Guidelines and Template for Developing a Vital Statistics Report

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This document contains two parts:

- **Part One: Guidelines** that explain how the template may be used and that provide support when writing a vital statistics report. The guidelines form the introductory part of this document as well as guidance boxes throughout the template. All guidance information has a blue or green background to make it easier to separate from the template.
- **Part Two: A template outline for a vital statistics report** with specifications on what should be included. This part is also available in Word format to make it easier to use.

Part One: Guidelines

The guidelines in Part One of this document contains an introductory part with general information, such as purpose and how to use the guidelines and the template.

The Table of content for tables, boxes, figures and graphs below specify where the guidelines information can be found.

For information about the template, see the Table of content for the template in Part Two of the document.

Table of content for the GUIDELINES

Guideline boxes

Guideline tables, figures and maps

Here we present only tables, figures and maps which are meant for general guidance. An overview of template tables can be found in Part Two (the template).

Acknowledgements

Abbreviations and Acronyms

CBR	Crude Birth Rate
CDC	Centre for Disease Control
CDR	Crude Death Rate
CoD	Cause of Death
CR	Civil Registration
CRO	Civil Registration Office
CRS	Civil Registration System
CRVS	Civil Registration and Vital Statistics
DHS	Demography and Health Survey
ECA	(United Nations) Economic Commission for Africa
ESCAP	(United Nations) Economic and Social Commission for Asia and the Pacific
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
MICS	Multiple Indicator Cluster Survey
MOH	Ministry of Health
NSDS	National Strategy for Development of Statistics
NSO	National Statistical Office
P&R	Principles and Recommendations for a Vital Statistics System, Revision 3, United Nations, 2014
SDG	Sustainable Development Goal
TFR	Total Fertility Rate
UN	United Nations
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
UNSC	United Nations Statistical Commission
UNSD	United Nations Statistics Division
VS	Vital Statistics
VSR	Vital Statistics Report
WHO	World Health Organization

A.   Purpose

The purpose of this document is to serve as a guidance tool for producing vital statistics reports (VSR) from civil registration systems. It is intended especially for countries that have little or no prior experience with preparing such vital statistics reports. The tool may also serve as a standardized approach for continental and international reporting. The tool has two parts:

- Part One: Guidelines that explain how the template may be used and that provide support when writing a vital statistics report.
- Part Two: A template outline for a vital statistics report with specifications on what should be included.

B.   Rationale

This guideline and template was prepared by Statistics Norway at the request of the United Nations Economic Commission for Africa (ECA) and the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP). Both of these organizations have in recent years established programmes to strengthen Civil Registration and Vital Statistics Systems (CRVS) in the countries in their respective regions.

The Africa Programme on Accelerated Improvement of Civil Registration and Vital Statistics (APAI-CRVS) was launched in 2012[1]. African Ministers responsible for Civil Registration during their third conference held in February, 2015, declared that *"we commit to analyse and disseminate statistics from civil registration regardless of the level of completeness as a means to establish the state of the system and its development.*[2] This template has been prepared to support countries in the realization of this goal.

ESCAP launched the 'Get Every One in the Picture" initiative in Asia and the Pacific region in 2014, as well as the Regional Action Framework on Civil Registration and Vital Statistics in Asia and the Pacific. The Asia Pacific CRVS Decade (2015–2024) was endorsed by 62 countries in 2014.[3] The CRVS initiative in the ESCAP region prioritizes the production of vital statistics from civil registration systems.[4]

In line with the recent efforts to coordinate improvement of civil registration and vital statistics in the ECA and ESCAP regions and in an effort to establish a standardized model, Statistics Norway was approached with a request to develop a template for a vital statistics report and guidelines to be followed when preparing a vital statistics report. The current document is a first version of this. Further versions will incorporate the experiences of various countries.

C.   Target audience and important considerations

This guideline and template is for use by national authorities responsible for the production of vital statistics based on civil registration information, primarily in developing countries with little

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[1] http://www.uneca.org/sites/default/files/images/apai_crvs_23-august-final-formatted.pdf.
[2] http://www.uneca.org/sites/default/files/uploaded-documents/Statistics/CRMC3/crmc3-final_resolution_third_ministerial_conference_on_crvs_en.pdf
[3] http://www.unescap.org/our-work/statistics/civil-registration-and-vital-statistics/about
[4] http://www.unescap.org/resources/guidelines-setting-and-monitoring-goals-and-targets-regional-action-framework-civil-0

experience in this area. These authorities vary from country to country depending on the institutional responsibilities provided by the country's legal framework for civil registration and vital statistics, as well as its existing administrative and organizational structures. In most countries, responsibility for the production of a VSR rests with the national statistics office (NSO). In some countries, the civil registration office (CRO) produces statistics pertaining to birth and death events, while in others the Ministry of Health is responsible for the production of statistics on deaths and cause of death (CoD). Irrespective of the model adopted, it is indispensable that all involved agencies collaborate in the production of the national VSR.

A major challenge when preparing this template and guidelines document was that the CRVS systems vary tremendously between countries, from practically non-existent to well-functioning systems. Thus, it is difficult to make a template that suits all countries. Certainly, the responsible authorities need to adjust their VSRs to the context of their CRVS systems and the conditions in their own countries.

As there are numerous detailed manuals and recommendations on vital statistics, this template and guide is mainly meant for countries with limited data availability and resources. More advanced options have also been included for countries where this is feasible.

D.   Link with other activities

The quality and reliability of national vital statistics depend on the principles and the processes followed in the production of these statistics. Moreover, it is critical that these statistics respond to the needs and meet the demands of potential users and stakeholders. Therefore, before writing the first VSR, it is useful to involve other parties. Some options are:

- Conduct a vital statistics stakeholder analysis which identifies the most important national and international users of the vital statistics and their needs.
- Conduct a rapid and/or comprehensive assessment of the vital statistics system. As part of this investigation, the data requirements of the different users and stakeholders should be identified.
- Assess the compliance of existing national VSRs with international standards in terms of content and completeness.

Another important activity is to align the vital statistics reporting with the national strategy for development of statistics (NSDS) or similar. This will ensure that the VSR is an institutionalized process that is sufficiently planned and resourced. A separate action plan for vital statistics production, outlining activities and their timing, the responsible parties, as well as the resources required, is also beneficial. However, a thorough assessment is not necessary every time a VSR is written.

