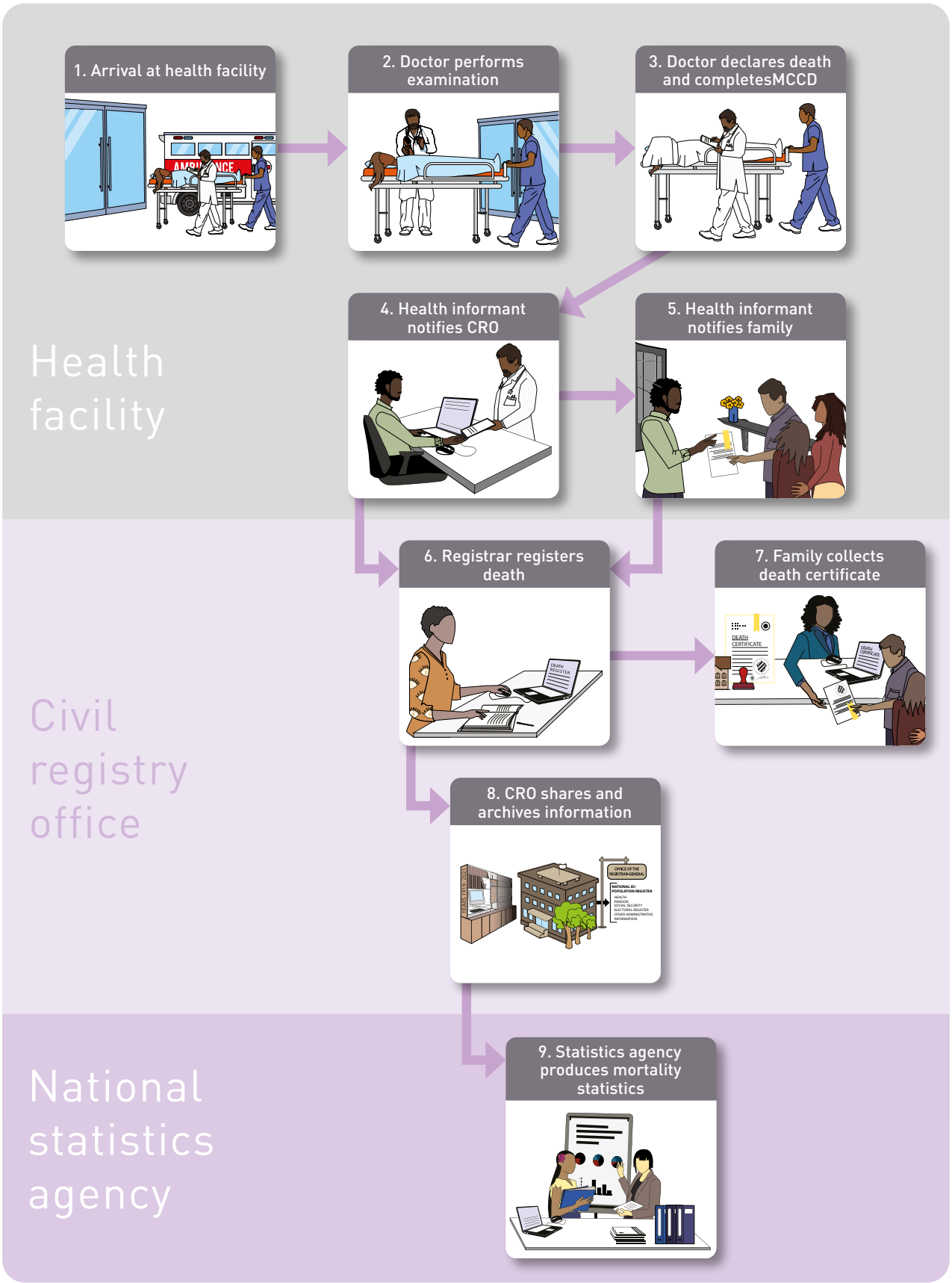


Fig. 4.5 Processes for dead-on-arrival cases or prior to admission, at the health facility, with a doctor present



Below is explanatory text for the steps illustrated in Fig. 4.5.

❶ If a doctor is available, a clinical examination of the corpse should be carried out to gather the information necessary for the completion of the MCCD.

❷ Depending on the availability of resources, the doctor may conduct a postmortem on site, including diagnostic tests to certify the cause of death, or request an autopsy.

❸ The doctor completes the MCCD, including both Frame A and Frame B. Doctors cannot decline to sign a MCCD because they are uncertain of the exact cause of death; they are merely expected to exercise their best clinical judgment under the circumstances. Should there be any suspicion that the death was due to external causes, the death should be reported to the police or judicial authorities for a medico-legal investigation (see Scenario 6).

Ideally, a forensic pathologist should investigate all deaths where there are medico-legal implications, for example, in the event of a suspected murder, death in custody and other complex medico-legal cases. Under such circumstances, the death may be registered without a final determination of cause of death pending the results of the medico-legal inquiry.

Not all health facilities have the capacity to conduct a postmortem or forensic autopsy, in which case the corpse would have to be transported to a higher level hospital with the requisite medical personnel and equipment. In some settings, the police are responsible for the transport of bodies to an appropriate health facility for postmortem. In such cases, the completion of the MCCD form and the notification and registration of death would take place subsequent to the availability of the postmortem findings.

If present, next of kin are likely to be able to provide the necessary demographic and sociodemographic information that is needed to complete the administrative section of the MCCD (including personal identity number if available). In the event of a fetal or child death, the personal details of the parents should also be included in the MCCD notification form. Whenever possible, this information should include the decedent's (or for a child's death, the decedent's parents') national ID number(s).

❹ If, on the basis of available information, the death is judged to be due to natural causes, the notification and registration process should be completed as for other deaths which occur in health facilities, as described in Scenario 1.

❺ If family members are present, the health facility gives them a notification form as evidence of the occurrence of the death, as described in Scenario 1. If active notification is not available, the family should be encouraged to take the notification form to the civil registrar for registration.

❻ The MCCD form is shared with the civil registrar, preferably electronically, the validation step should be conducted in the standard way, as described in Scenario 1, and the death registered.

❼ The family visits the registration office, signs the register and collects a copy of the death certificate.

❽ The registration record is included in the local or national archives so that family members can obtain copies of death certificates when needed.

The civil registrar shares the information about the death with designated government institutions, for example, the population register, the national ID system, and agencies responsible for the distribution of benefits such as pensions, insurances etc.

❾ The civil registrar sends a statistical report to the national statistics agency which conducts quality assessment checks and collates the information to produce mortality statistics which are used to inform public health decision-making.

Scenario 4:
Death in the community when no doctor is present

Many deaths occur at home with only family members present. In such cases, it is often a local administrator, village leader or religious official who deals with the administrative arrangements for the disposal of the corpse and for notifying the local registration authorities. Fig. 4.6 shows the notification and registration process in such instances.

Although death may occur without any involvement of the formal health sector, CHWs may be present and are generally well-placed to know when a death has occurred. In the event a CHW becomes aware of a recent death in the community, and legal and administrative structures permitting, a CHW can be tasked with preparing a death notification form. In such cases, the demographic and socioeconomic characteristics of the decedent would be provided by the next of kin. In this scenario, the CHW can complete a notification form that records details of the decedent and some of the circumstances of the death, such as date and place of death. This "death report" serves as the notification form that contains the basic administrative information contained in the MCCD but not the medical information on cause of death. If national law permits, and CHWs are designated by the civil registration authorities as official notification agents, this information can be shared with the civil registrar so that the event can be officially registered and certified, as outlined in Fig. 4.6. This is an "active" process of notification of death in the community. This approach is currently being implemented in some areas of Bangladesh (Uddin et al., 2019).

If this active process is not possible, CHWs can support the family to gather the information required to declare the death to the civil registrar and complete official forms that may be required for the death to be registered. In this, "passive" scenario, the CHW acts as a facilitator in the death notification process, assisting family members by providing advice and guidance on how to register the death of their relative and the necessary support to enable the family to complete the required forms – both to notify the death and to obtain a burial permit.

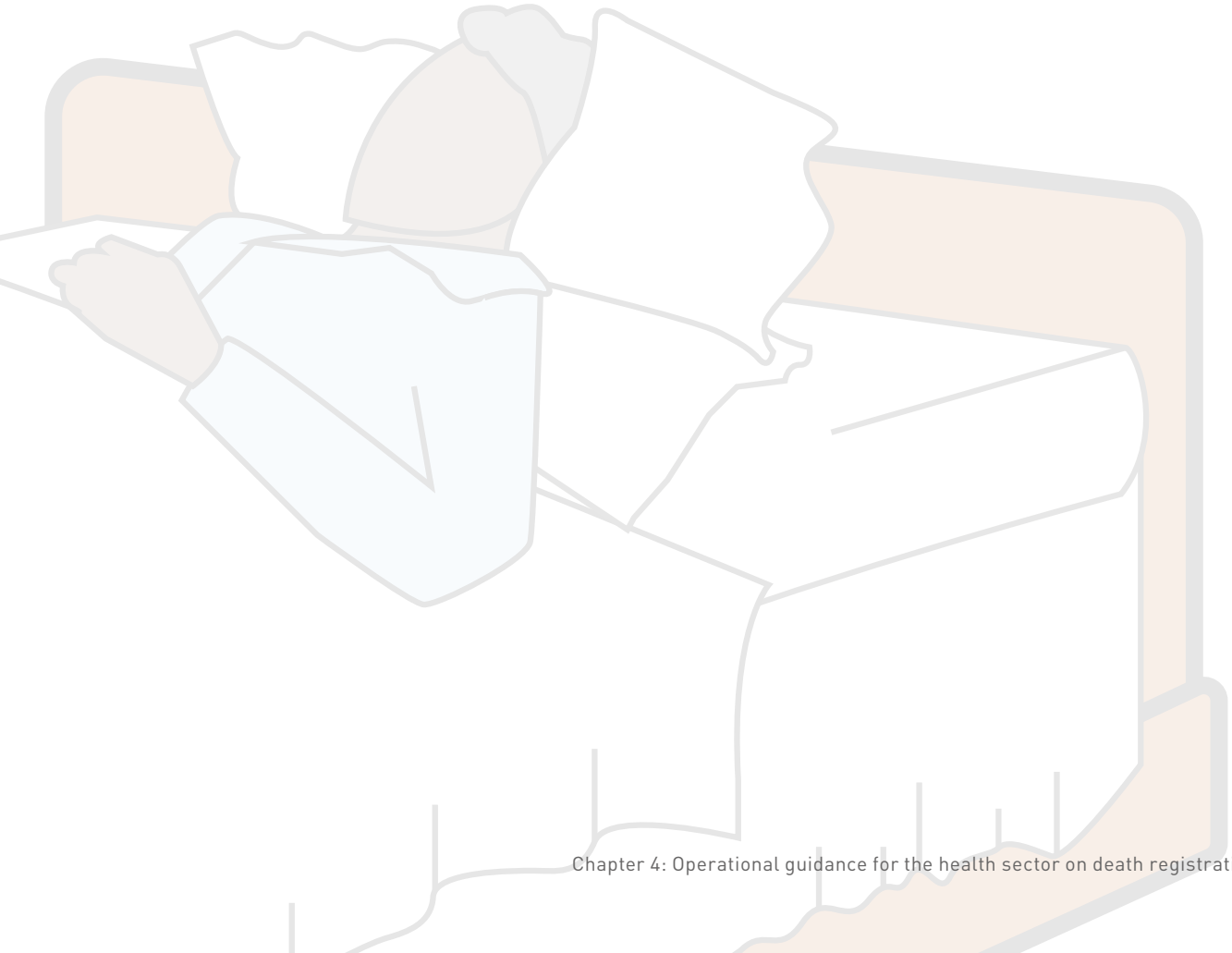
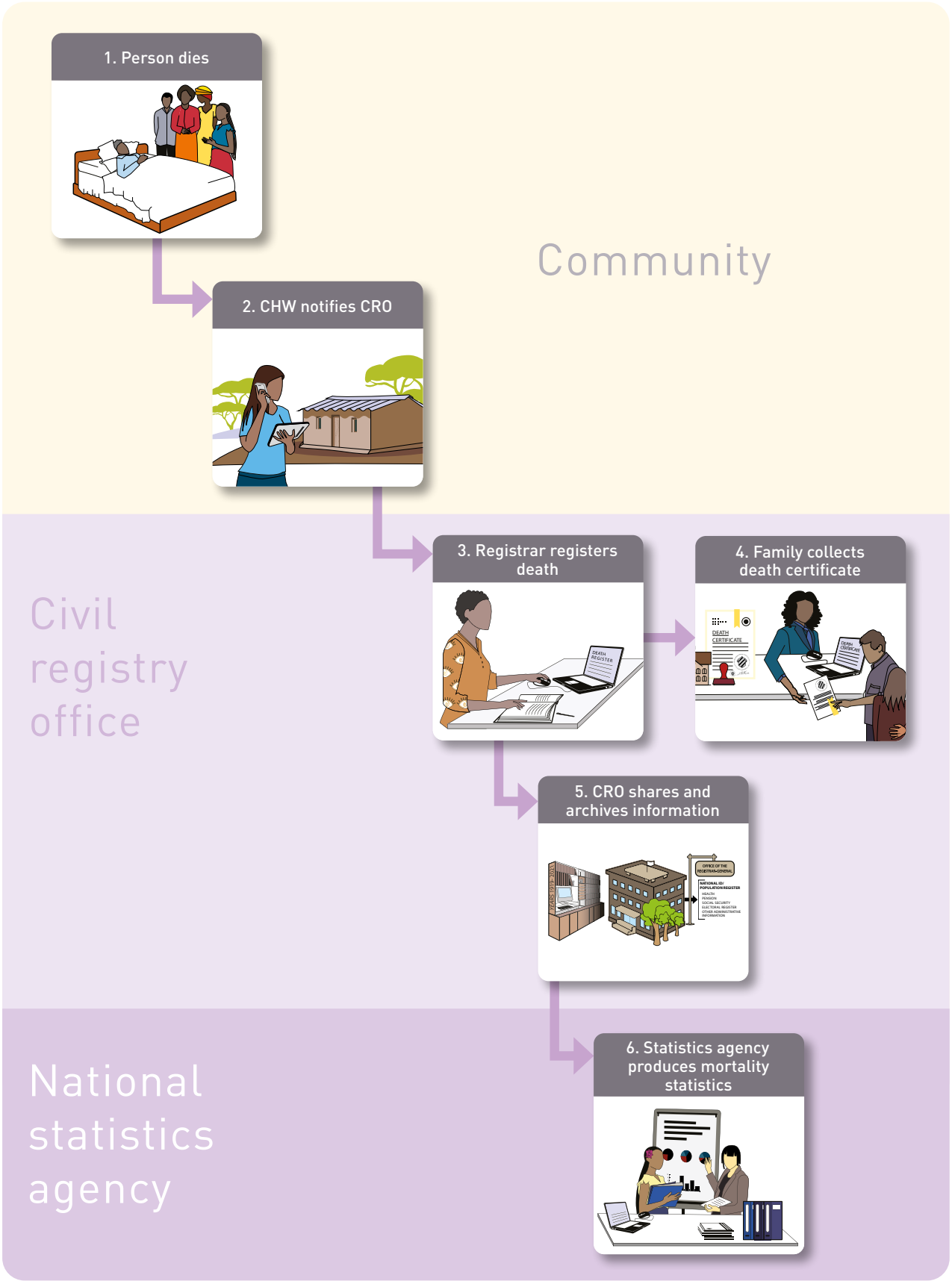


Fig. 4.6 Process for death in community where a community health worker is present



Below is explanatory text for the steps illustrated in Fig. 4.6.

❶ Death occurs in the community.

Local authorities issue a burial permit according to local regulations or customs.

❷ The CHW is informed by the family that a death has occurred. This may occur in the course of a regular visit to the household by the CHW. The CHW helps the family to notify the death in writing or verbally to the local registrar and may assist the family to complete a death notification form containing the core information items required for the death to be registered, notably date of occurrence, age and sex of the decedent (Annex 4).

When dealing with a death that occurred in the community, the CHW is not qualified to make any judgment as to the medical cause of death. The CHW encourages the family to inform the local registrar in writing or verbally of the event. In settings where CHWs are officially designated civil registration notification agents, the CHW transmits the death notification form to the local civil registrar.

❸ The civil registrar validates the information according to standard procedures and registers the death.

❹ The family visits the registration office, signs the register, and collects a copy of the death certificate.

❺ The registration record is included in the local or national archives so that family members can obtain copies of death certificates when needed.

❻ The civil registrar sends a statistical report to the national statistics agency which conducts quality assessment checks and collates the information to produce mortality statistics which are used to inform public health decision-making.

If the CHW identifies a stillbirth in the community, it can be notified to the civil register in the same way as a live birth (see also Section 3, Scenario 4).

Scenario 5:

Death in the community with verbal autopsy

When a death occurs in the community in the absence of a suitably qualified medical practitioner, it is not possible to ascertain the cause of death using the MCCD. However, as described in Box 12, it may be possible to use the notification of the death to trigger a VA in order to gather medical information from family members of the deceased relating to the death and so determine the probable underlying cause of death. The results of the VA conducted in such circumstances are intended for use at the population level for statistical purposes and are not used to identify the cause of death at the individual level.

Users of this guidance are reminded that the outcome of a VA – probable underlying cause of death – is not comparable to a medically certified cause of death and does not have the same legal status or statistical exactitude. The outputs of VA are compiled to generate distributions of leading causes of death in the local community. The results of individual interviews are not shared with either the respondents or the CHWs.

Several conditions must be met if a VA is to be triggered during the civil registration process:

- The health sector has carried out the necessary preparatory work to ensure that there is a legal and administrative framework for conducting VA in the community, including adaptation of a standard VA questionnaire, including translation and field testing.
- Information and communication technologies (ICT) systems are in place to enable interviews to be conducted on paper or using handheld devices and uploading the completed interviews to a central repository for data analysis and compilation.
- An appropriate interviewer can be identified to conduct the VA interview. This is generally a trained enumerator such as a nurse, CHW or community-based person who is in receipt of the necessary training and ongoing guidance and support.
- It is possible to identify a suitable respondent, such as a family member or caretaker, who was close to the decedent during the final illness and death.
- There is agreement to use a structured VA questionnaire to solicit information about signs and symptoms that the decedent experienced prior to death.