All these activities should be considered not only for preparing a VSR but also for supporting the work of building and improving the vital statistics system.

Thus, other references that provide additional support and guidance should also be used, namely:

- The United Nations Principles and Recommendations for a Vital Statistics System - Revision 3 (2014), available from http://unstats.un.org/unsd/demographic/standmeth/principles/M19Rev3en.pdf.

- Handbook on Civil Registration and Vital Statistics Systems: Management, Operation, and Maintenance (1998), and other related handbooks on this, available from http://unstats.un.org/unsd/demographic/standmeth/handbooks/default.htm.
- Strengthening civil registration and vital statistics for births, deaths and causes of death Resource Kit (2013), available from http://www.uq.edu.au/hishub/docs/Resource%20Kit/CRVS_ResourceKIt_active_content.pdf
- WHO (2010a): Improving the quality and use of birth, death and cause-of-death information: Guidance for a standards-based review of country practices. Geneva, available from http://www.uq.edu.au/hishub/docs/WP01/WP_01.pdf.
- Centers for Disease Control and Prevention, International Statistics Program (2015): Training Course on Civil Registration and Vital Statistics Systems, available from http://www.cdc.gov/nchs/isp/isp_fetp.htm.
- An extensive library of resources related to civil registration and vital statistics can be found at www.getinthepicture.org/resources

E. Initial focus on key vital events

The current template initially focuses on civil registration and statistics of two vital events, namely live births and deaths. This is in line with the recommendations of the United Nations (2014) that "top priority should be given to live births and to deaths because they are basic to the assessment of population growth as well as the health of the population."

Although the major data source for the VSR outlined here is civil registration of births and deaths, other data sources are required in most countries to obtain estimates of rates and indicators, such as birth and death rates. To find these rates a figure for the total population is needed. This may in most countries be obtained independently from population censuses, population registers, sample surveys and intercensal estimation procedures (United Nations, 2014). With this information, data disaggregated by age, sex, marital status, geographical location or other socio-economic characteristics can be obtained.

In this first version of the current template, the focus chosen is on births and deaths and there is therefore less material on marriages and divorces, adoptions, legitimations, foetal deaths and marriage annulments.

Information about causes of death (COD) is often included in death registration forms and this is important for monitoring and planning the health sector of a country. The recent epidemic of the Ebola virus disease in West Africa as well as the recently endorsed Sustainable Development Goals (SDGs) have underlined the significance and need to prioritize proper CoD records and statistics. CoD statistics are, however, only briefly touched upon in this document. CoD is a complicated topic on which few developing countries have good data. A separate guide on this may be developed at a later stage.

It is intended that a revised version of this document will be published after a few years. The new version will be an improvement of the present draft, based on the experiences of countries that have used it and it may also be expanded in scope to elaborate on other events.

Internal and external migrations are not considered vital events by the United Nations. These events are nonetheless very important, both in peoples' lives and for the population development of a country. We encourage the inclusion of statistics on such events if such data are available, of sufficient quality, and the country has the resources to evaluate and process them properly. This is in line with the recommendations of United Nations (2014) that "the aim must be to achieve centralized and peripheral coordination among the civil registration system, the vital statistics system, the general statistical service, population and migration statistical services, health statistics services, etc." Migration will not be covered as a specific topic in the current version of this template.

Recording migrations is particularly important for updating a comprehensive population register. Otherwise a population register cannot be used to make statistics of the population by age, sex, location and other essential variables. See also Box 7 on Civil Registration and Population Registers.

F.   Reasons for publishing a Vital Statistics Report

1.   National planning

"Vital statistics are used to produce the fundamental demographic and epidemiological measures that are needed in national planning across multiple sectors such as education, labour and health. Birth and death information from civil registration is also critical for a wide range of government activities (e.g. the construction of population registers and other administrative registers) and in commercial enterprises (e.g. life insurance, and marketing of products). In the health sector, vital statistics form the core of a country's health information system (WHO, 2010b).

The most important reason for developing and publishing a VSR is the needs of the public, the Government, civil society and the international community for data on births and deaths and essential indicators derived from these. Such information is important for monitoring time trends in the country and to study regional variation. Are there, for example, subnational areas with particularly high death rates? Is the birth rate declining or not?

The production and availability of a VSR is a key step towards stimulating and guiding civil registration improvements. For example, regional completeness data will visualize which regions are in most need of improvement. Putting the vital statistic into the public domain provides a demonstration of transparency and openness to scrutiny. On the other hand, it also exposes possible errors and omissions in the available data. However, this can have positive repercussions. By identification of errors in the data, civil registrars and other officials engaged in the collection of civil events information may be stimulated to produce more reliable and accurate registers. At the national level, vital statistics that reflect the inadequate state of the civil registration may stimulate the Government to increase investments for improving the system. Generally, a report is a good opportunity to learn from experience. In this regard, it is recommended that all countries produce an annual VSR even if a relatively low number of vital events are registered.

Moreover, civil registration data also have other potential areas of use, such as establishing school districts and planning regional and local school capacity. Further use includes planning of health and social services. Civil registration data are essential for updating a population register, which may be used as a basis for identifying persons eligible to vote, that is, for establishing electoral rolls. This is a cost-effective use of government funds and may significantly reduce the costs of holding elections. Population registers are discussed in Box 7.

2. Sustainable development goals

The Sustainable Development Goals (SDGs) replace the Millennium Development Goals (MDGs), which were adopted in 2000 for the period 2000–2015. Within the SDGs, CRVS is:

- a target in its own right (Goal 16, target 16.9: By 2030, provide legal identity for all, including birth registration);
- necessary for monitoring key outcome indicators (such as maternal mortality and non-communicable disease related deaths);
- a key strategy for effecting progress in others (such as social inclusion and access to education).

There are 17 SDGs with 169 associated targets and over 230 global indicators, which were endorsed by the United Nations Statistical Commission in March 2016. See http://www.un.org/sustainabledevelopment/blog/2016/03/un-statistical-commission-endorses-global-indicator-framework/.

The indicator "3.7.2 Adolescent birth rate (aged 10-14 years, aged 15-19 years) per 1,000 women in that group" is a concrete example showing that data from civil registration will be the best source of information both for the birth rate and number of woman in the age group, if the CRVS system functions sufficiently well. Many of the indicators are measured as shares of the total (target) population. These figures will also be more accurate if data are taken from an updated and good quality CRVS system. Another concrete example is the targets under Goal 4 on education and Goal 5 on gender equality which will require continuous updating of vital statistics and population figures in order to calculate participation rates and measure different forms of gender inequality.

In general, a substantial number of the indicators on sustainable development require information on the size of the total population or on specific population groups as a denominator. Without accurate, regular and complete vital statistics produced from civil registration it is not possible to develop reliable population estimates, especially not for subnational levels. In fact, it has been reported that over 40 per cent of all SDG statistics could be completely or partly calculated using data originating from a well-functioning CRVS system. See http://unstats.un.org/sdgs/.

G. How to use this document

This document is meant to be a template and guide for writing a VSR based on data provided by a civil registration system. The Table of Contents in the Template (Part Two) specifies the priority areas that should be covered in a VSR.

- In each chapter, the template specifies the areas that should be covered, often with a supplementary comment or specification to make it easier to write about each country. A simple way of doing this is to use the chapters directly to fill in the country specifics. This is why this template will also be available as an electronic Word file on the websites on CRVS of ECA and ESCAP (www.apai-crvs.org and www.getinthepicture.org). List of the essential tables and figures that should be included in a VSR are shown at the beginning of the template. The tables and figures to be included in a real VSR will depend on the availability of data and the needs identified in the specific country.
- There are many boxes in Part Two (the template) providing background information on how to develop and write a VSR. The boxes are meant as additional input, some of them providing examples. They are not part of the template as such and are, unless relevant, not meant to be included in the country VSR.

To make them easier to use, the boxes have been colour coded to identify the different purposes. The codes are as follows:

- Blue boxes: Guidance on how to use the document, as well as thoughts and suggestions from the authors
- Green boxes: Country examples and extracts from recommendations in the United Nations Principles and Recommendations for a Vital Statistics System: Version 3 (United Nations, 2014)

Several documents were consulted during the development of this template and guide, in particular the United Nations 2014 *Principles and Recommendations*. This is a comprehensive international guide providing detailed background information that is useful when preparing a VSR. We also consulted handbooks on CRVS published by the United Nations in the past (1998–2002), several reports from World Health Organization (WHO), and the Center for Disease Control (CDC) training course, listed in the references. These handbooks and reports also provide detailed background information for consideration when preparing a VSR.

Reference is made to VSRs from a few countries, in particular, Botswana, India, Kenya and South Africa. References to these reports can be found in the reference list at the end.

Part two:
Vital statistics report template

The following sections present the actual proposed content of a VSR. The table of contents presented can serve as a comprehensive model and gives an overview of the topics that should be included. In the different chapters, the text in this template touches upon the relevant areas which should be covered if data are available. Additional guidance including definitions and explanatory notes can be found in the text boxes.

Preface

A preface is usually a short introduction to the report, why and for whom it is prepared, and who contributed. It may be signed by a high ranking officer, such as the Minister or Permanent Secretary of the Ministry under which the main contributing institution is placed, the Director General of the main contributing institution, and/or the head of the department writing the report, depending on the traditions of the institutions in the country.

Acknowledgements

All parties who have contributed to the VSR should be mentioned here. This includes those who have contributed financially as well as those who have provided input and suggestions.

Executive summary

Here, a short summary of main findings should be presented.

Table of content of the template

Tables and figures in the template

The list below shows the tables which have been included in this template. A country VSR should ideally contain many more tables, figures and maps than this as they often provide good visualizations of data. The list shows the tables which have been included in this template. A country VSR should ideally contain many more tables, figures and maps than this as they often provide good visualizations of data.

Abbreviations and acronyms

Here, the acronyms and abbreviations used in the VSR should be inserted.

ABR	Abbreviation

Chapter 1. Introduction and Background

This chapter should provide information about the objectives of writing the VSR, including the needs of the public, the Government and international organizations for data on births and deaths. A description of the background and rationale for the report should also be included.

There should be an explanation of the scope of the report, including the vital events covered and the year(s) for which the statistics are released. The content of each chapter of the report should also be described under this heading. If the same set-up is used as in this template, the major contents of the chapters would be as described.

Chapter 2 should describe the CR system, including history, legal background, administrative structure, local and regional systems, data flows, relationship between the CRVS authorities and agencies, incentives and disincentives for civil registration, and plans for further improvement of CRVS. The length of this chapter would depend on previous descriptions of the system and the capacity of the office.

Chapter 3 should present the quality and completeness of the CR data, in the form of tables and preferably, also graphs and maps. Both the absolute numbers of registered events should be shown, and if possible, also the completeness rates. Data for several years are useful for showing the time trends, at national and regional levels to see where the needs for improvement are the greatest.

Chapter 4 should be devoted to basic tables and analysis of registered live births and the most essential fertility indicators. Graphs and maps may also be presented.

Chapter 5 should cover tables and analysis of registered deaths as well as the most essential mortality indicators.

CoD statistics are presented in chapter 6, but the guidance provided for this section is not as detailed as for births and deaths. While more detailed and key information could have been included in this report, access to CoD data is often strongly linked to health or other institutions with other sets of regulations. Depending on the setting in the specific country, it might be more appropriate to publish a separate report for CoD statistics, which is done in some countries, such as South Africa.

A chapter on marriages and divorces should be included in the VSR if such data are recorded and available. Key information to include can be found in chapter 7.

Chapter 8 should show key summary tables and graphs from the CRVS system, based on the United Nations (2014) *Principles and Recommendations*, if possible combined with estimates of the population size for various groups.

- At the end of the VSR, there should be: An appendix on the definitions used, which also specifies the formulas used for computation of the different indicators presented.
- An appendix which includes copies of notification and registration forms for the vital events presented in the VSR.
- A list of references, including reports, selected available vital statistics reports, and other reference material.

Box 1: Definition of vital statistics and vital events for statistical purposes[5] (BLUE BOX)

Vital statistics constitute the collection of statistics on vital events in the lifetime of a person, as well as relevant characteristics of the events themselves and of the person and persons concerned. Vital statistics provide crucial and critical information on the population in a country.