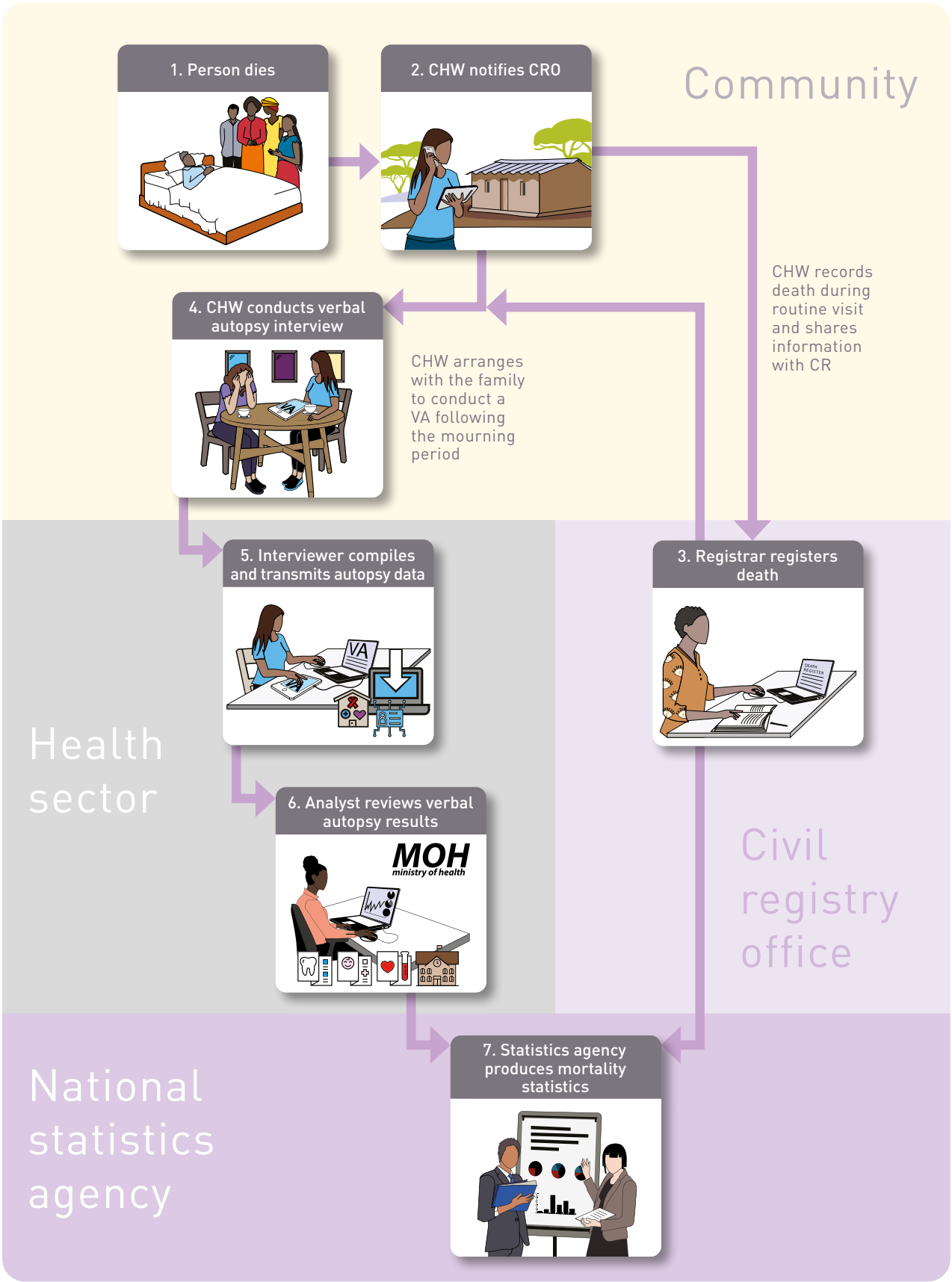
Guidance is available on good practices for integrating VA into CRVS systems. Based on experience from many countries it is important to note that it is advisable to delay implementing the VA interview for some weeks after the death out of respect for the need for the family to mourn (de Savigny et al. 2017).

Fig. 4.7 shows how a VA may be triggered during the death notification/registration process and how the resulting information is shared with the civil registration system. In the scenario depicted, the CHW prepares a death report form, obtaining demographic and socioeconomic characteristics of the decedent from next of kin. If the law has designated CHWs as notification agents, the form can be shared with the civil registrar to facilitate the official registration of the death. As previously, a summary of the death report form (usually a copy of the personally identifiable information and administrative data contained in the notification) is given to the family; the summary report serves as a burial permit which will allow the family to prepare for the disposal of the corpse and/or may be needed by the family when collecting the death certificate from the civil registration office.

Following a locally appropriate mourning period, the CHW or other enumerator conducts a VA interview with the family member most familiar with the events leading up to the death. It is now common practice to conduct the interview using handheld devices, such as tablets, in order to avoid manual data entry and to facilitate expedited data transfer through online transmission. Use of such devices with embedded control and validation checks helps minimize data entry errors thereby improving data quality.

The results of the VA interview are subsequently analysed to determine probable cause of death. In some settings, this is performed using automated algorithms. However, research is underway to assess the potential role of conducting a review by doctors of the VA interview, notably including the open narrative section. The use of doctor review would likely be limited to a sample of VA interviews.

Fig. 4.7 Process for death in the community with verbal autopsy



Below is explanatory text for the steps illustrated in Fig. 4.7.

❶ Death occurs at home without a doctor in attendance.

❷ The CHW is informed by the family that a death has occurred. This may occur in the course of a routine visit to the household. The CHW, if designated as an official notifier, helps the family to complete a death notification form containing the core information items required for the death to be registered, notably date of occurrence, age and sex of the decedent (Annex 4).

In a passive approach, the CHW encourages the family to visit the registration office and facilitates the completion of forms and actions needed to register the event and obtain a copy of the death certificate. In an active approach, where the CHWs are designated informants, they share the death notification with the civil registration office so that the registrar can prepare the registration record.

❸ The family visits the registration office to declare the death (verbally or in writing), sign the register, and obtain a copy of the death certificate. The registrar assigns a registration number, registers the death in the system and provides a death certificate and/or burial permit to the family. The registration number is stored in the CRVS database and incorporated into the VA questionnaire on the tablet. The contact details of the family and key information on the decedent are prepopulated in the VA questionnaire.

The CHW makes an appointment with the family to conduct a VA interview, at an appropriate time following the mourning period.

❹ The CHW explains the purpose and process of VA and obtains consent from the respondent to participate. The CHW conducts the VA interview using a paper questionnaire or handheld device and uploads the responses to a central repository for analysis.

❺ The VA interview data are analysed, either using automated algorithms or doctor review to generate a probable cause of death.

❻ The VA results are aggregated to generate cause-specific mortality fractions for the community. These statistics are produced through the health sector and are not combined with the civil registration based vital statistics. The cause of death as determined by VA for a given individual is not shared with the family, nor with the civil registrar because it has no legal status equivalent to the cause of death determined through the MCCD.

❼ The information is compiled and analysed to generate data on cause-of-death distributions in the population, which are used for public health purposes by the health sector and national government statistics offices.

Experience in countries shows that it is inadvisable to attempt to do VA for all community deaths due to the significant resource and time implications. The recommended strategy is to first aim to notify all community deaths to the civil registrar with information on date of occurrence, name of the decedent, age, sex and place of usual residence. Subsequently, VA is conducted on a representative sample of the population of a country in order to estimate population-level cause-specific mortality fractions (Bloomberg Philanthropies, 2020). This approach enables the production of valid statistics on age and sex distributions of deaths from all causes for the whole country and nationally representative cause-of-death distributions at an acceptable cost.

Scenario 6:
Death due to unnatural causes

Special considerations arise in cases of deaths due to unnatural causes and those that require a medico-legal investigation. These include deaths due to external causes of death – injuries due to accidents and violence – for example, unexpected sudden deaths, and deaths occurring within a short time of hospital admission (see also Scenario 3).

These cases require a medico-legal death investigation (MLDI) involving the police and law enforcement system, the office of the coroner or medical examiner (depending on type of system), and the health sector. MLDI authorities investigate deaths that occur within a given jurisdiction that are unnatural, violent or suspicious, sudden or unexpected, unusual, medically unattended or otherwise represent a potential threat to public health and safety. The legal requirement to notify the MLDI authorities of certain kinds of death improves data collection.

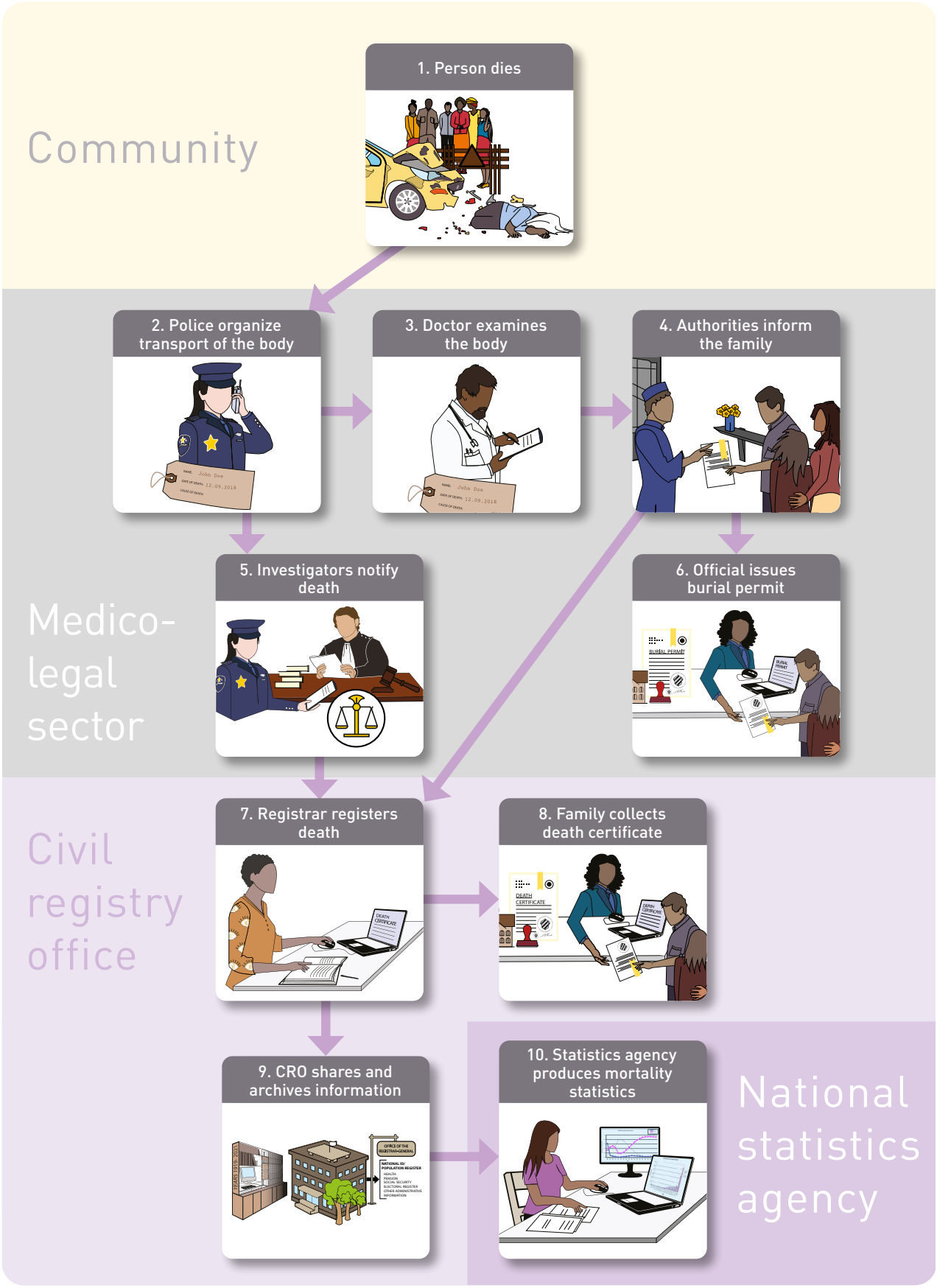
The MLDI is designed to determine how and why a person died. A coroner or medical examiner must answer five questions when investigating a death, namely:

- who (identity of the deceased)
- when (date of death)
- where (location of death)
- how (medical cause of death)
- by what means (natural causes, accident, homicide, suicide or undetermined).

The purpose of a MLDI is to establish facts, not to determine civil or criminal liability.

Fig. 4.8 is a process map which shows the flow of information about a death due to unnatural causes. In such cases, the involvement of the health sector is mainly in relation to providing information on cause of death by way of a MCCD, postmortem or clinical autopsy. In medico-legal cases, the health sector works with the investigating authorities, including the police, to determine the cause of death.

4.8 Process for notification and registration of deaths due to unnatural causes



Below is explanatory text for the steps illustrated in Fig. 4.8.

❶ When a death occurs due to an accident, homicide or other unnatural causes, the police are involved and will commence an investigation to ascertain cause and responsibility.

❷ The police generally transport the corpse to the morgue.

❸ A doctor undertakes an examination of the corpse and may request tests such as toxicology, tissue sampling (histology), radiographic imaging (X-ray, CT scan) or other examination methods in order to determine cause of death and complete the MCCD form.

An autopsy (also called postmortem examination) may be required to determine the cause and manner of death and to evaluate any disease or injury that may be present. An autopsy should be conducted by a medical examiner, pathologist or other doctor trained in this type of examination.

❹ Authorities inform the family about the circumstances of the death.

❺ If an inquest is to be held, then the death cannot be registered until the judicial investigation has been completed. In these circumstances, funeral arrangements cannot be finalized until the coroner has authorized the release of the corpse for burial or cremation.

In some instances, the final determination of the cause of death and responsibility by the judicial authorities may take many months. In these cases, the death can be registered once the police release the corpse and the cause of death marked as "pending"' until the final determination is made.

❻ If a death is referred to the coroner, funeral arrangements should not be made before the consent of the coroner has been obtained. The coroner can give consent for burial or cremation to take place before the death is registered.

❼ The death can only be registered, and a death certificate issued, after the registrar has received the permit from the coroner.

❽ The family visits the registration office, signs the register, and collects a copy of the death certificate.

❾ The registration record is included in the local or national archives so that family members can obtain copies of death certificates when needed.

The civil registrar shares the information about the death with designated government institutions, for example, the population register, the national ID system, and agencies responsible for the distribution of benefits such as pensions, insurances etc.

❿ Once the judicial investigation has been completed, the local registrar should update the death registration record to include cause-of-death information and forward such information to the statistics office.

Scenario 7:
Notification and registration of stillbirths

An estimated 2 million stillbirths occurred in 2019, most (98%) in LMIC; more than three quarters of those occur in sub-Saharan Africa and South Asia (UNICEF 2020). Stillbirths have been recognized as a preventable public health problem and an essential part of the Sustainable Development Agenda, expressed through the Global Strategy for Women's, Children's and Adolescents' Health, which was launched at the UNGA in 2015 (Every Woman Every Child, 2015).

WHO recommends that countries register fetuses and infants weighing at least 500 g at birth, whether alive or dead, and include them in national vital statistics. When information on birth weight is unavailable, the corresponding criteria for gestational age (22 completed weeks) or body length (25 cm crown-heel) should be used. The criteria for deciding whether an event has taken place within the perinatal period should be applied in the order: (1) birth weight; (2) gestational age; (3) crown-heel length (WHO 2016, Section 5.7.2). The Core Stillbirth Estimation Group (CSEG) of UN IGME recommends using a stillbirth definition that uses the gestational age as single criteria. Gestational age is used in preference to birth weight and length criteria as it is a better predictor of maturity and hence viability, and it is the most commonly used criteria across data sources, including household surveys (UN IGME 2020, p. 3).

The UN advises that the collection of information on the frequency and characteristics of stillbirths, should be almost as high a priority as it is for live births and deaths. There is increasing health-related interest in and need for information about stillbirths in order to assist in the measurement and understanding of adverse pregnancy outcomes, and women's ill-health before and during delivery.

The UN and WHO note that there is a strong statistical rationale for the routine monitoring of stillbirth rates to aid in improving maternal and child health programmes, for making international comparisons and for global tracking of reporting on targets in the Global Strategy for Women's, Children's and Adolescents' Health. In addition, the recording of stillbirths will also improve accurate reporting of perinatal mortality, defined as stillbirths plus neonatal deaths of live born infants within the first 7 days of life.

The legal requirements for the registration or reporting of stillbirths vary from country to country. In many settings, the civil registration of stillbirths enables the family to make funeral arrangements and provides them with documentary evidence of the occurrence of the stillbirth. This may be required if, for example, there is an inquiry into the causes of the stillbirth. For countries that report stillbirth deaths through the health sector, a stillbirth certificate from the health facility serves to allow burial or cremation.

Country practices also vary with regard to whether stillbirths should be included in the general civil register of vital events or separately recorded in a stillbirth register. In the United States, for example, stillbirths are included in the general civil register of births. By contrast, in the United Kingdom, the stillbirth register is separate from the standard register of births. Some countries do not include fetal deaths in the civil registration system but instead report and collect information on fetal deaths through the health sector.

Because health care workers are often present around the time of delivery, they are well positioned to ensure that stillbirths are counted and reported and that the civil registry is notified. When stillbirths occur in health facilities, health administrators should hold responsibility for reporting these events to the civil registrar in order to alleviate the stress for the family. Community-based health workers should also be encouraged to report stillbirths occurring outside health facilities to the appropriate health authority or to the civil registrar in the same way they report live births occurring in the community.