For statistical purposes, vital events concern the life and death of individuals as well as their family members. Vital events proper concern life and death and include live births, deaths and foetal deaths. Dual events are those occurring simultaneously in the lives of two individuals, which cannot occur again in the life of either individual without a previous change to his or her status. Those events include marriage, registered partnership, separation, divorce, legal dissolution of registered partnerships and annulment of marriage. Finally, vertical family events are those involving a descendant; they comprise adoption, legitimation and recognition. The focus of this document is births and deaths. The recommended definition of the event for which data are collected for vital statistics purposes are given in Part I of the United Nations *Principles and Recommendations for Vital Statistics: Revision 3* (United Nations, 2014).

END BOX 1.

Box 2. Tabulation programs (BLUE BOX)

This template does not provide any advice on how to create tables. There are many different programs that are useful in the tabulation process, depending on the format of the data and the experience of the users. For many of these programs, there are good online training solutions. The programs are of different complexity and cost. Information about them can easily be found on the Internet. Some examples are:

- Excel – for many purposes, this program is sufficient. Its advantage is that most institutions already have it and have experience using it.
- CSPro (Census and Survey Processing System) is a free program provided by the US Census Bureau , which among others can be used for data entry and tabulations.
- R is another freeware. It is mainly used for data analysis, but can also be used for tabulations.
- There are also other statistical packages which can be very helpful, but which require license payments. Some of the most common programs are:

  - SPSS (Statistical Package for the Social Sciences).
  - SAS (Statistical Analysis System).
  - Stata (Data analysis and statistical software).

END BOX 2.

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[5] http://unstats.un.org/unsd/demographic/standmeth/principles/M19Rev3en.pdf

Chapter 2. Civil Registration System of the Country

Before presenting the data, the CRVS system should be presented to the audience as background information. This could be brief or long, depending on the availability of this information in earlier reports or elsewhere, the situation in the country, and the capacity of the office publishing the VSR.

The description should highlight the most important historical, legal, organizational, administrative and practical issues. To help in this description we have formulated a number of questions that would be useful to answer - or at least to address.

Many of the suggestions in this chapter are based on the United Nations *Principles and Recommendations for a Vital Statistics System*, the United Nations handbooks on civil registration and vital statistics systems[6], ESCAP guidelines for setting and monitoring the goals and targets of the Regional Action Framework on CRVS in Asia and the Pacific, as well as VSRs from Botswana, Kenya and South Africa in the ECA region and India in the ESCAP region. A list of reference materials is also provided at the end of this document. Countries may find it useful to consult these publications. It may also be useful to refer to the tools and guidelines developed by ECA[7], ESCAP[8], WHO[9], Center for Disease Control and Prevention[10] and others, to review and assess CRVS systems, reports, reviews and assessments that have been undertaken in the country. Especially the ESCAP and WHO publications include a number of relevant questions and issues that would guide the development of a well-functioning CRVS system.

2.1. History

It is useful for the audience of the VSR to learn about the history of civil registration as well as the production of vital statistics in the country. Key questions that should be addressed are:

- When was civil registration introduced and by whom?
- What where the reasons for introducing civil registration?
- Was civil registration initially including everybody or did it only include some regions or population groups?

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[6] The six most recent volumes of *Handbook on Civil Registration and Vital Statistics Systems* focus on the following themes:
  a) Management, Operation and Maintenance (1998)
  b) Preparation of a Legal Framework (1998)
  c) Developing Information, Communication and Education (1998)
  d) Policies and Protocols for the Release and Archiving of Individual Records (1998)
  e) Computerization (1998)
  f) Training (2002)
These handbooks can be downloaded from
http://unstats.un.org/unsd/demographic/standmeth/handbooks/default.htm

[7] http://www.uneca.org/sites/default/files/uploaded-documents/Statistics/CRVS/assessment_tool_en.pdf
[8] http://www.unescap.org/resources/guidelines-setting-and-monitoring-goals-and-targets-regional-action-framework-civil-0 , http://www.unescap.org/our-work/statistics/civil-registration-and-vital-statistics/about or getinthepicture.org
[9] http://www.uq.edu.au/hishub/docs/WP01/WP_01.pdf and or http://www.emro.who.int/civil-registration-statistics/assesment/crvs-rapid-assessments.html
[10] http://www.cdc.gov/nchs/isp/isp_fetp.htm

- Have there been important changes in CR over time on issues such as legislation, organization and completeness?
- Does the country produce VSRs? How frequently are they published and what is the reference period covered by each report?

2.2. Legal and administrative issues

Countries have different legal traditions, with some having very detailed legislation while others have a tradition of writing rather general laws but developing detailed regulations and directives. A reference to acts, laws, regulations and directives related to CRVS would be necessary, preferably with links to central documents available online. It would also be useful to note if the law specifies in detail on the items of information be collected at the time of registration. Such documents should be annexed to the report.

Key issues which should be addressed are listed below in italics:

- *Are there special laws or acts for registration of vital events?*

It would be useful to identify the laws and when they were introduced, and what the most important paragraphs are.

- *Does the legislation specify which vital events should be registered?*

Births and deaths are most commonly registered. The legislation may also say if registration of births and deaths is compulsory.

- *What are the time lines for vital event registration?*

In accordance with the legal framework of the country, when should vital events be registered? Is there a deadline for registering a vital event? Is there a difference in how soon an event is registered depending on where the vital event takes place and what kind of vital event it is? Is there a difference between birth and death registration? If yes, both should be specified. Generally, in actual practice, are vital events usually registered immediately or only some days, weeks or months afterwards? Is the time limit for late registration aligned to international recommendations of up to one year?

- *Does the legislation specify how the registration should be done?*

For example, is it usually the case that for institutional births the institution is responsible for providing a notification of a birth to the parents? What about non-institutional births? Are the parents responsible for obtaining a birth notification from a midwife, village chief or other respected person? Or do they have to register the birth elsewhere afterwards?

- Does the legislation specify which information should be included when registering?

Typical key information could be name of person, birth or death date, etc.

- *Does the legislation specify who can register? Can the vital events of all residents be registered or only those of citizens? Is it, for example, possible to register vital events for citizens of other countries, including refugees and stateless persons? If yes, under which conditions?*

In some countries, the law specifies that every birth should be registered but, in practice, persons with a foreign or an undetermined nationality are often denied the registration of their births.

- *Is it specified in the legislation which administrative units should register vital events, i.e. name of the institution, geographic level, etc.?*

For example, is it specified that registration should be done by local health facilities or by CR offices? Can vital events be registered outside the country? Where?