The WHO international MCCD form requires a certifying doctor to report on all deaths, including both early fetal deaths and stillbirths. Frame B of the MCCD includes questions relevant to fetal or infant deaths, including gestational age and age of the mother (see Figs 4.1 and 4.9). Completion of this form will enable the calculation of key stillbirth and perinatal indicators. In addition, WHO recommends collecting data on a minimum perinatal dataset which includes information on maternal age, place of delivery, mode of delivery, birth weight, gestational age and birth outcome.

Fig. 4.9 Frame B of the MCCD

Fetal or infant death
Multiple pregnancy? ☐ Yes ☐ No ☐ Unknown
Stillborn? ☐ Yes ☐ No ☐ Unknown
If death within 24 hours, specify number of hours survived .....
Birth weight (in grams) .....
Number of completed weeks of pregnancy .....
Age of mother (years) .....
If death was perinatal, please state conditions of mother that affected the fetus and newborn

In most settings with high levels of completeness of civil registration, stillbirths registered are included within the same register as other vital events. In settings where stillbirths are not currently being routinely registered, countries may decide to establish a separate stillbirth register. In all settings, as noted in Chapter 3, the health sector should play a key role in ensuring that the civil registrar is notified of all stillbirths, and that complete statistics on stillbirths are available to guide policy and planning for maternal and child health. The health sector is key for the continuous and universal collection of information on stillbirths through the CRVS system. When the stillbirth occurs in a health care setting with a doctor present, the health sector can also ensure that stillbirths have a medically certified cause of death in the same way as other deaths.

When stillbirths occur in health facilities, the responsibility for notification of these events to the civil registrars should lie with health facilities themselves and not with the parents. This is to alleviate the stress for families and also because unless there is a legal requirement for a stillbirth certificate for burial purposes, the family has no incentive to register; the major users of information on stillbirths are the CRVS system and the health sector.

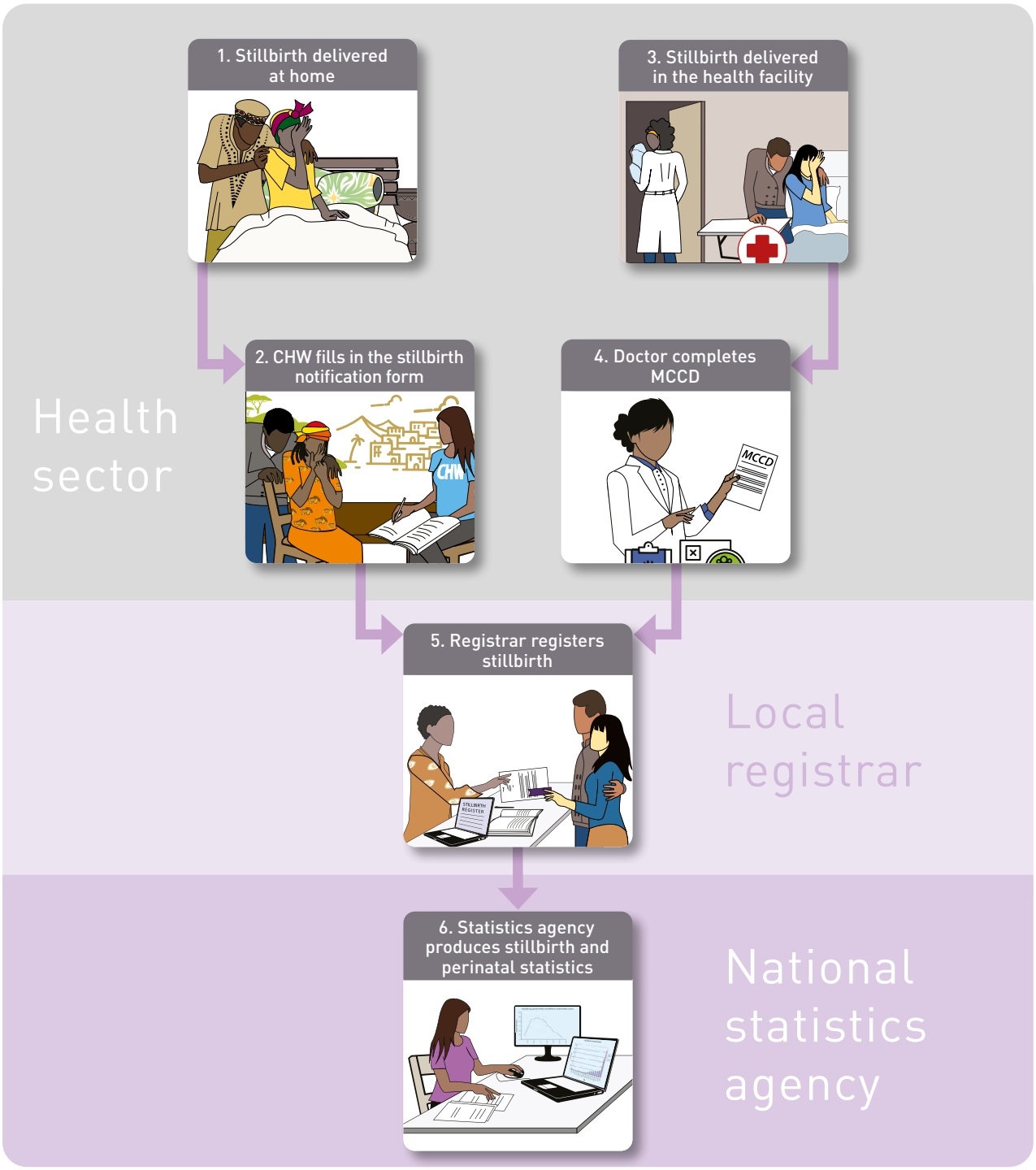
Community health workers should be encouraged to identify stillbirths occurring outside a facility and notify them to the civil registrar in the same way so that they can be shared with the civil register in the same way as live births occurring in the community. If a stillborn child has not been named, it can be identified through other characteristics such as the names of parents and date of occurrence. However, provision for inclusion of the name of the stillborn child when one is given should be allowed.

Local civil registrars should record stillbirths in a stillbirth register based on notifications from health facilities or CHWs. They should include stillbirths in the regular statistical reports submitted to the national statistics agency.

On completion of stillbirth registration, the civil registrar may provide the parents with a stillbirth certificate which is a relevant extract of the stillbirth register. Usually certification of stillbirths is not addressed by the law. However, a certificate can be produced if required for disposal of the corpse, to allow official recognition of the stillbirth or to access maternity benefits.

A generic process for registration of stillbirths is shown in Fig. 4.10 (as Fig 3.9 in Chapter 3).

Fig. 4.10 Generic process for the registration of stillbirths



Below is explanatory text for the steps illustrated in Fig. 4.10.

1. Stillbirth occurs in a community setting.

2. The CHW or other officially designated person notifies the occurrence of the stillbirth to the civil registration office in the same way as a live birth occurring in the community. The CHW completes the notification form based on information provided by the parents. Core information requirements are shown in Annex 4 Table A4.2.

3. Stillbirth occurs in a health facility.

4. The attending doctor completes the MCCD, Frame A and Frame B, as well as the administrative information needed to include the event in the stillbirth register.

5. The information provided by the health facility is shared with the local civil registrar who enters the information pertaining to the event in the civil register or stillbirth register as appropriate. The civil registrar conducts the process of validation in the same way as that followed in the case of live births occurring in health facilities. The civil registrar can, in case of doubt, initiate an enquiry with the local health office or local administration to satisfy themselves about the veracity of the information.

   The registrar may issue evidence of stillbirth registration if required for disposal of the corpse, allow official recognition of the stillbirth, or to access maternity benefits. For example, in the United Kingdom, the Royal College of Obstetricians and Gynaecologists provide guidance for registering a stillbirth and providing certification for a fetal death.

6. The civil registrar sends a statistical report to the national statistics agency which conducts quality assessment checks and collates the information to produce stillbirth and perinatal statistics which are used to inform public health decision-making.

4.4 Key elements common to all death registration scenarios

4.4.1 Minimum information required for notification and registration of deaths

The minimum information items required for legal purposes to permit the civil registration of a death include:

- date of occurrence of the death
- place of occurrence of the death
- name of the decedent
- sex of the decedent
- date of birth of the decedent (or age in years if not available)
- place of usual residence of decedent
- marital status of the decedent
- national ID of the decedent, if available
- in the case of infants and stillbirths, name of mother/father and ID where available.

Because these information items will appear in the civil registration record and possibly in the death certificate, it is essential that the informant records them accurately and completely (see Box 13). Additional information is generally collected in most civil registration systems, including, for example, occupation and education of the decedent. However, the absence of such information should not prevent the event itself from being registered. Other variables are collected for the purposes of computing vital statistics on the population, many of which are of great importance for the health sector, in particular medical cause of death (see also Section 4.2).

As indicated earlier in Section 4.3, when death occurs in a health facility in the absence of a doctor or other trained health worker who is able to complete the MCCD, the death should nonetheless be notified to the local civil registrar so that the fact of death can be registered, even if it is not possible to determine the medical cause of death. Under such circumstances, a death notification form may be used without the MCCD; this form should be populated with the minimum information required for legal purposes and thus enable the civil registrar to proceed to the registration of the death. The UN affirms that the minimum information required to register a death comprises personal particulars, the date and place of occurrence of death, and the place of usual residence (UNSD, 2014). This same form should be used in settings where CHWs, community leaders, morticians or religious institutions are designated as

Box 13. The importance of accuracy and confidentiality with regard to mortality information

The importance of ensuring accuracy and confidentiality in the recording (and sharing) of mortality information by the health sector cannot be over emphasized. The information collected by health workers during the course of the provision of health care is used to support service delivery and is not generally intended to be used for legal purposes.

This has a number of consequences. Firstly, when providing the information necessary for death notification to the civil registrar, health functionaries may not realize the importance of accuracy and completeness. Minor errors in completing forms at the time of information collection may not seriously affect delivery of services but can have serious implications when used to populate the forms required for death registration. Inconsistencies in name spelling between health care records and forms used for notification and registration may result in the issuance of a death certificate with an incorrect name, causing major problems for the surviving family members who may be unable to claim survivor benefits due to such discrepancies. The validation milestone is an important step as it offers an opportunity to correct any errors before the death or stillbirth is officially registered.

All health information, especially with regard to cause of death, is highly personal and sensitive and there should be sound protocols in place to protect the privacy and confidentiality of the information pertaining to the individual. In order to promote the provision of full and trustworthy data in the system, the confidentiality of the information must be protected, i.e. those who provide information must be assured that it will be used only for the purposes prescribed by law and/or in aggregated form so that individuals are not identifiable. In some countries, sharing the cause of death from the MCCD is strictly prohibited and the information is used only for statistical purposes, after it has been anonymized and collated. In other settings, the law allows the inclusion of summary cause-of-death information in the registration record, which is shared with the next of kin when the death certificate is issued. Sharing of the completed MCCD with family members by the certifying doctor is not advisable because it puts pressure on the doctor to avoid recording causes of death that are commonly stigmatized, such as AIDS, cancers, suicide and reproductive health conditions.

An important exception to the strict rules for confidentiality is the reporting of deaths due to notifiable diseases such as Ebola or cholera. In such cases, individual cause-of-death information can be shared with the relevant authorities in order to protect public health as well as next of kin of the decedent and other contacts.

notification agents. Annex 4 lists the core information and data items that should be included in a death notification form; in addition to key information about the decedent, this form requests particulars of the person(s) involved in notifying the death to the civil registrar. The purpose of this information is to enable any follow-up action that may be deemed necessary during the validation step.

Finally for the purposes of generating vital statistics and for health information purposes, countries should aim to collect the information recommended by the UN Statistics Division in the 2014 edition of its *Principles and recommendations for a vital statistics system* (UNSD, 2014).

4.4.2 Validation of information on deaths and causes of death

Given the legal importance of civil registration, whether the registration system is manual, or partially or fully digital, it is important to incorporate a validation step into the process whereby the civil registrar, before registering the death, completes a series of checks to ensure the veracity of the information received, query possible duplicates, and ensure the completed notification form is free from clerical errors or missing information. This would entail checking the spelling of the name, and checking that information is provided on key items, including date of birth and sex of the decedent, the date and place of death and place of usual residence. In case of doubt, the civil registrar may refer the matter back to the health facility to verify the accuracy of the information provided. Where there are online and real-time registration systems with a centralized database, the system should be able to alert the user if there are any discrepancies, for example, if the death appears to have already been registered.

Validation is an important requirement as any correction of mistakes after the registration is complete (except for obvious clerical errors) can involve a lengthy legal and/or administrative process with potentially high associated financial costs. This is particularly important as the death certificate will be required by family members to make claims of inheritance or social and economic allocations such as pensions or orphan benefits. Details obtained from the notification form are also validated following statistical edit checks which can either be done manually or using computer-based edit checks at the time of data processing in the vital statistics compiling office.

Following validation, the civil registrar enters the relevant details about the death in the prescribed death register. The registrar will then "sign" the register, either by adding their seal or, in case of automated registration systems, by signing a printed, computer-generated register. In countries where the registration law permits, and/or the necessary digital infrastructure exists, the registrar concludes the registration process by adding a digital signature to the electronic death register. Once registration is complete, the civil registrar can issue an official death certificate.

4.4.3 Issuance of the death certificate to the family

Once the death has been registered, the next milestone is that of the issuance of a death certificate. In countries where a copy of the death certificate is a necessity for permission to dispose of the corpse, the registrar can provide the family with a copy immediately. When rapid burial is required for religious reasons, the civil registrar must be available on a continuous basis. However, it should be kept in mind that where cause of death must be included on the death certificate, the short timeline may result in poor quality of cause-of-death information because of the lack of time to conduct clinical or biomedical tests to inform the cause-of-death determination and the completion of the MCCD form. In health facilities where on-the-spot death registration is available, the next of kin can be provided with a copy of the death certificate prior to discharge unless delays are needed to permit a postmortem or clinical autopsy.

In settings where permission to dispose of the corpse is not dependent on having a death certificate and is granted, instead, on the basis of a death notification form provided by a health facility or a local administrative official, families may feel no immediate need for the death certificate unless it is required for claiming insurance, pension or social security benefits, the granting of probate or settlement of inheritance claims. In such circumstances, it is advisable for the fact of death to be registered on the basis of the death notification provided by the health sector and the family informed accordingly.

Where CHWs play a role of conduit of registration information, they can help deliver a copy of the death certificate to the family. Depending on local conditions, the family may be contacted by the civil registrar (by telephone or online) to collect the death certificate. In some settings,

the death certificate can be sent back to the health facility for distribution to the family or the process may occur electronically. It is essential to ensure that this process conforms to data protection laws covering any personal and sensitive information contained in the death certificate.

Country CRVS systems differ with regard to the inclusion of cause of death in the death certificate that is given to the family. When conducting a legal review, the country's decision-makers should assess the benefits and risks of including cause of death in the death certificate, copies of which may be obtainable by family and even non-family members. There may be stigmatization of families where a death has occurred due to certain infectious diseases. Sometimes a copy of the death certificate, including cause of death, is required by insurers whose policies may exclude payment for certain causes, for example suicide. While this may be important for the prevention of fraudulent claims, systems should be in place to ensure that such stipulations do not impede the correct recording of cause of death.

4.4.4 Sharing information on deaths and causes of death within government

Once a death has been registered and a certificate issued, the civil registrar should prepare a statistical report for each registered death to be forwarded to the national statistical agency responsible for the compilation of vital statistics. This should be done monthly or quarterly and should involve checking and verifying the completeness and accuracy of the reported data in each record and explaining when particular information items may not be available. This statistical report should accurately report both the date of occurrence of the death and the date of registration. Furthermore, information about a death of an individual is usually shared across government agencies, especially those involved in the provision of social insurance, pensions or benefits to which surviving family members are entitled. This information permits the cancellation of the decedent's national ID and enables the entry in the birth registration data as "deceased", thus limiting the risk of identity theft.

The sharing of death and cause-of-death information must comply with strict rules of confidentiality of personal information, both in relation to microdata (individual records) and associated statistical reports. The issue of data privacy and confidentiality is covered in more detail in Section 5.5. The UN advises that individual vital statistics records may be provided to certain users for research purposes, under a user agreement on confidentiality and the use of data between the statistical agency and users. Usually, identifying information is removed from the file to protect the privacy of individuals (UNSD, 2014, para 269).