- *Are there any fees related to registration?*

Does the person registering a vital event have within the time stipulated by law or regulation to pay a fee to the Government Registrar? If possible, state where in the law this is specified and how it is regulated.

- *Is there a penalty for late and delayed registration? What is considered "late" in the law?*

Some countries have a timeline of 6 months for early registration whereas other countries have no timeline at all.
- *What do the relevant laws say about sharing and confidentiality of data?*

Is it specified which data can be shared with other institutions and which cannot? Are there exceptions for producing statistics or other areas? (See box 3.)

- *How are the registration laws implemented?*

If possible, say something about to what extent the intentions of the registration law are followed in different parts of the country and for different population groups.

- *Is there a system for issuing and administering ID cards which is integrated with the civil registration system, or is there a separate system for ID management? Are personal identification numbers used to identify individuals in the CR system and other systems?*

Box 3. Confidentiality of data (BLUE BOX)

In some countries, data on vital events are not transferred from one government agency to another, purportedly for confidentiality reasons. In general, individual data should not be shared with others, but exceptions should be made for agencies producing official statistics. This is also in line with the *United Nations Recommendations and Principles* (p. 12, paragraph 36-37) which emphasize the importance of safeguarding vital statistics micro data and that the data will be used only for authorized statistical or administrative purposes.

Many countries have a National Statistical System (NSS) based on a Statistics Act and the NSO has the overall responsibility for all official statistics, including checking the quality of statistics produced by other public agencies. However, in some countries, the capacity of the NSOs for doing this is limited.

It is very important for the office compiling vital statistics[11] to have micro data on all vital events, because it will do a much better job in tabulation and analysis if it has access to such data. In

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[11] In most countries, it is the NSO that produces the vital statistics, but not everywhere.

particular, micro data are necessary for checking for and detecting errors, which can be fed back to the civil registration system.

Norway, for example, has a very strict Personal Data Act and a strong Data Protection Authority. Nevertheless, transfer of micro data from the National Population Registry and other public registers to Statistics Norway is permitted by the Statistics Act, even with inclusion of name and personal identification number. Statistics Norway is, however, not allowed to *publish* information on individuals or anonymous information that can be linked to specific individuals, except data in an aggregate form such as in tables, analyses and research reports.

In April 2015, the European Union passed a specific regulation on this topic, clearly stating that the NSOs should have free-of-charge access to administrative registers and the possibility to use administrative records for statistics. The regulation also states that when a new administrative register is established, the NSO should be consulted in order to see how best to use information from the register to produce statistics.

(See http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32015R0759&from=EN).

In Botswana, vital statistics information is captured by three organizations, namely, the Department of Civil and National Registration (CNR), Ministry of Health (MOH) and Administration of Justice (AOJ), Data are transferred to Statistics Botswana for analysis and reporting (Statistics Botswana, 2014). In Kenya, the Annual VSR is produced by the Civil Registration Department (CRD) in collaboration with the Kenya National Bureau of Statistics (CRD, 2014).

In general, it should be noted that both the Civil Registration Authority and the NSO should have good routines in place to protect the data from misuse and use by unauthorized persons. This includes limited or controlled access to buildings and to servers and computers which contain the micro data, and registration of all use of the data by date, time and person.

END BOX 3.

2.3. Organizational structure, registration process and information flows

The description of the organizational structure should cover the two following issues:

- How the CRVS system is organized between agencies at the central level, who has which responsibilities, and the data flow between the different agencies
- How the different agencies are organized internally, the data flow between the different units and administrative levels, and their responsibilities.

In order for the audience to get a quick overview, it may be useful to present flow charts of the inter-linkages and data flows.

Figure 2.1 presents a possible way of showing the overall structure and data flows within and between agencies. It includes:

- Regional levels of registration offices: In some countries, there are only one or two levels, while in others there can be three or more. In the example, there are three levels. It is useful to mention the number of local registration offices as well as the number of regional offices.
- Flow of information from one unit to another: In the figure, it is assumed that the local health facility is the first point of registration. The arrows show how the information flows go from

there. It is assumed that information is shared with the local CR office, but, in some countries, there are no registration offices at the local level. In some countries, information may also be sent directly to the Ministry of Health or the Vital Statistics Compiling Office.

- Data flow at central level: It is common that the data flow from the Civil Register to the Vital Statistics Compiling Office, as shown in the figure. In some countries, the Civil Registration Authority carries out the compilation and statistical work itself while in others, a Ministry, often the Ministry of Health, might be responsible.

Figure 2.1: Possible organizational chart presenting multisectoral health facility based engagements on different levels
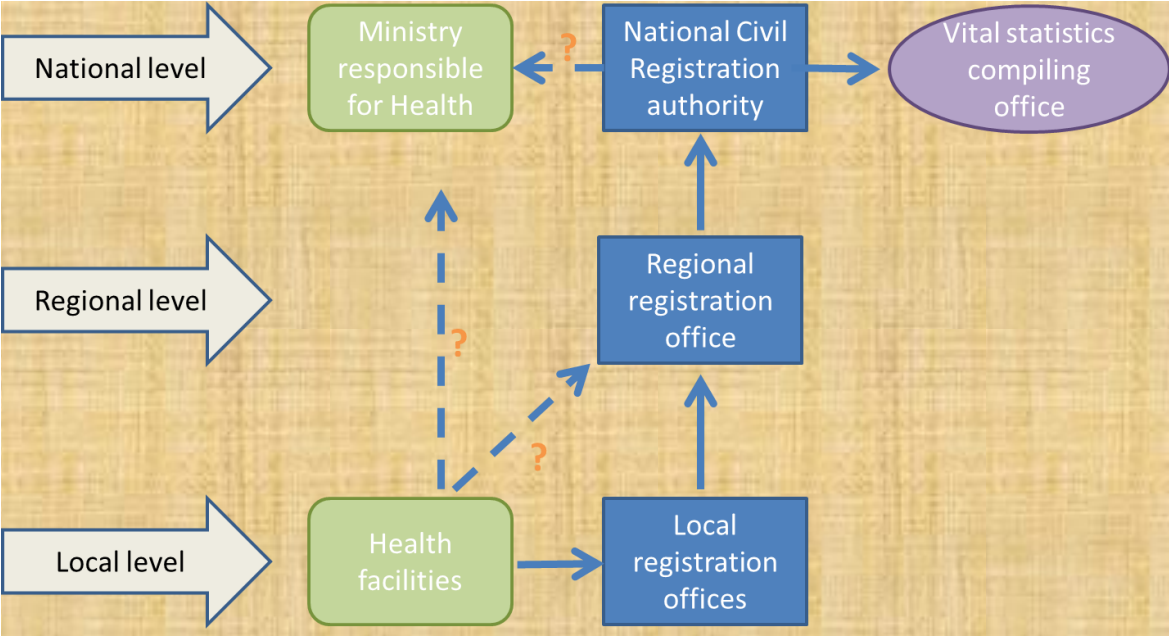
It is possible to split the information in figure 2 into two or more different figures, presenting different levels or reporting schemes. Box 4 gives an example of how this is done in Kenya.