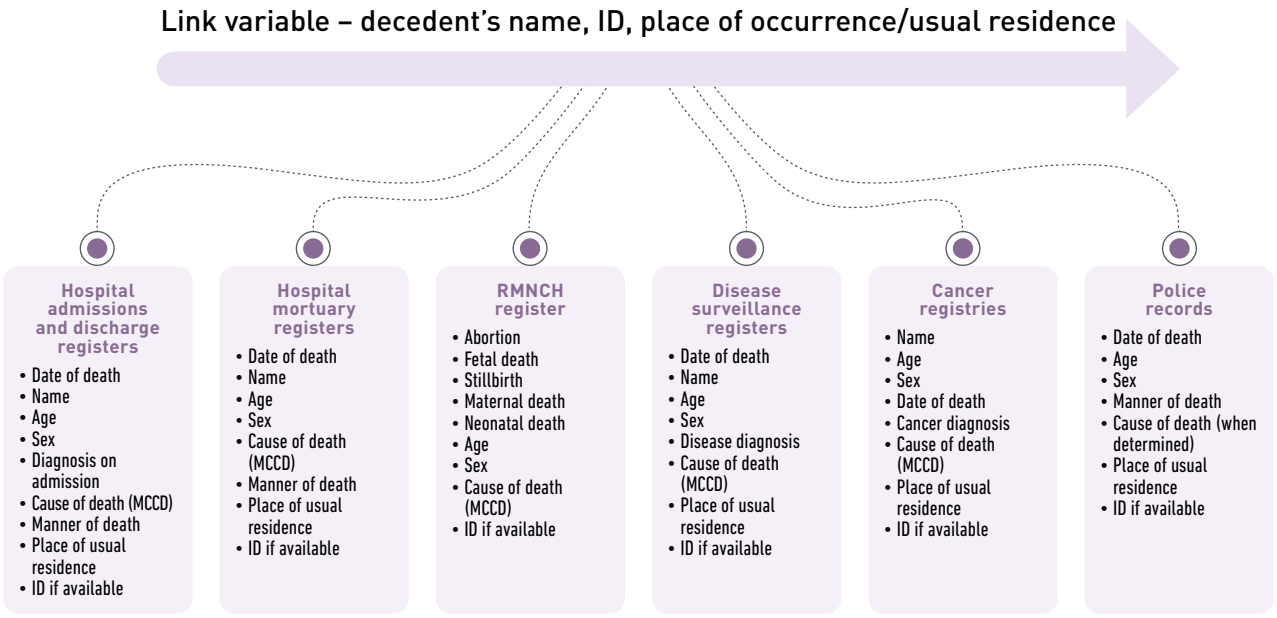
4.5 Integrating death notification into health and other administrative programmes

In the same way that contacts with RMNCH programmes may be leveraged to improve the registration of births, health service contacts throughout a person's life course can also provide opportunities to improve the registration of deaths, and equally, improve the recording of cause of death. Administrative staff and health care personnel maintain longitudinal patient records and event-based registers, and some may routinely contribute to national level disease-based registers (e.g. cancer registries). These patient records and the many disease-specific health services and programmes that are called upon to maintain event-based registers and track mortality can often furnish much of the information needed to register the event of a death. To facilitate this, health information managers should standardize and simplify register designs to capture only necessary data elements. They should ensure that staff have the knowledge and support they need to accurately input the essential data so that they can be used as the basis for the registration of deaths as well as for tracking progress towards agreed health and development goals (Shamba et al., 2021).

Fig. 4.11 identifies some of the key registers that are routinely maintained by health facilities and in local communities by CHWs. These registers often hold the key pieces of administrative data needed to register a death (see Section 4.2), and record events and the services received immediately preceding or following the occurrence of a death. For example, hospital admission and discharge registers record details such as the name, age and sex of a patient, their place of usual residence, as well as diagnoses and treatments administered during that hospital admission. The administrative information that is recorded is generally all that is required for death registration purposes should the patient die during their stay in hospital.

Disease surveillance programmes, which track patients diagnosed with specific infectious diseases and associated deaths, and other registers, which track patients with non-infectious diseases, such as cancer registries, may not always include longitudinal data linking individual diagnosis and eventual death, although some do. These registers may

Fig. 4.11 Examples of registers maintained by health facilities, communities and the police and the data they can provide to facilitate the integration of deaths and causes of death into the CRVS system



include the core information items required for a death to be registered (IARC, 2020).

Deaths due to accidents or interpersonal violence, or deaths that occur in suspicious circumstances will usually be recorded in police records and/or in mortuary registers (if, for example, the decedent was "brought in dead").

Other potential sources of information on deaths include records and registers maintained by funeral agents, morticians, cemetery authorities and religious institutions. In settings where permission to dispose of a corpse is highly regulated, these can be an important source of information about a death and therefore of value to the CRVS system. However, as previously indicated, there is great variation across countries and settings in terms of the legal and regulatory framework governing disposal of bodies which means that such records cannot always be considered to be reliable sources of mortality information.

Health facility-based registers include admission and discharge registers, ward registers and registers that list and follow particular individuals requiring ongoing management over a period for time, such as antenatal or immunization care registers, or registers of chronic diseases such as cancer. Each register maintains the minimum information necessary to follow up the patients, including personal details and information about care and treatments. Patient registries are useful for monitoring the quality of health services and for capturing treatment interventions. In addition to data that identify individuals, these registries include diagnosis on admission and discharge, results of laboratory tests and treatments. If a patient dies in hospital, the registry also provides cause of death assigned according to the standards of ICD-10.

Community-level records and HMIS integrate data from community-based workers who provide health promotion and disease prevention activities. These providers may formally work for the health system (e.g. health extension workers in Ethiopia or CHWs in Kenya) or work informally as community-based providers (for instance, volunteers serving people living with HIV) who may or may not be associated with the health system. The information these providers collect at the point of service is essential for community programme management and decision-making on budgets, policies and human resources. Community health workers use data to follow up their clients and manage their care, especially for interventions that require longitudinal follow up and community-facility linkages.

4.5.1 Integrating death registration into RMNCH programmes

As noted in Chapter 3, most RMNCH services maintain individual patient records and registers that include information about stillbirths, as well as maternal, neonatal and infant deaths. Furthermore, in many settings, services

routinely collect significant quantities of potentially valuable information that documents the circumstances surrounding such deaths. While the primary purpose of collecting this information and maintaining various event-based registers is to serve the needs of health planners and managers, as well as for statistical purposes, more often than not these patient registers and allied data collections can be used to improve the capture and registration of stillbirths, neonatal and early infant deaths, which in many LMIC, often go unreported and unregistered.

There are two ways that RMNCH programmes can create the opportunities for improving death registration rates. The first is by making sure the registers include the information necessary to notify a death to enable the completion of the notification form which is shared with the civil registrar, thus removing the onus of declaration from the family as outlined above. This implies that the routine data collection systems and related registers include the information pertaining to the occurrence of the death, with essential personal details about the decedent.

In addition, in settings where a PIN is included in the health records, it is possible to link records, for example, maternal and infant records, and thereby capture "missing" unregistered deaths. This can be particularly important in LMIC where many stillbirths and neonatal deaths tend to go unreported and hence child mortality indicators calculated on the basis of registered deaths are likely to be underestimates (Greene-Cramer et al., 2019).

Annex 5 lists the various registers that collect information about reproductive outcomes in the course of routine RMNCH care provision, focusing on deaths associated with pregnancy and childbirth and those occurring among children up to 5 years old. It also lists the items of information that are needed in order to notify and register a death and summarizes the ways in which various RMNCH services can be leveraged to improve notification and registration rates.

In order to realize the potential contribution of RMNCH programmes to improved death registration, it may be necessary to add certain items of information to the existing data collections and registers. Including the key pieces of information needed for death registration in RMNCH registers facilitates death registration by creating the opportunity for health care workers to complete a death notification form that can serve as the basis for death registration and the issuance of a death certificate (see Scenario 1).

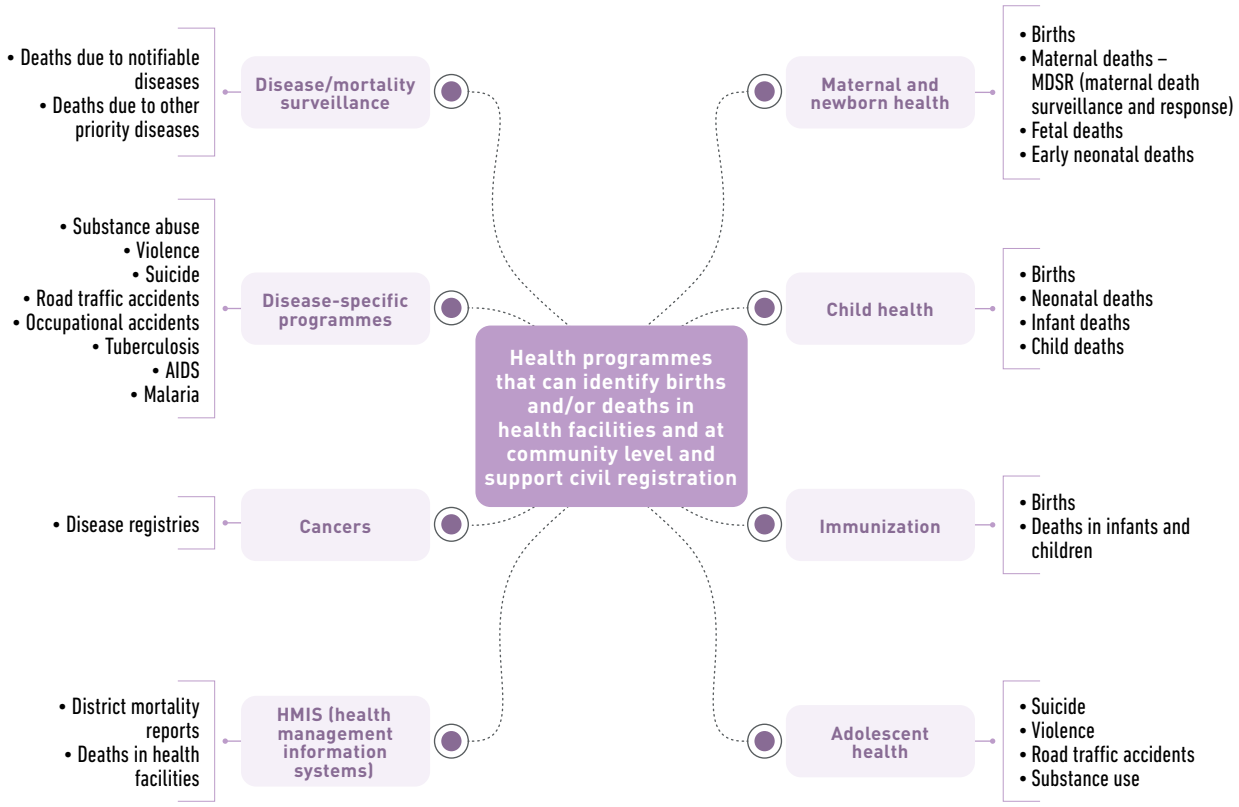
As discussed in Chapter 3, the utility of the information collated by various health programmes for civil registration purposes is greatly enhanced when the individual registers are linked through a "link variable". Use of a link variable – a unique PIN (PID or ID number) being the most efficient and desirable – facilitates information sharing between the heath sector and the civil registration authorities. This can help in the removal of duplicates; equally it may help identify deaths missing from the CRVS system. Ideally, data from registers would be online and centralized (see Chapter 5); this removes the rigidity of geographical boundaries in service provision and helps to ensure a continuum of care across interventions and over time. More significantly in the context of this guidance, the inclusion of a link variable allows interoperability across registers and helps identify deaths that may have been missed. For example, if a child is not brought in for an expected immunization, this could be investigated as a possible death. The use of the DHIS2 tracker application would enable the reporting from the various registers to be streamlined into a single individual report for transmission by the health administrator to the civil registration authorities, thus avoiding the risk of duplicate reporting.

Maternal and perinatal death surveillance and response (MPDSR) and integrated disease surveillance and response (IDSR) are WHO-led systems which capture information on deaths. It is essential to seize the opportunity to harness the synergies between the two systems. IDSR, which is designed to cover up to 412 specified diseases and conditions (including maternal deaths, HIV etc.) is primarily used in Africa. Together, the proportion of deaths that could conceivably be captured through an IDSR system is likely to be high.

4.5.2 Integrating death registration into disease and mortality surveillance programmes

In most countries, the health sector is involved in the monitoring and tracking of key infectious diseases such as TB, HIV/AIDS, malaria; as well as a number of noncommunicable diseases, such as various common cancers, cardiovascular diseases and mental ill-health; and external causes of morbidity and mortality, such as road traffic accidents. Numbers of deaths (by cause where available) are reported by age, sex, date of occurrence, place of occurrence, and place of usual residence of the decedent. In large hospitals, the data are usually collated and entered into a database, often the DHIS2 or a similar package. Data from community reporting is generally aggregated at district level, also using DHIS2. Whereas this information

Fig. 4.12 Potential for integrating mortality monitoring into CRVS systems



is useful for health system planning and management, it cannot be used for the purposes of civil registration. An immediate option would be to use the DHIS2 tracker module which collects individual information on each death. Given a supportive legal framework and assured protection of individual confidentiality, core data items – name of decedent, sex, date of death, date of birth/age, place of usual residence – could be notified to the civil registrar to enable the civil registration of death.

In Africa, mortality surveillance is supported through a WHO-defined, country-led infectious disease surveillance and response (IDSR), which monitors infectious diseases subject to international reporting through the International Health Regulations (WHO, 2005). The IDSR covers up to 412 specified causes of death, including maternal deaths and HIV/AIDS. However, the IDSR system and other disease surveillance mechanisms that operate in other parts of the world, are targeted to monitor and assess the health impact of specific diseases or conditions, and this often results in them operating independently of each other. This undermines their potential contribution to CRVS. The analytical skills required to reconcile data from various sources in order to produce mortality and cause-of-death statistics for the entire country are often lacking in low-resource settings.

Countries with a high burden of infectious diseases such as HIV/AIDS, TB and malaria, tend to have relatively well supported surveillance programmes that are designed to measure and monitor the impact of investments by governments and donors. For example, many national HIV/AIDS surveillance programmes are set up to track patients from the start of their illness, throughout their treatment and in the unfortunate event of their death, record the circumstances of that death. Because these programmes are providing care to people with specific conditions, they have the potential to provide information not only on the fact of death but also on the medical cause of death. For this to occur, it is essential to have a memorandum of understanding between the health sector and the civil registrar that provides assurance of confidentiality and data security.

Annex 6 shows information which, if included as part of disease-specific surveillance systems, would contribute to the death notification process, including the cause of death. This listing, in addition to identifying the key pieces of information that are needed to support the legal registration of a death, also describes potential sources of these items as well as their relevance in terms of CRVS systems (i.e. whether they are required for legal, statistical and/or health purposes).

Opportunities for harnessing information collected by the health sector in order to increase death registration are summarized in Fig. 4.12. WHO-defined, country-led information systems such as the MPDSR and the IDSR focus particularly on identifying circumstances and causes of death in order to identify interventions needed to avert future deaths. Both are designed to capture information on deaths; the potential of the IDSR system to capture information on deaths in Africa where death registration rates are especially low is likely to be high (WHO, 2019, p. 117).

To benefit from these opportunities, it is important to ensure that when different health programmes record a death, they bring together all the information needed to enable the death to be notified to the civil registration system. This will require enhanced coordination across health sector programmes as well as closer involvement with CRVS agencies, and amendments to authorizing laws as needed.

In support of this, the UN recommends that countries establish – within the overall framework of a CRVS coordinating committee that involves various sectors as well as health – a mortality subgroup or task force with the mandate to develop a harmonized approach to reporting of deaths and causes of death across programmes through the national health information system (UNSD, 2018). This could help maximize the completeness and timeliness of death reporting to the civil registrar while also avoiding duplicate reporting through different channels. Standard operating procedures should be put in place so that these surveillance programmes could notify such deaths to a centralized system in a routine manner.

4.6 Monitoring the health sector contribution to notification and registration of deaths and stillbirths

In parallel with the situation for births, the effectiveness of the health sector's involvement in the notification of deaths to the civil registration authorities should be monitored using a set of process indicators. Health functionaries facilitating the notification of deaths occurring in health facilities or in the community should systematically record actions taken by them in this regard. This continuous recording of actions taken and follow up can form the basis for monitoring through a set of process indicators, which is crucial for successful implementation of this approach.

Examples of process indicators (see Annexes 3 and 7):

- number of deaths in the health facility notified to the civil registrar, within a defined period, by sex and age;
- percentage of deaths in the health facility notified to the civil registrar, within a defined period, by sex and age, among total deaths in the health facility;
- number of deaths notified by community-based health workers within a defined period, by sex and age at death;
- number of neonatal deaths in the health facility, by early (0–6 completed days) and late (7–27 completed days), within a defined period, notified to the civil registrar;
- number of stillbirths notified by the health facilities, within a defined period, to the civil registrar;
- percentage of stillbirths in the health facility notified to the civil registrar, within a defined period, among total stillbirths in the health facility;
- number of stillbirths notified by CHWs within the legally mandated time period, within a defined period, after birth;
- number of maternal deaths notified by the health facility, within a defined period, to the civil registrar; and
- number of deaths notified by the health facility with completed MCCD form, within a defined period, reported to the civil registrar.

Likewise, national civil registration authorities should monitor notifications of deaths received from the health sector and report back on the numbers of notifications registered. As part of the process monitoring, the health sector should also conduct regular reviews of the quality of MCCD completion. This can consist of an evaluation of a random sample of around 50 MCCD forms from each of the selected hospitals using available guidelines such as the *CRVS technical guide: assessing the quality of death certificates: guidance for the rapid tool* (Gamage et al., 2020).

The assessment checks basic errors in completing MCCD forms, such as:

- documenting multiple causes of death per line;
- missing time interval from disease onset to death;
- incorrect or clinically improbable sequence of events leading to death;
- ill-defined or poorly specified conditions entered as the underlying cause of death;
- abbreviations used when certifying the death; and
- illegible handwriting.

More detailed evaluation of the MCCD forms involves review by expert doctors and cause-of-death certifiers and statistical coders on the appropriateness of the selection of underlying cause of death in the light of the sequence of events noted in the MCCD form.

Implementing such quality assessment processes depends on a supportive environment within the health and CRVS sectors. For regular quality assurance strategies, it is important to ensure frequent and systematic sharing of information between civil registration and the health sector at local level and a well-functioning, formal coordination mechanism guided by a memorandum of understanding and/or clear SOPs, as described in Chapter 2.

4.7 Production of statistical reports on deaths and causes of death

The national civil registration office should produce and share with the statistics agency their reports of all deaths registered in their region, to include details of sex, age, local administrative area, date, place of usual residence of the decedent, and cause of death (where available).

Following official registration and validation, the national civil registration office should de-identify records and anonymize the data in order to produce regional- and national-level statistics. Registrations should be divided into those that are timely or current (completed within the legal set deadline, usually 30 days following death); those that are late (registered after the legally specified time period but within a grace period usually within 1 year of the death); and those that are delayed (registered after the grace period has expired) (UNSD, 2014, paras 369–370).

Tabulations should be produced on:

- total number of deaths registered within the legally mandated time period, often 30 days following death, and disaggregated by sex, age group, place of occurrence (hospital, health centre, home) and place of usual residence;
- total number of late and delayed registrations of deaths, and disaggregated by sex and age group;
- total number of stillbirths reported for registration within a specified number of days after birth, and disaggregated by place of birth (hospital, health centre, community) and place of usual residence of the mother.

The statistical entity responsible for compiling and disseminating mortality and cause-of-death statistics – generally the national statistics office or ministry of health – should conduct analyses of aggregated data to identify data gaps and errors. Tools are available to support this from WHO (WHO, 2020d) and the University of Melbourne (University of Melbourne, 2018). Both tools automatically review the mortality and cause-of-death data for errors and omissions, tabulate the information, and present the results in the form of easy-to-use tables and charts. They also provide the opportunity to compare the findings with those from other groups of countries.

Monthly and quarterly bulletins which summarize the number of registered deaths should be produced and compiled at national level and issued regularly. This is usually done by the national statistics office but in some countries by the ministry of health. The regular presentation of selected totals can alert responsible officials on a relatively current basis of unusual changes in numbers of deaths registered. Such reports are of great importance for quality assessment and for early detection of missing data.

The UN has published detailed information and guidance describing the tabulations and mortality indicators that should be prepared from civil registration records and on the presentation and dissemination of those

statistics (UNSD, 2014). It is recommended that, as a minimum, tabulations should be produced which provide information on:

- the numbers of deaths by age and sex, administrative area, month of occurrence and place of usual residence (administrative area); and
- monthly data on total number deaths by broad age groups (i.e. children, adults and persons aged 65 years and over).

Reporting numbers of deaths by broad age group provides information on the seasonal pattern of deaths and can help to identify excess mortality associated with epidemics, such as COVID-19, or extreme climate conditions. See, for example, the European monitoring of excess mortality for public health action (EuroMOMO, 2020a).

In addition to routine reporting of monthly data, annual tabulations should be produced which provide numbers of registered deaths by:

- calendar year
- sex (i.e. for males and females separately)
- place of occurrence
- place of usual residence
- age at death.

The following age groupings should be used:

- within the first year after birth
- between completed years 1–4[1]
- completed years in 5-year age bands (i.e. 5–9, 10–14, etc. up to completed years 80–84 at the minimum or 90–94)
- completed years 85 and over (or up to 95 years and over)
- by ICD-10 list of causes (WHO, 2020e).

[1] "Completed years of age" is a demographic concept that defines the exact age at death. For example, a person who dies *after* their 34th birthday, but *before* their 35th birthday, will have completed 34, but *not* 35 years of age. The age of death in completed years is thus 34.

In countries and settings with small population numbers, the annual number of deaths at specific ages may be very small. As a result, the data derived would tend to fluctuate and be too unstable for analysis. In order to overcome this problem, it is usual to calculate an average of number of death and population over a 3–5 year period in order to average out annual fluctuations.

In addition to reporting absolute numbers of deaths, and for the purposes of international comparisons, UNSD (2018) guidance recommends the routine reporting of key mortality indicators, as follows:

- crude death rate (CDR)
- neonatal mortality rate (NMR)
- infant mortality rate (IMR)
- under-5 mortality rate (U5MR)
- maternal mortality ratio (MMR)
- age-specific mortality rates (ASMR)
- death rates by age and sex
- life expectancy at birth.

Annex 7 includes tables showing the method of calculation of these core indicators, many of which are part of the SDGs as described in Chapter 1.

As far as possible, vital statistics reporting should include cause-of-death data. While the ICD contains over 10 000 codes denoting possible causes of death, these can be condensed into three broad groups of causes of death:

- **Group I:** Communicable diseases (e.g. TB, pneumonia, diarrhoea, malaria, measles), maternal and perinatal causes (e.g. maternal haemorrhage, birth trauma) and nutritional conditions (e.g. protein-energy malnutrition). ICD-10 codes: A00-B99, D50-D53, D64.9, E00-E02, E40-E46, E50-E64, G00-G04, G14, H65-H66, J00-J22, N70-N73, O00-O99, P00-P96, U04.
- **Group II:** Noncommunicable diseases (e.g. cancer, diabetes, heart disease, stroke). ICD-10 codes: C00-C97, D00-D48, D55-D64 (minus D 64.9), D65-D89, E03-E07, E10-E34, E65-E88, F01-F99,

G06-G98 (minus G14), H00-H61, H68-H93, I00-I99, J30-J98, K00-K92, L00-L98, M00-M99, N00-N64, N75-N98, Q00-Q99, X41-X42, X44, X45, R95.

- **Group III:** External causes of mortality (e.g. accidents, homicide, suicide). ICD-10 codes: V01-Y89 (minus X41-X42, X44, X45).

- **Symptoms, signs and ill-defined conditions:** ICD-10 codes: R00-R99, minus R95.

This broad cause-of-death classification corresponds to that used by the Global Burden of Disease global estimates (IHME, 2020; WHO 2020f). Annex 8 shows typical distributions of these broad groups of causes of death and how they can be interpreted.

Guidance relating to the production of a national vital statistics report for deaths has been developed by UNECA, UNESCAP and Statistics Norway (Brunborg and Nielsen, 2017).

The topics on death to be investigated in the vital statistics report are based on the information that is collected on death in the civil registration system. Many of the topics recommended by the UN are complex, for example, deaths by educational attainment, occupation and socioeconomic status of the decedent. Therefore, this guidance focuses on key tabulations for registered deaths. Reporting numbers of deaths is important for monitoring health trends and health sector planning and for population projections. In settings where the completeness of death registration is low, completeness rates should be presented, together with the death registration figures, to enlighten the audience about the quality of the data presented.

Information on causes of death will be of good quality only if the cause of death has been certified according to the standards of the ICD. Therefore, detailed analysis of cause-of-death statistics will most likely use data reported from health facilities only.

4.7.1 Reporting statistics from verbal autopsy

Verbal autopsy (VA) is an important source of information on causes of death, especially in populations where a large proportion of deaths occur outside hospitals and do not have a physician to complete a medical certificate of cause of death. The automated collection and analysis of VAs have been introduced into CRVS systems comparatively recently and experience is still being gathered on the statistical presentation of causes of death derived from VA compared with those from medically certified deaths.

Because of the costs of collection of VAs, it is generally advisable that VA data collection be based on cluster sampling of national populations. This would permit a national VA report to include a frequency distribution of the leading 10–20 causes of death at national level or, in large countries, at subnational level. Given that VA is a relatively new source of routinely collected cause-of-death information, it is particularly important that the VA data are analysed to assess plausibility of cause-specific mortality fractions, given other known factors in the country and in the VA population.

Guidance is now available to help countries understand and interpret mortality and cause-of-death data generated from VA implemented routinely as part of health information, mortality surveillance and CRVS systems (D4H Technical Working Group, 2020). The guidance describes techniques and approaches that can be used to contextualize and interpret the VA findings, assess their plausibility and present them in ways that are relevant and useful to country health-related policy-makers. The guidance is intended to be used by data managers and analysts involved in country health information, and CRVS or related statistical systems.

Because of the substantial differences in data collection methods, levels of detail, and analytical precision, it is currently advised that cause-of-death distributions derived from VA be presented separately from causes of death resulting from medically certified deaths. The WHO Verbal Autopsy Reference Group is currently reviewing methods for aggregating mortality data from multiple sources and for integrating the results into national statistical processes.

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5

CIVIL REGISTRATION AND VITAL STATISTICS SYSTEMS AND DIGITAL TECHNOLOGIES

Chapters 3 and 4 describe the advantages of decentralizing notification responsibilities to health workers and other informants to improve registration of events occurring in health institutions and the community. In order to fully seize the opportunities offered by closer collaboration between the health sector and civil registration systems, it is important to first understand the opportunities offered by the adoption of digital HMIS and unique identification numbers (UINs).

In this final chapter, we advocate for using digital applications to further strengthen the CRVS system by facilitating timely data exchange:

- transfer of notification data from the informant to the registrar;
- vertical transmission of registration data from local civil registration offices to the national registrar; and
- horizontal sharing of individual-level or aggregate data on vital events between the national registrar, the national statistics office, and other agencies.

In addition to real-time, or otherwise timely, sharing of data, software platforms offer several other advantages. They may be used to augment family-friendly services, for example, by enabling the parents or next of kin to retrieve a birth or death certificate at the time and place of registration; or by enabling an individual to retrieve a replacement certificate if needed years later. From an individual rights' perspective, software applications have the potential to mount reliable data security mechanisms to assure privacy of personal data from the time of data collection. From a convenience perspective, a digital civil registration record can establish an individual's identity which, with the proper regulations in place, can be linked across multiple agencies to facilitate voter registration, vehicle registration, educational enrolment, and other services. Finally, from a statistical perspective, software can build in quality control mechanisms to improve completeness, consistency, and comparability of vital statistics.

Although digital applications have the potential to "standardize and streamline civil registration and vital statistics processes, integrate data from multiple systems and securely store data at scale, all in a cost-effective way", it is a long process to establish the social and political environment that enables the assembling of the various components of a modern, integrated CRVS system (APAI-CRVS, 2020). Across the globe, countries are on a continuum where, at one end they are developing plans to transition from paper records to a digital record system, and at the other are benefiting from the efficiencies of a well-established system that affords the same privileges and opportunities to all individuals in the population. In recent years, WHO and other stakeholders have produced guidance to implement digital data systems (APAI-CRVS, 2020; Grassi et al., 2017; OECD, 2019; WHO, 2019a).

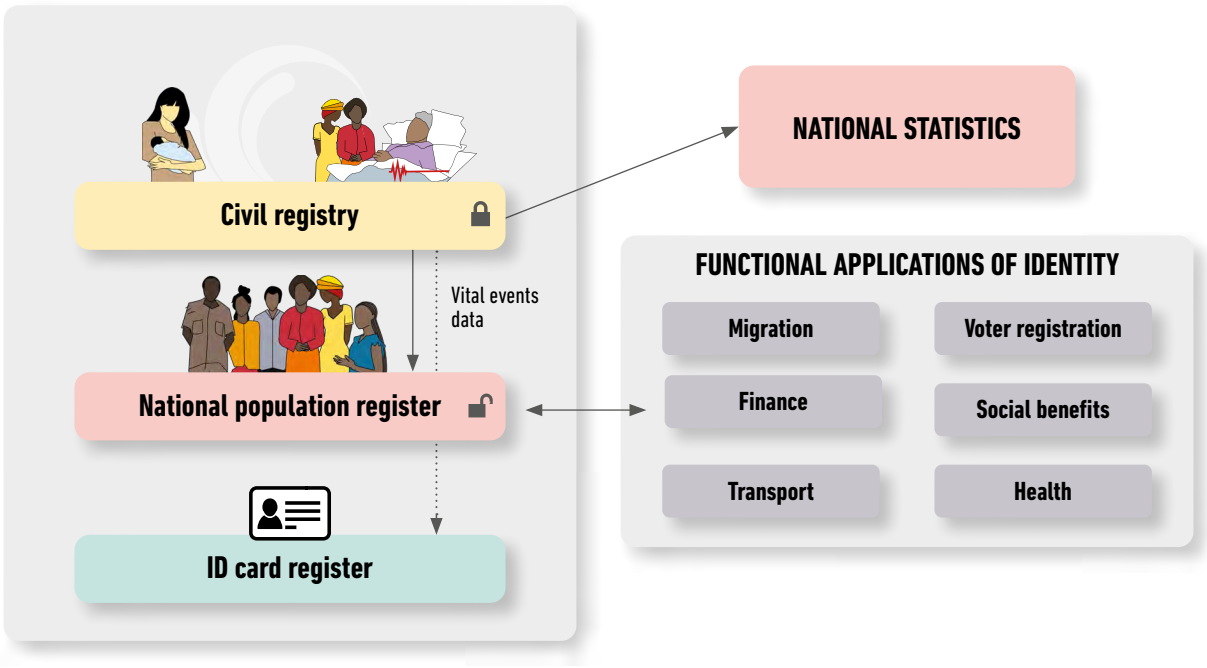
5.1 Civil registration and administrative registers

A birth registration record, evidenced by a birth certificate, is the primary means of conferring legal identity, and thereafter accessing services such as health and education (see Chapter 1). The compilation of individual birth registration records is the foundation of a population register. A population register is "an individualized data system, that is, a mechanism of continuous recording, and/or of coordinated linkage, of selected information pertaining to each member of the resident population of a country in such a way to provide the possibility of determining up-to-date information concerning the size and characteristics of that population at selected time intervals" (UN, 1969). In its most basic form, the population register is a database containing a dynamic, longitudinal record for each person residing in a defined area and provides government officials with demographic information and other attributes of the resident population (see also Box 14).

Fig. 5.1 illustrates how civil registration records form the basis of the population register. Each birth record is assigned a UIN to create an identity system. Information concerning other life events, such as marriage and death, can be integrated into the uniquely identifiable record. As national legislation permits, individual identity information can be shared across agencies to link other information to an individual's unique record. The population register should also contain unique records with UINs for other residents not entering the system through the birth register, such as migrants and nationalized citizens. The resulting identity system serves designated government agencies by providing information on individuals who are eligible for services, and an evidence base to inform policy-making, allocation of resources, creation or tailoring of government programmes and other purposes (UN, 2020).

In settings where birth registration is not universal, legal identity can be conferred by a recognized identification authority, e.g. national identification authority (UNSD, 2018). However, this generally does not occur until the age of majority (usually

Fig. 5.1 Civil registration as the foundation of the identity ecosystem



Note: Adapted from World Bank, 2017.

Box 14. Civil registration and population registers

National population registers are typically maintained via a legal framework that requires both nationals and foreigners residing in a country to register with the designated local authorities. Each person is assigned a unique identifying number (UIN) which enables information across different registers (i.e. birth, death, marriage etc.) to be linked and for central records to be updated. The linking of records means that as well as providing population statistics, the registers can also be used for longitudinal data which follow an individual across the life course (Aquilar et al., 2018, p. 22). Currently, only a few high-income countries, mostly in Europe and Asia, maintain a population register, but a number of other countries are moving in that direction, for example, India (Poulain and Herm, 2013; Government of India, 2010).

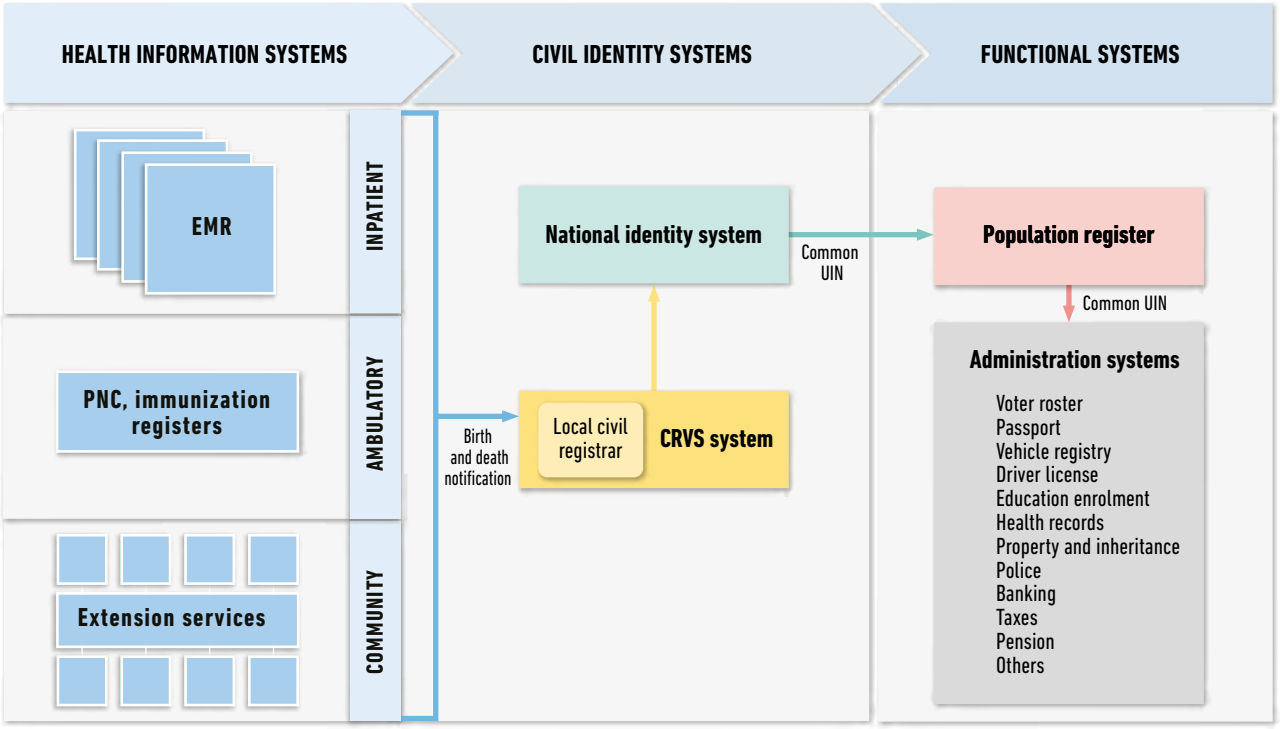
The primary function of a population register is to provide the government with reliable and up-to-date information about its population and thus enable it to perform specific administrative tasks, such as levy tax, hold elections, track migration and produce demographic statistics. Population registers are also useful in relation to social insurance and welfare systems, and are particularly valuable for the purpose of programme planning – including for health service provision. Information held in the population register may be used as a basis for issuing documents needed for the admission of children to nurseries, kindergartens and schools, as well as the assignment of residents to health clinics (UN, 2014, para 476). The accuracy of population registers is highly dependent on there being a mechanism in place to uniquely identify all individuals. It is generally accepted that assigning a UIN to individuals at birth and retiring it only after their death, is the most efficient and effective way of maintaining an up-to-date population register, ensuring its quality and eliminating duplication.

starting between 16 and 18 years), which means that the rights of those below the age threshold are potentially violated. In principle, therefore, legal identity should be conferred at birth whenever possible, and evidenced by an official birth certificate issued immediately after birth registration. Through various outreach programmes to mothers and young children, health institutions and health workers in the community play an important role in notifying, promoting and tracking birth registration (Jackson et al., 2018).