Figure 2.1 does not provide information about the responsibilities of the different actors involved. ECA has developed a general figure showing possible data flow, and the responsibilities of the different actors at central level (see figure 2.2).

Chart 1: Complete Civil Registration and Vital Statistics Systems and their Multi-sectoral Services and Linkages in a Country

Source: http://apai-crvs.org/
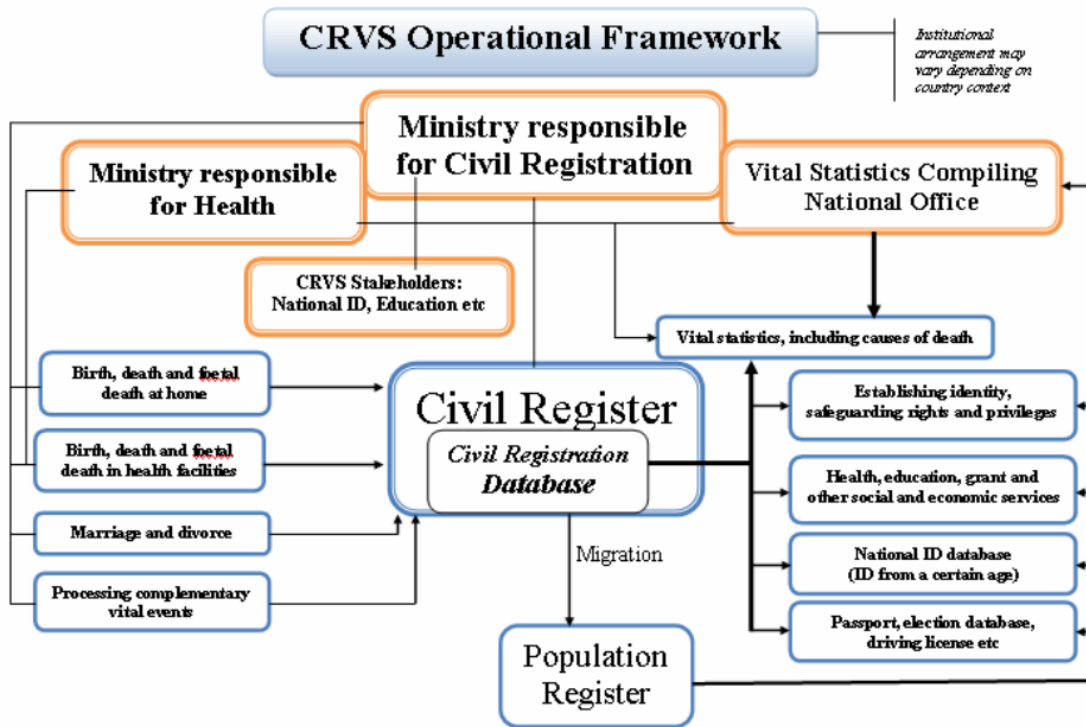
Box 4. CRVS organization in Kenya (GREEN BOX)

Figures B.4.1 and B.4.2 show two charts taken from a CRVS assessment for Kenya. They show the flow of information on vital events that occur at home, in the community, or in a health facility. The 2013 VSR for Kenya gives a more detailed explanation, which we quote from as an example of how a CRVS system at the local level can be described:

"The first chart shows that assistant chiefs are responsible for notifying events that occur at home or in the community to the local civil registration office (CRO). The registration assistant enters information on an official registration form. This form has two parts that contain a matching serial number—an Acknowledgment of Birth Notification (ABN) in the case of a birth and a Burial Permit in the case of a death—and a registration form. The ABN is a perforated slip that is part of the birth registration form. The death registration form has a detachable section called the Burial Permit. The registration assistant retains the counterfoil copy of the ABN or Burial Permit and gives the original slip to the parents or next of kin as proof of notification, which they later submit to the CRO to obtain an official certificate. The local assistant sends the registration form, including the original and the duplicate, to the CRO, who retains the counterfoil

of the duplicate. The CRO forwards the duplicate to the national Civil Registration Department, which transfers vital events data to the National Bureau of Statistics."

Figure B.4.1. Flow of vital events information occurring in the home or community, Kenya, 2013
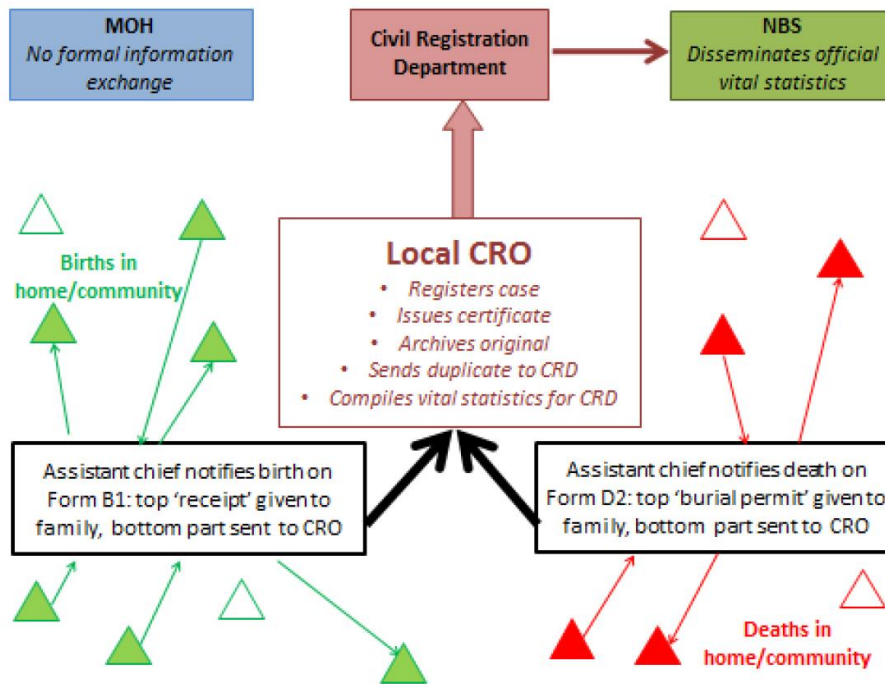
Source: Measure Evaluation Kenya Associate Award (2013).