5.2 Health information systems, identity systems and functional systems

The increased use of digital technologies in health systems presents valuable opportunities to link health and civil registration systems, thereby optimizing the quality and efficiency of civil registration. Most countries are exploring or already implementing electronic medical record systems that are built from scratch or adapted from available platforms such as DHIS2 Tracker, Commcare and OpenSRP. Such

Fig. 5.2 Schematic for linking an individual's vital information to the civil identity system and functional systems



Note: EMR – electronic medical record; PNC – postnatal care; UIN – unique identification number.

platforms can be programmed to create a patient record or chart for each individual, starting from the time of delivery in an institution or another first encounter with the health system. Information regarding a birth or death recorded in the digital health chart facilitates active notification to the civil registration authority and can improve the coverage, completeness, and accuracy of civil registration.

Integrated electronic health information systems and civil registration systems can improve efficiency by using the information originally recorded on a birth or death event in the health information system – as close as possible to the date and place of occurrence of the event – for multiple uses including event notification, civil registration, establishing a secured or encyrpted UIN, and linking individual information to population and administrative registers.

In countries where a national identity system does not successfully assign a legal UIN at birth to all births, the health system can assign a *functional* UIN to monitor an individual's medical diagnoses and service utilization over time. The health institution can share information on birth and death events from the electronic patient record, including an individual's functional unique identifier, with the civil registrar for registration of the vital event. Table 5.1 summarizes the differences between legal and functional identification numbers.

A functional UIN assigned by the health system can be substituted by or matched with a legal UIN provided by the civil registration or identity authority. The World Bank's ID4D guidance on UINs further expands on the three commonly used models to develop UINs and provides advice in developing and maintaining a UIN system (World Bank, 2016).

Table 5.1 Legal versus functional identity numbers

Number	Purpose	Location
Legal UIN	To identity individuals for various purposes under the law	Civil register Population register
Functional UIN	To identify and track clients receiving services within or across systems	Client registers, such as health, education, and other services

Figure 5.2 highlights the pathway of an individual's identity that is initiated in the health information system, processed in the civil registration and identity systems, and used across multiple functional systems to prove identity, determine eligibility, exercise privileges, and declare rights.

5.3 Integrated civil registration systems in low- and middle-income countries

The combination of decentralization and digitization of the civil registration system, including notification, registration and certification, can quickly and effectively increase birth and death registration coverage. In the process of scaling up and modernizing the system for quick wins in coverage and completeness, stakeholders should also consider how to avoid pitfalls in the longer term. For example, commercial off-the-shelf software solutions are an easily available option but may result in a country being financially and intellectually beholden to a vendor for recurring licensing fees or fees associated with trainings, adaptations and updates. This predicament is called vendor lock-in. Countries may rather decide to use a free, open-source software package based on published standards and have local IT staff learn the source code. This is a good option that ensures scalability assuming a dedicated group with low turnover is responsible. The third option is bespoke, or a custom, home-grown system. While this option ensures intellectual ownership, there is a risk of re-inventing the wheel and not incorporating important standards around security, quality and comparability that other commercial or open-source software developers have built in.

Whichever type of software platform a country chooses, they must be prepared to implement it in a step-by-step process. Initially, an increase in registration coverage is a priority, and thereafter other weaknesses in the system can be identified and strengthened. For example, documentary requirements of the mother, father, or next of kin may be enforced to achieve better identity information, avoid duplicate registrations, and guard against fraud. Ultimately, the system will find a balance between maintaining high registration coverage and, at the same time, arrive at complete, accurate and secure records.

Among several countries in Africa, the United Republic of Tanzania is making use of decentralized registration agents from the Ministry of Health and the Ministry for Regional Administration and Local Government, coupled with mobile technology, to increase birth, and later death, registrations (UNICEF, 2020, pp 59–69).

Mozambique is another good example of leveraging national resources to roll out a digital registration system. Here, authorized informants use mobile phones to notify a live birth to registration officials at the *postos* (subdistrict) level. The registration official compiles required documentation from the parents to fill the electronic registration form which is transmitted by mobile phone to the central server at the national registrar where the registration is verified and completed. Once complete, any civil registrar can access and print the registration certificate (see Box 9, Chapter 3). Bangladesh and Zambia are piloting the OpenCRVS software developed by Plan International to register live births and deaths (Plan International, 2018). This is a free, open-source solution that may be appropriate for countries with low connectivity since it functions on different devices both online and offline. The software is adaptable and based on data exchange standards that allow interoperability with other systems (e.g. OpenMRS, DHIS2). It has data quality and security measures built in.

5.4 Interoperability within and across data systems

Interoperability is the ability of different information systems, devices and applications to access, exchange, integrate and cooperatively use data in a coordinated manner, within and across organizational, regional and national boundaries, to provide timely and seamless portability of information (HIMSS, 2020). Semantic interoperability requires a common message structure for data exchange as well as common data coding and vocabulary so that a meaningful interpretation is shared across systems. The possibilities to interoperate e-CRVS and other administrative systems is growing hand in hand with the appearance of new software platforms and the increased demand for real-time data.

The pace of integrating interoperable solutions across different types of devices and software platforms depends on a number of factors, including the breadth and depth of software and hardware infrastructure (i.e. electricity supply, computers, mobile devices, Internet access) and the capacity to use and maintain technology and appropriate legal framework for data use and protection. To achieve interoperability, it is essential that stakeholders in the CRVS system are involved in the design of interoperable data systems at an early stage of development to agree on common data elements, definitions and standard classification and coding systems, for example, in the health and civil registration sectors.

One key to achieving interoperability is by employing application programming interfaces (API), a set of concise procedures that allows different computer systems to seamlessly exchange information. Because a civil registration record requires data on vital events that are collected in the health or social sector, such as the declaration of birth, death, perinatal death and on the MCCD, software developers can create APIs to exchange information between electronic medical records or health information reporting software to a digital notification form that the civil registrar uses to complete registration. The ICD-11, for example, is built with a data-driven API that is e-health compatible and interoperable with DHIS2, allowing the new ICD-11 coding tool to be embedded into online or offline software (WHO, 2019b). Early efforts are already underway in: Uganda, which embedded the ICD-11 coding tool in the DHIS2 platform; Colombia, which embedded the tool into their MCCD; Rwanda, which integrated it in their OpenMRS system (Mugisha et al., 2020); and the United Nations Relief and Works Agency (UNRWA), which embedded it in electronic medical records software (UNRWA, no date).

In low-resource settings, an increase in registration coverage relies on the decentralization of birth and death notifications communicated by mobile phone applications. With the expanded use of mobile phone devices comes several mobile-ready APIs. The United Republic of Tanzania's registration agency, RITA, for example, receives and stores registration information transmitted from a mobile device's API (UNICEF, 2020, p. 68).

5.5 Data privacy and protection

Whether on paper or digital format, personal data collected in a notification or registration form are exposed to the risk of an accidental or unlawful data breach during collection, transmission and storage. To reduce the risk and avoid the occurrence of a breach, both individuals and authorized agents (hereafter, to include company, agency, etc.) are responsible for protecting the privacy and confidentiality of personal data.

Data privacy is the right of individuals to keep information about themselves from being disclosed to others without prior authorization (Harman et al., 2012). In order for an authorized agent – such as an enumerator or health provider – to not violate data privacy, the individual must give a clear statement of consent to their personal data being collected and processed for one or more specific purposes. Likewise, the authorized agent who has access to personal information is obliged to properly handle and keep that information confidential and not divulge it to third parties without the express consent of the individual (Nathanson, 1994). Data security, on the other hand, comprises strategies, regulations and software that focus on assisting authorized persons to protect against unauthorized access to personal data. Data security, therefore, is a prerequisite to data privacy but cannot replace data privacy (Data Privacy Manager, 2020).

In a well-functioning CRVS system, the protection of personal data – including maintaining privacy and guarding against unauthorized access – must be ensured at various steps in establishing a vital events record. Vulnerable links in the chain of secure information storage and transmission include: enumerators transferring data to the data managers of the survey or census; health or other informants transmitting notification data on vital events to the civil registrar; local registrars transmitting data to the regional or central registrar; and the registrar sharing data to other government agencies and stakeholders.

Data protection starts with the collection of primary data. A person who is authorized to collect data may be a trained household enumerator – such as for survey or census data collection – or an officially designated informant such as a local health institution or local administrator. These persons collect personal data in electronic format via a mobile phone device, tablet or computer, or by paper and pencil that is later converted to digital format through data entry or scanning. For electronic data, examples of data security technology include backing up or storing data in a cloud, on a server, or on another external device. While acknowledging that cloud-based services and other options run their own risks of security breaches, they must be weighed against the risk of potential loss of data due to a force majeure or cyberattack (McDowall and Mills, 2019). To secure data privacy during transmission, technologies include data encryption, applying a hash algorithm to data, and tokenizing sensitive data by exchanging it with a non-sensitive equivalent.

To prevent breaches of personal data, countries need to develop and implement data protection laws as a pre-requisite for building new or expanding existing systems. that address both data privacy and data security, from the moment of primary data collection of a vital event, to digitizing and storing personal information associated with the event, to transmitting personal data between different actors. In this regard, and as the only international policy governing data privacy and protection currently in existence, the European Union General Data Protection Regulation

(GDPR) provides a good model (EU, 2020). Countries considering the introduction of digital sharing of data, particularly highly sensitive information around births, deaths and causes of death, are encouraged to examine this international policy when developing their own rules and policies regarding data privacy, confidentiality and security.

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ANNEX 1: GLOSSARY

Definitions come from UNSD (2014) unless otherwise noted.

Autopsy

An autopsy (postmortem examination) is a surgical procedure that consists of a thorough examination of a corpse by dissection to determine the cause, mode and manner of death. Autopsies are usually performed by a medical examiner or a pathologist. Only a small portion of deaths require an autopsy. Autopsies may be divided into two main types (Strasser, 2008):

- **Clinical autopsy:** Clinical autopsy is performed to gain a greater understanding of the pathological processes and factors that contributed to a patient's death and is usually conducted for research or education purposes. For instance, a clinical autopsy may be performed to evaluate the standard of care provided by a hospital, and thus provide insight into how patient deaths could be prevented in the future.
- **Forensic autopsy:** Forensic autopsy is used to determine the cause, mode and manner of death and to answer questions of interest to the legal system in cases where death is due to external causes or occurs under suspicious circumstances. Medical examiners attempt to determine the time of death, the exact cause of death, and what events, if any, preceded the death, such as a struggle. A forensic autopsy may include obtaining biological specimens from the deceased, such as stomach contents, for toxicological testing.

Burial permit

An official document, often issued only for a legally registered death, authorizing the removal of the dead body (corpse) to a cemetery or other final site.

Certification

The issuance by the **civil registrar** of a legal document certifying a birth, a death or other **vital event**.

Civil registrar

The official authorized by law to carry out the **civil registration of vital events (CRVS)** in a designated geographical area (e.g. an entire country, or a county, district, municipality or parish) and to record and report the information on those vital events for legal and statistical purposes.

Civil registration

The UN defines civil registration as "the continuous, permanent, compulsory and universal recording of the occurrence and characteristics of **vital events** pertaining to the population as provided through decree or regulation in accordance with the legal requirements of a country". The process of civil registration establishes and provides legal documentation for such events.

Civil registration system

The institutional, legal and technical settings established by government within which civil registration is conducted in a technically sound, coordinated and standardized manner throughout a country, taking into account cultural and social circumstances particular to that country. See also **Vital statistics system**.

Completeness of civil registration

The completeness of **civil registration** is the number of registered events divided by the estimated total number of events (separately for births and deaths). Methods for calculating the completeness of birth and death registration are described in the *UN Principles and recommendations for a vital statistics system* (UNSD, 2014) and in the *Guidelines and template for developing a vital statistics report, 2017*, published by UNECA (Brunborg and Nielsen, 2017).

Death

This guidance adopts a common determination of death based on irreversible loss of all brain functions: "the permanent disappearance of all evidence of life, including the irreversible cessation of circulatory and respiratory functions, or the irreversible cessation of all functions of the entire brain, including the brain stem" (NCCUSL, 1980).[1]

Delayed registration

Delayed registration is the registration of a **vital event** after the legally specified period, including any grace period. Since the grace period is usually 1 year following the vital event, a delayed registration is usually considered to be a registration of a vital event more than 1 year after the event occurred. After a year has passed, it is usual to require additional proofs of the facts of birth or death due to the legal nature of the record. Additional documentation is required for registration to not only guarantee the accuracy of the information supplied but also prevent the filing of a false birth or death record for fraudulent purposes. See also **Late registration**.

Demographic and Health Survey

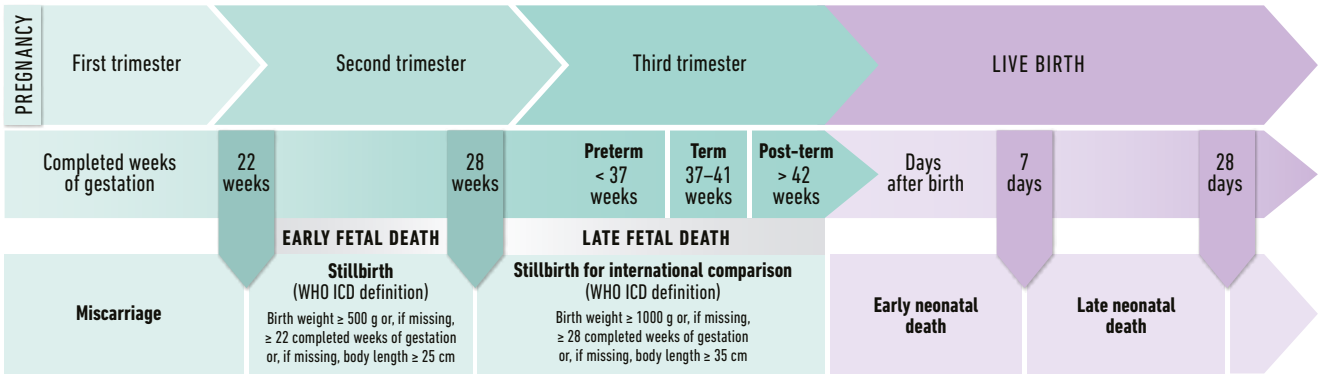
The USAID-sponsored Demographic and Health Survey (DHS) programme was established in 1984 to assist over 90 developing countries collect and share information about their people, their health and their health systems. The DHS programme enables countries to compile key data on infant and child mortality, fertility rates, family planning use, maternal health, child immunization, malnutrition levels, and prevalence of HIV and malaria, data which allows global partners and participating countries to better understand population health trends and needs (DHS Program, 2020).

Fetal death

Fetal 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 (WHO, 2019, Section 2.28.4). For international reporting purposes, WHO recommends that countries report late fetal deaths, meaning those that occur at or after 28 weeks' gestation (third trimester stillbirth). The early and late fetal death periods correspond with WHO-defined weight, gestational and length criteria presented below and in Fig. A1.1:

- **Early fetal death:** Death of a fetus weighing at least 500 g but less than 1000 g, or if missing, between 22 and 28 weeks' gestation (≥ 22 weeks and < 28 weeks), or if missing, measuring between 25 cm and 35 cm in length (≥ 25 cm and < 35 cm).
- **Late fetal death:** For international comparisons, the death of a fetus weighing at least 1000 g, or if missing, at least 28 weeks' gestation, or if missing, measuring at least 35 cm in length.

Fig. A1.1 Visual representation of the definitions of fetal death used by WHO and ICD



[1] The UN defines death as follows: "the permanent disappearance of all evidence of life at any time after live birth has taken place (postnatal cessation of vital functions without capability of resuscitation)". The UN definition of death excludes **fetal deaths**, which it defines separately. However, as WHO includes fetal deaths in the MCCD, we have used a medical definition of death here (which includes fetal deaths).

Informant (for civil registration)

The informant is the person or institution required by law to notify the local **civil registrar** of the occurrence of a **vital event**, its characteristics, and the persons directly concerned with the event and their characteristics. In settings where most birth and death events occur in institutions (e.g. births in hospitals or maternity clinics, deaths in nursing homes or hospitals), it is common practice to designate the institution as the informant.

Late registration

A late registration is the registration of a **vital event** after the legally specified time period but within the grace period; the grace period is usually 1 year following the vital event. See also **Delayed registration**.

Legal identity

Legal identity is the basic characteristics of an individual's identity (i.e. name, sex, and place and date of birth) conferred through **civil registration** and the issuance of a certificate by an authorized civil registration authority following the occurrence of birth. Legal identity is retired by the issuance of a death certificate by the civil registration authority upon registration of death. In the absence of birth registration, legal identity may be conferred by a legally recognized identification authority. This system should be linked to the civil registration system to ensure a holistic approach to legal identity from birth to death (UNSD, 2020).

Live birth

The complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of the 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.

Medical Certificate of Cause of Death (MCCD)

The internationally accepted template form for the reporting of deaths through the health sector. Doctors or trained health staff are required to complete Frame A of the form which requires the listing of both the immediate and underlying causes of death (Part 1), as well as any contributory causes of death (Part 2), expressed in terms that can be coded to statistical categories in accordance with the rules of the International Classification of Diseases (ICD) (WHO, 2016a).

Neonatal death

Death of a live born infant within the first 28 days of life regardless of gestational age or birth weight. For statistical purposes, the following ICD-10 definitions are generally used (WHO, 2016a):

- **Early neonatal death:** Death of a live born infant from birth to 6 completed days of life, regardless of gestational age or birth weight.
- **Late neonatal death:** Death of a live born infant between day 7 and completed day 27 of life, regardless of gestational age or birth weight.

Notification

The capture and onward transmission of minimum essential information on the fact of birth or death by a designated agent or official of the **civil registration system** using an authorized notification form (paper or electronic) with that transmission of information being sufficient to support eventual registration and certification of the birth or death (Cobos Muñoz D et al., 2018).

Perinatal death

A perinatal death is a death which occurs during the perinatal period, which, for international reporting purposes, includes fetal deaths from 28 weeks of completed gestation until the 7th day after birth (WHO 2016a, p. 188) (see Fig. A1.1). Perinatal mortality rates for international comparisons combine **stillbirths** and early **neonatal deaths** per 1000 live births.