Figure B.4.2. Flow of vital events information occurring in a medical institution, Kenya, 2013
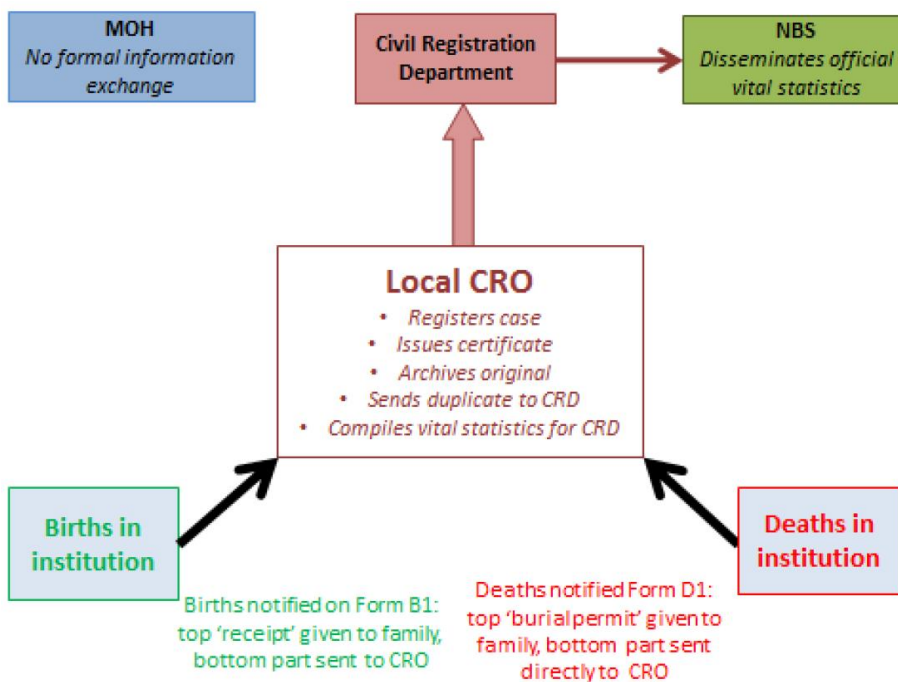
Source: Measure Evaluation Kenya Associate Award (2013)

End BOX 4

Registration process and information flows

In this section, following the overall presentation of the organization in the previous chapter, the processes and information flows should be presented in more detail.

The VSR, especially if it is published for the first time, should include a description of how a vital event is registered in the country. It may be useful to present the registration of births and deaths *separately*, as there are important differences between these events, although there are also similarities for events occurring at health facilities. A graph may be included here or in the respective vital events chapter on the data flows for each event. It may be important to provide separate charts for the registration processes of institutional and non-institutional events, i.e. events occurring outside health institutions. If the process is different for the different vital events, charts should be presented separately for each event, as shown in figures B.4.1 and B.4.2 for Kenya (box 4).

The description of the registration process should include the following key issues:

- W*here do the vital events usually occur? At home, at a medical facility or elsewhere?*
If there is available information, it is useful to know the share of births and deaths taking place at the different locations. These shares are quite different for births and deaths in most countries, so information should be included separately for both. A table or graph showing the figures by place of occurrence, such as in box 4, could be included here.

- *Where are the vital events usually registered?*
At a medical facility or at a local registration office? Can births and deaths be registered at medical institutions or only at local civil registration offices – or both? Are there differences between birth and death registration on this?

For vital events occurring in a health facility, the registration process is often initiated there, either by health personnel or by CR staff located there. It is important to describe the system that has been established for notification of the event, registration of the event, and possible certification of the event. The division of labour between the different institutions has to be clearly explained, describing the role of the health facility and what falls under the responsibility of the local CR office, and other roles, such as local government if they are involved in the process. For births (and deaths) occurring at home or elsewhere in the community, informants, that is, the affected family members (parents or next of kin), or those designated by law, need to initiate the registration process. This is usually done by reporting the event to the local registration office within the period required by law, this is important for collecting current vital events information.

The report should include a map or a table showing the different regional divisions and the registration service points in the country, including the lowest administrative unit where registration of vital events takes place. The table should ideally include regional codes, etc. A good example of this can be found in the Kenya VSR for 2013, which shows a map of the sub-counties in Kenya and a list of local CR offices in each county (box 5).

Box 5. Sub-counties and CR office overview for Kenya (GREEN BOX)
Figure B.5 Map and excerpt of table of local CR offices in Kenya.
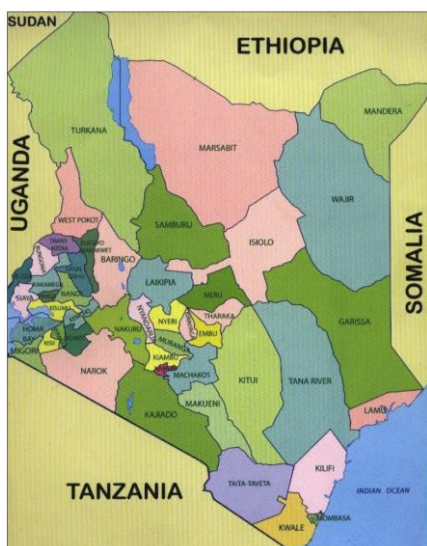
Table 1: Local civil registration offices by county

County		Local civil registration areas		County (cont.)		Local civil registration areas (cont.)	
1	Kiambu	1	Gatundu	25	Elgeyo Marakwet	1	Keiyo
		2	Githunguri			2	Marakwet
		3	Kiambu East	26	Nandi	1	Nandi North
		4	Kiambu West			2	Nandi South
		5	Ruiru	27	Samburu	1	Samburu
		6	Thika	28	Trans Nzoia	1	Trans Nzoia East
2	Kirinyaga	1	Kirinyaga			2	Trans Nzoia West
3	Murang'a	1	Kigumo	29	Turkana	1	Turkana
		2	Murang'a East	30	Uasin Gishu	1	Eldoret East
		3	Murang'a South			2	Eldoret West
		4	Murang'a West	31	West Pokot	1	West Pokot
4	Nyandarua	1	Nyandarua North	32	Homabay	1	Homabay
		2	Nyandarua South			2	Rachuonyo
5	Nyeri	1	Kieni East			3	Suba
		2	Mathira East	33	Kisii	1	Gucha
		3	Nyeri Central			2	Gucha South
		4	Nyeri South			3	Kisii Central
6	Kilifi	1	Kilifi			4	Masaba
		2	Malindi			5	Masaba South
7	Kwale	1	Kinango			6	Nyamache
		2	Kwale	34	Kisumu	1	Kisumu East
8	Lamu	1	Lamu			2	Kisumu West

Source: Kenya Vital Statistics Report, 2013, pp. 3-4.