Population register

An individualized data system, i.e. a mechanism of continuous recording, and/or of coordinated linkage, of selected information pertaining to each member of the resident population of a country in such a way as to offer the possibility of deriving up-to-date information concerning the size and characteristics of that population at selected time intervals.

Postmortem

A medical examination of a dead person's body in order to determine cause of death. See also **Autopsy**.

Stillbirth

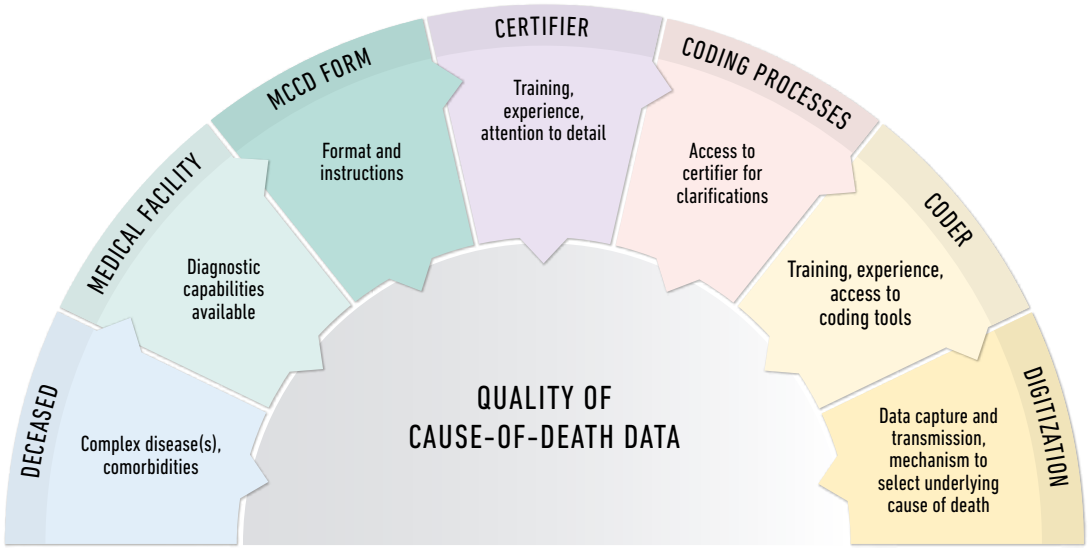
See definition for "Fetal death" (WHO, 2016b).

Underlying cause of death

The underlying cause of death is defined (WHO, 2016a, Section 4.1) as the disease or injury that initiated the train of events leading directly to death, or the circumstances of the accident or violence which produced the fatal injury. Under international rules for selecting (i.e. coding) the underlying cause from the reported conditions, every death is attributed to one (and only one) underlying cause based on information reported on the MCCD. The international standard form (MCCD) was specifically designed to facilitate the selection of the underlying cause of death when two or more causes are recorded on the death certificate.

Commonly encountered problems in mortality coding are mainly related to coding practices, coder qualifications and training, the quality of death certification etc. (Fig. A1.2).

Fig. A1.2 Factors that commonly affect quality of cause-of-death data



Unique or personal identification number (UIN/PIN)

The information included in the **civil registration system** provides the basis for the attribution to each individual of a UIN, which may be associated with biometric characteristics such as height, hair colour and fingerprints. Birth registration establishes **legal identity** and is the starting point for the attribution of a UIN. Death registration marks the closure of an individual identity record and the removal of the individual from active functional registers such as the **population register**, the electoral register and social insurance registers (UNSD, 2020).

Vital event

The occurrence of a live birth, death, fetal death, marriage, divorce, adoption, legitimation, recognition of parenthood, annulment of marriage or legal separation. For statistical purposes, vital events include all events concerning the life and death of individuals, as well as their family relationships and civil status. Vital events “proper” are limited to life and death events and include live births, deaths and fetal deaths (including legally induced abortions).

Vital statistics

A set of summary measures which describe the frequency of occurrence and relevant characteristics of **vital events** derived from **civil registration** and other sources.

Vital statistics system

An integrated system for the collection, compilation and reporting of data and statistics pertaining to **vital events**. As the functions of CRVS systems are inextricably linked, it is now more commonplace to refer to CRVS systems as a single entity.

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ANNEX 2: INFORMATION COLLECTED FROM MATERNAL AND CHILD HEALTH PROGRAMME REGISTERS THAT INFORMS THE NOTIFICATION OF BIRTHS

The data items below are based on the *Handbook on civil registration and vital statistics systems* (UNSD, 2018, pp 18–19) core topics for live birth registration.

Table A2.1 Minimum information needed to complete a birth notification form – infant

Data item	Definition/description	Rationale
Name	Full name	If the infant has not yet been named this can be the name of a parent for an interim period, depending on local customs
Name of mother/ father	Full name	Identifies parentage and descent
ID number of mother/ father (if available)	National ID number If national ID number is unknown or unavailable any other official identity number, such as health ID number, could be provided	Helps to confirm identity and enables data sharing with other designated agencies
Date of birth	Day, month and year of birth	Provides an additional check on identity
Sex of infant	Male or female	Key to generating reliable statistics
Type of place of occurrence of birth	Hospital, health centre, other	Required for statistical purposes
Address	Place of usual residence of mother	Provides an additional check on identity

Table A2.2 Minimum information needed to complete a birth notification form – declarant or informant

Data item	Definition/description	Rationale
Name	Full name, as written in an official document such as an ID card or passport	Enables subsequent follow up if necessary
Relationship to infant	Parent, family member	Enables subsequent follow up if necessary
Contact details	Address and mobile phone number	Enables subsequent follow up if necessary

Table A2.3 Minimum information needed to complete a birth notification form – official issuing the notification form

Data item	Definition/description	Rationale
Name	Full name, as written in an official document such as an ID card or passport	Permits follow up if required
Official position	Health functionary, community leader	Confirms legal authority to issue notification form and/or burial permit
Contact details	Address and telephone number	Permits follow up if required
Official stamp, signature and date		Confirms official status of the notification form

Table A2.4 Information collection by maternal and child health programmes – purpose and application to birth notification and CRVS systems

Data items	Source	Purpose(s)	Additional comments
Name of child	Parents	Required for legal purposes only. This information is included in the birth certificate.	For the purpose of civil registration, the name of the child is a crucial legal piece of information and must be recorded correctly. The name of the child must be written in full, including the surname, as declared by the parent(s). The name must be correctly spelled; in cases of doubt, for example, does not conform to the standard spelling, it must be checked and validated. Any error in spelling will be replicated on the birth certificate and will be difficult to correct once the birth has been registered. In countries with multiple official languages the use of standard spelling of names can pose a challenge, particularly when the registration processes are digitized. In such cases, the use of a commonly accepted link language might offer a solution (in India, for example, English is used). In many countries, a child is not named immediately after birth; this can cause a delay in registration if laws require that a child be named before they can be registered. Immunization sessions thus often provide a good opportunity to register a child who has not been registered earlier because they were not named, assuming that the child will have a name by that time.
Date of birth[a]	Maternity ward delivery register (in case of health facility births) Parents (in case of home births)	Required for both legal and statistical purposes. This information is included in the birth register and in the birth certificate, and is used as proof of age. This information is used to compile statistics on the total number of births occurring during specific periods (e.g. month, year).	The exact date of the occurrence of the birth event, in terms of day, month and year should be recorded.

Table A2.4 Information collection by maternal and child health programmes – purpose and application to birth notification and CRVS systems continued

Data items	Source	Purpose(s)	Additional comments
Sex[a]	Maternity ward delivery register (in case of health facility births) Parents (in case of home births)	Required for both legal and statistical purposes. This information is included in the birth register and in the birth certificate. The information is used to compile birth and fertility statistics, disaggregated by sex. It can also be used estimate the sex ratio at birth.	Sex refers to the biological characteristics of a newly born child. Most countries require newborns to be categorized as either "male" or "female", although some countries have introduced a category, "undetermined". No abbreviations should be used. Information on the sex ratio at birth is used to study gender biases in registration rates and to identify any societal gender preferences (as evidenced by unusually high or low sex ratio at birth).
Name of mother and/or father	Parents	Required for legal purposes. This information is included in the birth register and in the birth certificate.	The name must be correctly spelled for the reasons as specified above.
National ID number of mother and/or father	Parents The national ID cards of the mother and father	Required for statistical and health purposes. Unique national ID numbers permit digital linking of the registers maintained by various maternal and child care programmes (via a link variable).	Most countries assign some form of unique identifier to their adult population at birth, usually a national ID number. In terms of a suitable link variable, it may be sufficient to just have the mother's ID number.
National ID number/birth ID number of the child	In countries where this is provided to the child immediately after registration, the national ID number will be available from the child's national ID card and in some cases will be included on the birth certificate Birth ID number of the child will be available from the birth certificate	Required for statistical and health purposes. A unique number, a national ID or a birth ID allows digital linking of registers maintained by the various child care programmes and provides a means of tracking a child even when they move to another location to ensure provision of a continuum of care offered by RMNCH programmes.	Not all countries allocate a national ID number to an individual on registration of a birth. However, for every birth that is registered, a birth ID is provided. The birth ID will be unique if it is generated centrally, which is possible only when the birth registration database is centralized and local registration centres are linked to this central database in real time. If a child has not been registered even by the time of the first immunizations neither the national nor the birth ID number will be available. In such cases, it may be advisable to use the registration number given to the child in the delivery care register.
Birth weight[a]	Maternity ward delivery register (in case of health facility birth) Community health worker records (in case of home births and assuming community health worker is responsible for weighing the child after birth)	Required for statistical purposes. Birth weight is used in the analysis of infant mortality and child health; statistics on birth weight cross-classified by mother's age and level of educational attainment inform health policies and programmes aimed at subpopulation groups in need of pre- and postnatal care.	Birth weight should be recorded immediately after birth, ideally within the first hour of life, before significant postnatal weight loss has occurred. The weight recorded should be expressed in units prevalent in the country (kilograms and grams, or pounds and ounces) and to a standard degree of accuracy. Exact weights should be recorded, not ranges.

Table A2.4 Information collection by maternal and child health programmes – purpose and application to birth notification and CRVS systems continued

Data items	Source	Purpose(s)	Additional comments
Gestational age[a]	Maternity ward delivery register (in case of health facility birth) Community health worker or parents (in case of home births)	Required for statistical purposes. Gestational age is used in the analysis of infant mortality and child health; statistics on gestational age cross-classified by mother's age and level of educational attainment inform health policies and programmes aimed at subpopulation groups in need of pre- and postnatal care.	Gestational age should be recorded as completed weeks of gestation (which can be aggregated into groups for statistical reporting). Gestational age at time of birth is calculated from information about the onset of the last menstrual period and results of ultrasound scans if available. It is important to collect information on gestational age as preterm birth is associated with an increased risk of health and developmental problems during infancy and is highly correlated with infant mortality.
Parity[a]	Mother or medical records	Required for statistical purposes. As parity is strongly associated with fertility level, as well as birth outcomes and infant mortality, data on parity is used to inform and develop targeted health policies and programmes.	Parity refers to the number of times a woman is or has been pregnant and carried the pregnancies to a viable gestational age (i.e. including live births and stillbirths over a given gestational age threshold).
Multiple births	Maternity ward delivery register (in case of health facility births) Parents (in case of home births)	Required for statistical purposes. Statistical information on multiple births is used in the analysis of trends of single, twin, triplet or higher-order births over time. It is also used to assess the impact of multiple births on maternal and infant outcomes.	Each live-born infant or stillbirth should be characterized as being either a single, twin, triplet or higher order birth. In the event of multiple births, each birth should be notified and registered separately. In the event of multiple births, the infant's birth order (with respect to its newborn siblings) should be specified.
Type of attendance at the delivery[a]	Maternity ward delivery register (in the case of health facility births) Parents (in the case of home births)	Required for statistical purposes. Data on birth attendants provides useful information on the utilization of medical care facilities and resources. Statistics on numbers of live births by site of delivery and type of attendant at birth are of great use in evaluating the need for medical services and for providing insight into patterns of infant mortality.	For recording purpose, birth attendants can be classified as: (a) doctor; (b) nurse; (c) nurse-midwife; (d) midwife; (e) other paramedical personnel; (f) layperson; or (g) "not stated". Some countries divide the midwife category into "trained midwife" or "untrained midwife".
Mode of delivery[a]	Maternity ward delivery register (in the case of health facility births) Parents (in the case of home births)	Required for statistical purposes. Mode of delivery data provides useful information on the availability and quality of maternity care and on the types of delivery problems encountered. Analysis of mode of delivery data reveals if there is a high incidence of complicated deliveries, for example, obstructed labour.	The main modes of delivery are "CVD" (i.e. a cephalic vaginal delivery or normal delivery); "assisted vaginal delivery" (if vacuum and/or forceps were used); "caesarean" (if caesarean or C-section was used).
Date of birth of mother/father or age of mother/ father at the time of birth	Parents, or parents' national ID cards	Required for statistical purposes. Age of mother at birth is used in the calculation of age-specific fertility rates. Age-standardized rates are more useful when making comparisons with other populations as the comparisons are not then affected by the differences in the age composition between the populations being compared.	Information on the date of birth of both parents (or age of mother and father at time of birth) is usually categorized into 5-year age groups for those aged between 15 and 49 years, with terminal groups of "under 15 years" and "50 years and over".

Table A2.4 Information collection by maternal and child health programmes – purpose and application to birth notification and CRVS systems continued

Data items	Source	Purpose(s)	Additional comments
HIV status of mother	Mother or medical records	Required for statistical and health purposes. Information on the mother's HIV status facilitates the onward referral of both mother and infant for appropriate follow-up care, in particular, prevention of mother-to-child transmission of HIV programmes.	HIV status is generally recorded as either "HIV-positive"; "HIV-negative"; "not tested"; or "unknown". Treatment status, such as "mother on antiretroviral therapy (HAART)"; "mother received antiretroviral prophylaxis (AZT or NVP)" may also be recorded.
Mobile phone number of parents	Parents	Required for logistical purposes. Mobile phones may be used to send SMS reminders to both or either parent about an upcoming appointment, or to send details of how, where and when to register the birth of their child.	The mobile phone is proving to be a very useful way of delivering a wide range of electronic and real-time health-related services. The mobile phone number can also serve as a link variable across various health and administrative registers. A major drawback of reliance on mobile phone technology is that people sometimes change their mobile numbers when they migrate or switch to a different service provider. However, this problem is receding as options for phone number portability and retention increase.

Note:
[a] Core data item also collected for stillbirth registration.

ANNEX 3: RECOMMENDED SET OF PERINATAL STATISTICS AND INDICATORS

This annex outlines some of the key perinatal statistics and indicators that should be produced and reported as part of any CRVS system. Recommended tabulations of data on live births (and stillbirths), disaggregated by sex of the child, age of mother at the time of the birth, and birth weight are shown in Tables A3.1–A3.3. Table A3.4 lists the core set of perinatal indicators required to support policy-making and to chart progress towards development goals. This table also shows how these indicators can be calculated using data collected by civil registration systems.

Table A3.1 Number of live births, by sex of child and by age of mother

Age of mother at birth (years)	Both sexes Number (% of total)	Male Number (% of total)	Female Number (% of total)	Sex ratio at birth (Number of boys per 100 girls)
All ages				
< 15 years				
15–19 years				
20–24 years				
25–29 years				
30–34 years				
35–39 years				
40–44 years				
45–49 years				
≥ 50 years				

Table A3.2 Number of stillbirths, by sex of child and by age of mother

Age of mother at birth (years)	Both sexes Number (% of total)	Male Number (% of total)	Female Number (% of total)	Sex ratio at birth (Number of boys per 100 girls)
All ages				
< 15 years				
15–19 years				
20–24 years				
25–29 years				
30–34 years				
35–39 years				
40–44 years				
45–49 years				
≥ 50 years				

Table A3.3 Number of live births, by sex and birth weight

Birth weight (g)	Both sexes Number (% of total)	Male Number (% of total)	Female Number (% of total)
< 1000			
1000–1499			
1500–1999			
2000–2499			
2500–2999			
3000–3499			
3500–3999			
≥ 4000			
Low birth weight (< 2500 g)			
Eligible for KMC (< 2000 g)[a]			

Note:
[a] WHO (2003). Kangaroo mother care: a practical guide. Geneva: World Health Organization (https://www.who.int/maternal_child_adolescent/documents/9241590351/en/, accessed 29 November 2020).

Table A3.4 Key perinatal mortality indicators

Indicator	Formula for calculation
Stillbirth rate	(C/A)*1000
Percentage of stillbirths that are intrapartum	(D/C)*100
Percentage of stillbirths that are antepartum	(E/C)*100
Early neonatal mortality rate	(F/B)*1000
Neonatal mortality rate	(G/B)*1000
Perinatal mortality rate	((C+F)/A)*1000
Maternal mortality ratio	(H/B)*100 000
Caesarean section rate (all births)	(I/A)*100
Assisted birth rate (all births)	(J/A)*100
Low birth weight rate (live births)	(K/B)*100
Preterm birth rate (live births)	(L/B)*100

Notes:
A Number of total births (live births plus stillbirths);
B Number of live births;
C Number of stillbirths;
D Number of intrapartum stillbirths;
E Number of antepartum stillbirths;
F Number of early neonatal deaths (0–6 completed days of life);
G Number of neonatal deaths (0–27 completed days of life);
H Number of maternal deaths;
I Number of caesarean section births (live births plus stillbirths);
J Number of assisted births (live births plus stillbirths) (forceps, vacuum);
K Number of low birth weight births (live births weighing less than 2500 g);
L Number of preterm births (live births born at less than 37 weeks' gestational age).

The definition of a stillbirth (or late fetal death) may vary between countries and even between health care facilities within a country, and should be specified.

* multiplied by;
/ divided by.

Source: WHO (2016b). Making every baby count: audit and review of stillbirths and neonatal deaths. Geneva: World Health Organization (https://www.who.int/docs/default-source/mca-documents/maternal-nb/making-every-baby-count.pdf?Status=Master&sfvrsn=6936f980_2, accessed 29 November 2020).

ANNEX 4: MINIMUM INFORMATION NEEDED TO NOTIFY A DEATH

Data items below are based on *Handbook on civil registration and vital statistics systems* (UNSD, 2018, p 20) core topics for death registration.

Table A4.1 Minimum information needed to complete a death notification form – decedent

Data item	Definition/description	Rationale
Name	Full name, as written in an official document such as an ID card or passport	Specifying the full name of the deceased individual will help to ensure that the notification refers to the right individual, especially in settings where family names are similar across many members of the community
ID number (if available)	National ID number If national ID number is unknown or unavailable any other official identity number, such as health ID number, could be provided	Helps to confirm identity and enables data sharing with other designated agencies
Date of birth (if available)	Day, month and year of birth If exact date of birth is unknown, age in years should be provided	Provides an additional check on identity Key to generating reliable mortality statistics
Date of death	Day, month and year of death	Key to generating reliable mortality statistics
Sex	Male or female	Key to generating reliable mortality statistics
Type of place of occurrence (hospital, home, work, other)	Home, place of work or "other"	Required for statistical purposes
Address (if known)	Place of usual residence In the case of a child death, place of usual residence of the mother and/or father	Provides an additional check on identity
Nationality (citizenship)		For establishing citizenship and legal purposes
Marital/civil status	Single, married, civil union, separated/divorced, widowed	Required for legal and statistical purposes

Table A4.2 Minimum information needed to complete a death notification form – declarant or informant

Data item	Definition/description	Rationale
Name	Full name, as written in an official document such as an ID card or passport	Enables subsequent follow up if necessary
Relationship to decedent	Spouse, parent, child, neighbour, health agent, police or "other"	Enables subsequent follow up if necessary
Contact details	Address and mobile phone number	Enables subsequent follow up if necessary

Table A4.3 Minimum information needed to complete a death notification form – official issuing the notification form

Data item	Definition/description	Rationale
Name	Full name, as written in an official document such as an ID card or passport	Permits follow up if required
Personal ID number	Unique identification of the official issuing the notification form	Permits follow up if required
Official position	Community leader, funeral director, health functionary or agent	Confirms legal authority to issue notification form and/or burial permit
Type of cause of death certification and certifier of the cause of death	Name and position of doctor signing the MCCD	Ensures link to the MCCD form
Manner of death	Natural or non-natural	If death is not due to disease but due to external causes such as an injury it may be necessary to commence an inquiry by the police or judicial authorities
Contact details	Address and telephone number	Permits follow up if required
Official stamp, signature and date		Confirms official status of the notification form

ANNEX 5: USE OF HEALTH REGISTERS TO SUPPORT REGISTRATION OF MATERNAL, FETAL AND NEONATAL DEATHS

Event	Register	Items of information	Opportunities for facilitating death registration	Link variable(s)
Pregnancy	Antenatal care register	Expected date of delivery Mother's name, national ID number, date of birth, mobile phone number, address and/or location of usual residence Father's name, national ID number and date of birth Pregnancy outcome and gestational age (if reported)	Knowing the expected date of birth Raising awareness of the need for death registration	Mother's national ID number and/or name
Maternal, neonatal or fetal death	Delivery register	Date of death Name of decedent (in case of maternal death) Sex of decedent (in case of stillbirth or early neonatal death prior to discharge) Date of delivery and age of mother (in case of maternal death)	Facilitate declaration of stillbirths, early neonatal deaths or maternal deaths through notification of the circumstances of the death to the civil registrar	Mother's national ID and/or name Infant's birth registration status Surviving child's national ID number and/or name
Fetal death/ stillbirth	Delivery register Perinatal death surveillance and response programme	Date of death Mother's ID and name Sex of fetus Birth weight and gestational age of fetus[a] Cause of stillbirth and associated maternal conditions	Notification of fetal death/ stillbirth to the civil registrar	Mother's national ID number and/ or name
Neonatal death	Infant death register Perinatal death surveillance and response programme	Date of death Sex and age of infant (in days) Cause of death Mother's ID and name	Notification of neonatal death to the civil registrar	Mother's national ID number and name
Maternal/ pregnancy-related death	Maternal death surveillance and response programme	Date of death Name and age of mother Cause of death (if available from case-based reporting forms)	Notification of maternal/ pregnancy-related deaths to the civil registrar	Mother's national ID number and/ or name Surviving child's ID number and/ or infant name Linkage possible to the live birth or fetal death register

Event	Register	Items of information	Opportunities for facilitating death registration	Link variable(s)
Immunization	EPI register	Date of birth Name and sex of child A missed immunization might prompt inquiry into whereabouts about of child and thus to prompt a death notification	Facilitate declaration of death through notification Capture of late/delayed death registration	Mother's national ID and/or name Child's national ID or birth ID number and/or name
Deaths in children under 5 years of age	Child health monitoring registers	Date of death Name, sex and age Cause of death	Notification of child deaths (deaths in the under 5s) to the civil registrar	Mother's national ID number and/or name Child's national ID number and/or name

Notes: EPI – Expanded Programme on Immunization; [a] If reporting thresholds are met.

ANNEX 6: SOURCES OF INFORMATION TO INFORM DEATH REGISTRATION

Data item	Sources	Purpose	Additional comments
Name	Hospital admission/ discharge register Medical records Next of kin	Required for legal purposes only. This information is included in the death certificate.	Facilitates matching of the death record to a birth record and annotation as "deceased" in order to prevent fraud and identity theft.
Personal identification (ID) number	Hospital admission/ discharge register Medical records ID document Next of kin	Required for legal purposes only. Facilitates linkage to a death registration/ certificate and to other health and administrative registers.	Enables an individual's identity to be "closed" and removed from identity from all linked health and administrative registers.
Sex	Hospital admission/ discharge register Medical records ID document Next of kin	Required for legal, statistical and health purposes. This information is included in the death register and the death certificate.	This information is used to compile death and mortality statistics disaggregated by sex. It is also used to compile statistics on the sex ratio at death and to study gender bias in registration.
Date of birth	Hospital admission/ discharge register Medical records ID document Next of kin	Required for legal, statistical and health purposes. This information is included in the death register and the death certificate.	This information is used to compile death and mortality statistics disaggregated by age group. Accurate information on exact age important for the analysis of mortality and cause-of-death statistics.
Place of birth	Next of kin ID document Civil registration records	Required for legal purposes only. This information is included in the death register.	Facilitates matching of the death record to a birth record and annotation as "deceased" in order to prevent fraud and identity theft.
Age at death in years	Hospital admission/ discharge register Medical records ID document Next of kin	Required for legal, statistical and health purposes.	This information is likely to be less accurate than date of birth for calculating age at death.
Place of occurrence (address)	Hospital admission/ discharge register Next of kin Mortuary register	Required for legal and statistical purposes. This information is included in the death register and the death certificate. This information may be used if there is a need for a medico-legal investigation.	This information is used to compile mortality statistics by geographic location.
Location of occurrence (hospital, home, place of work, etc.)	Next of kin Mortuary register	Required for statistical and health purposes.	This information is used to compile mortality statistics by place of occurrence. It also enables the health sector to monitor what proportion of all deaths occurs in health facilities.

Data item	Sources	Purpose	Additional comments
Place of usual residence (of the mother if an infant death)	Hospital admission/ discharge register Civil registration records Next of kin	Required for legal and statistical purposes. Permits linkage to the individual in a population register which is usually maintained by place of usual residence.	It is important to record details of the decedent's usual place of residence in cases where the death occurred outside of the place of usual residence, for example in a referral hospital. This information is useful for purposes of studying the geographical distribution of deaths by place of usual residence. Death rates and are normally produced by the place of usual residence as well as by place of occurrence.
Marital status	Next of kin Civil registration records	Required for legal purposes only.	Permits surviving family members to claim insurance and other widow(er) entitlements.
Nationality/ ethnic group or citizenship	Next of kin	Required for statistical purposes. Information pertaining to nationality and ethnicity must be used in a non-discriminatory manner.	Analysis of patterns of mortality by ethnicity may highlight important disparities between groups.
Causes of death (as determined by the MCCD)	MCCD Judicial or police inquiry	Required for statistical and health purposes. Information on cause of death is treated as confidential in some settings and should not be included in the death certificate unless required by law.	Used for tracking levels and causes of deaths by key stratifiers including age, sex, geographic location.
HIV/AIDS, TB and malaria status	Patient management register Hospital admission register Hospital discharge register Hospital death register	Required for statistical and health purposes.	
Deaths due to notifiable conditions under the International Health Regulations	IHR disease register Hospital register Case-based reporting forms	Required for statistical and health purposes.	Notifiable diseases include polio, H1N1 influenza, SARS, cholera, pneumonic plague, yellow fever, Ebola and Zika.
Cancers	Cancer registry Hospital admission register Hospital discharge register Patient management register Hospital death register	Required for statistical and health purposes.	
Road traffic accidents	Mortuary register Hospital death register Police records	Required for statistical and health purposes.	

ANNEX 7: RECOMMENDED CORE SET OF MORTALITY STATISTICS AND INDICATORS

Table A7.1 Deaths by age and sex

Age of decedent (years)	Sex of decedent			Total number of deaths
	Male	Female	Not stated	
< 1				
1–4				
5–9				
10–14				
15–19				
20–24				
25–29				
30–34				
35–39				
40–44				
45–49				
50–54				
55–59				
60–64				
65–69				
70–74				
75–79				
80–84				
85+				
Not stated				

Table A7.2 Deaths by place of usual residence and sex

Place of usual residence of decedent	Sex of decedent			Total number of deaths
	Male	Female	Not stated/unknown	
All deaths				
Urban				
Rural				
Place 1				
Place 2				
Place 3				
Place 4				
Place ...				
Total				

Table A7.3 Deaths by place and type of place of occurrence

Type of place of occurence	Type of place of occurrence					Total number of deaths
	Hospital	Other institution	Home	Other	Not stated	
All deaths						
Urban						
Rural						
Place 1						
Place 2						
Place 3						
Place 4						
Place ...						
Total						

Table A7.4 Deaths by month of occurrence and sex

Month of occurence	Total	Male	Female
January			
February			
March			
April			
May			
June			
July			
August			
September			
October			
November			
December			
Total			

Table A7.5 Key mortality indicators

Indicator	Formula for calculation
Infant mortality rate	(B/E)*1000
Under 5 mortality rate	(C/E)*1000
Maternal mortality ratio	(D/E)*100 000
Crude death rate	(A/F)*1000
Age- and sex-specific death rate	(Number of deaths in a specific age group/Total population in the same age group)* 100 000, separately for male and female

Notes:
A Total number of deaths;
B Number of deaths of infants less than 1 year of age;
C Number of deaths in children under 5 years of age;
D Number of maternal deaths;
E Number of live births;
F Mid-year population;
* multiplied by;
/ divided by.

Note: Probabilities of dying for infant and under-5 age groups may also be calculated with standard life table approaches.

ANNEX 8: ANALYSIS OF CAUSE-OF-DEATH DATA

Groups of causes of death in a population follow a predictable age pattern that has been identified from decades of epidemiological research. Fig. A8.1 shows a commonly found pattern of distribution of causes of death by age in settings with relatively high life expectancy. The proportion of deaths due to **Group I** causes (i.e. communicable diseases, maternal, perinatal and nutritional conditions) is high among children but declines thereafter to very low levels although it may rise again at older ages (above 80 years or thereabouts) due to pneumonia. The proportion of deaths due to **Group II** causes (i.e. noncommunicable diseases) is relatively high in children (due to, for example, congenital anomalies), declines in adulthood, but rises significantly at older ages due to the increasing incidence of cancers and cardiovascular diseases and stroke. The proportion of deaths due to **Group III** causes (i.e. external causes of death including accidents and violence) is generally highest in young adulthood. This pattern is especially marked among males.

This is a typical cause-of-death pattern by age and would not necessarily be replicated exactly in every country. However, significant departures from this pattern should be closely investigated as they are suggestive of problems such as poor medical certification of the cause of death and coding practices and age-misreporting of deaths.

Fig. A8.1 Distribution of broad cause of death (Groups I, II and III), by age group

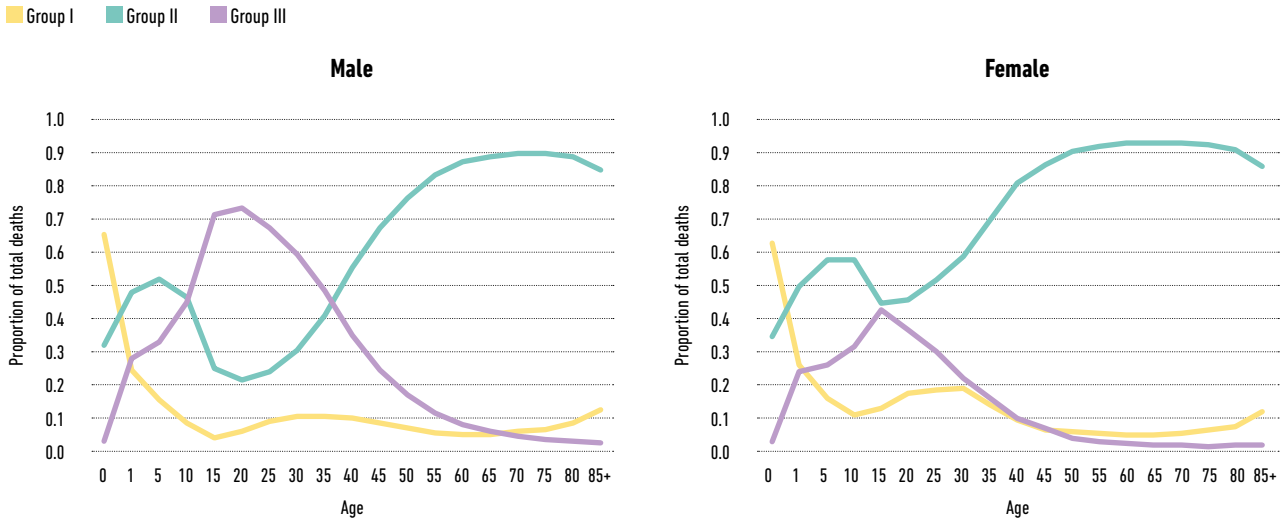
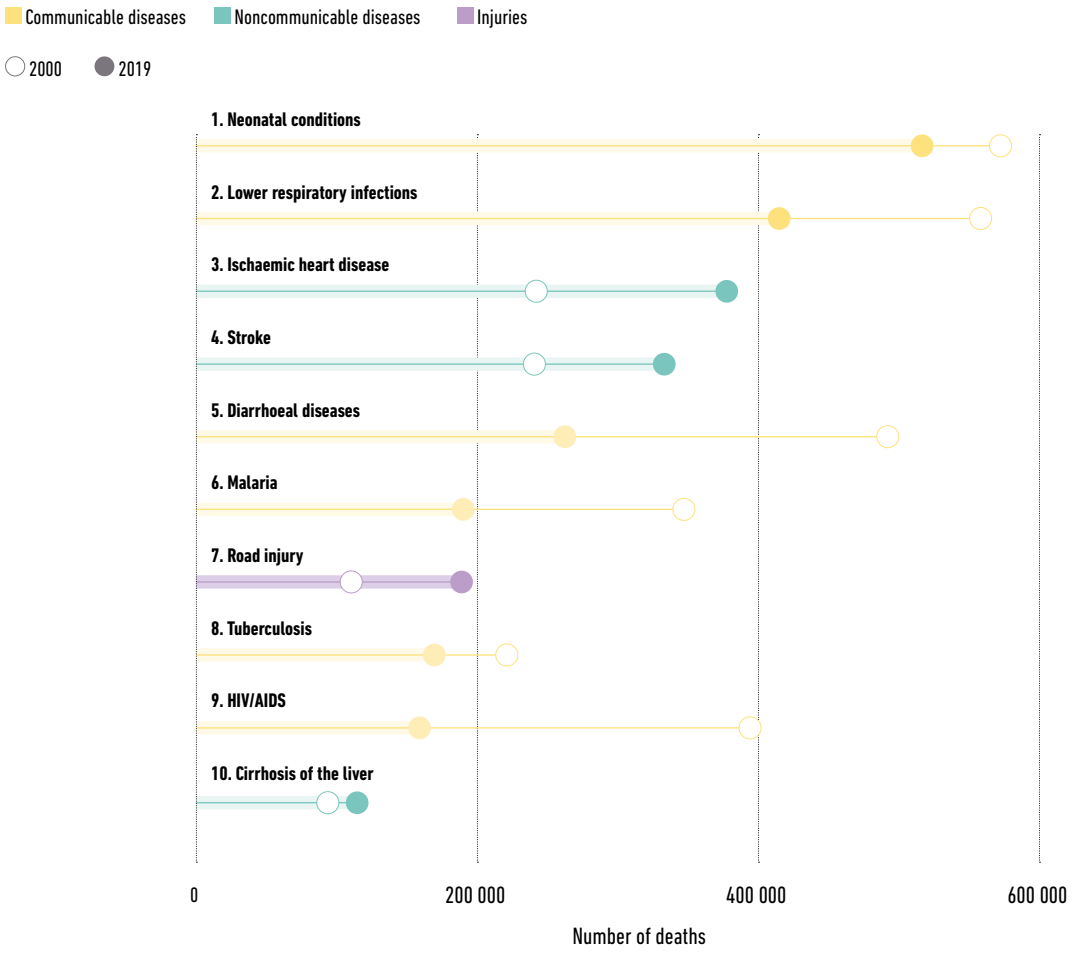


Fig. A8.2 Top 10 causes of death, low-income countries, 2000 and 2019



Source: WHO (2020). Global health estimates 2019: deaths by cause, age, sex, by country and by region, 2000–2019. Geneva: World Health Organization (https://www.who.int/news-room/fact-sheets/detail/the-top-10-causes-of-death, accessed 14 December 2020).

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