END BOX 5.

- *How are the vital events usually registered?*

Information about a vital event is usually recorded at a local registration office. It is useful to know if this information is entered into a book, on a paper list, a separate paper form or slip for each event, a computer/electronic database, or any other means. If the data are computerized, are the data entered at a stand-alone computer or via Internet into a local, regional or national server? In cases that rely on paper forms, is all the information in the forms recorded and made available electronically in a database?

- Are there procedures for checking the quality of data?

Are there procedures for verification of information received and entered? Is there a supervisor who has as his/her responsibility to check that information has been entered correctly?

Late or delayed registration

- How soon after the occurrence is the vital event registered? How is this related to the law on registration? What is the share of late registrations for births and deaths?

There are two issues with regard to late or delayed registration: The first issue is vital events that are registered after the deadline for registration according to the law of the country, called late or delayed registrations. There is no international recommendation on this and national laws usually range from three months (or less) to one year (or more). Some but far from all countries have introduced a special fee for late registrations. Such fees may encourage people to register earlier, but they may also have the effect to discourage some people from registering their vital events at all.

The second issue is registrations that arrive too late for inclusion in the annual (or monthly or quarterly) statistics. There is no international recommendation on this either. The Nordic countries, for example, have a deadline of 1st of February in the calendar year succeeding the year x under consideration. Vital event records that arrive after the first of February are included in the vital statistics for the current calendar year (x+1). This is more or less compensated for by events that arrive too late for the current year and which are included in the following year (x+2). But in periods

with fast changes in demographic events such as births, the number of registered events for a year may be too low (or high). For most countries a cut-off date on 1st of February may be too soon. In Botswana, for example, "Timely registration are births that were registered within 60 days of occurrence as stipulated in the Births and Deaths Act." (Statistics Botswana 2014).

A graph or table showing the proportion of vital events that are registered within the timelines set by the law would be useful. It would also be useful to know if in actual practice the vital events are registered immediately or only some days, weeks, months or years afterwards. Box 6 provides examples of how timelines are presented in South Africa and Botswana. In the VSR 2012 for Botswana, for example, there is a table and a chart showing whether the births were registered currently or late (i.e., occurred in previous calendar years). Another table shows how soon the births were registered (within one month, 1-3 months, etc.).

It may also be useful to make a table showing when (e.g. how late) the events which took place in a specific year were registered. Box 6 also provides an example of this.

- *It would be useful to mention if registration of births is linked to other public services such as immunization, use of other health services or enrolment to social security programmes.*

Some countries with low birth registration sometimes link registration to other public services in order to increase registration rates for older children or grown-ups. This may be considered as a kind of delayed registration of births. For the purpose of legal rights and protection, this is very useful. For vital statistics it is, however, far from ideal. One reason is that these delayed registrations cannot be used in vital statistics compilation.

Issuance of documentation
- *Does the institution where the vital event occurred issue a notification document on the birth or death to the relatives or those designated persons by law?*
- *Does the local registration office issue birth and death certificates or are these issued by another office? If yes, what is the procedure? Does the local civil registrar transmit the recorded information to the office responsible for issuing the certificates? How is this done – on paper or electronically?*

Box 6: Timeliness of birth registration (GREEN BOX)
This box provides a few examples related to the timeliness of registration. Figure B.6.1 is from South Africa's vital statistics report and describes recent trends in current and late registrations. In South Africa, the law requires that registration is done within 30 days of a birth (defined as current registration). Figure B.6.2 describes the time taken for registration of births and deaths in 2014 in Botswana.

Figure B.6.1 Birth registrations by status of registration, South Africa, 1994–2014
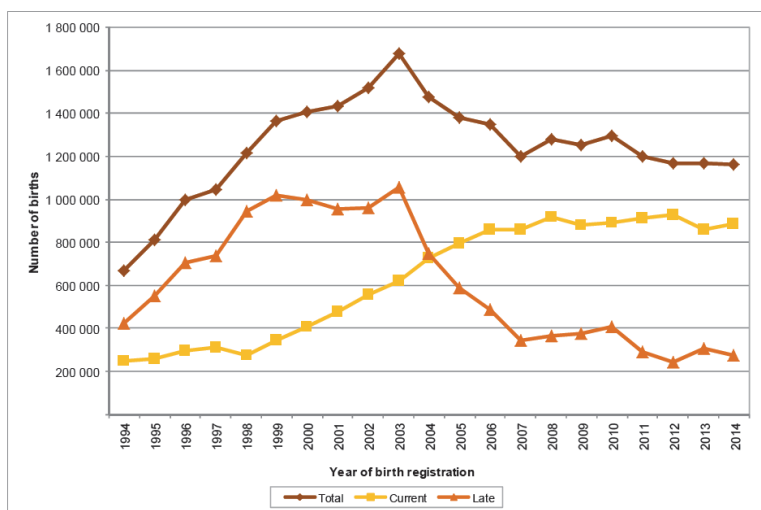
Source: Recorded live births 2014, Statistics South Africa (2015), available from
http://www.statssa.gov.za/?page_id=1854&PPN=P0305.

Figure B.6.2 Table OR pie chart showing whether births were registered currently or late (occurred in previous calendar years) in Botswana, 2012.

Table 2.1: Registered births by type of birth and status of registration-2012

Status		Type of Birth				
		Live Births		Still Births		
		Number	Percentage	Number	Percentage	Total
Current	Number	40,856	98.7	528	1.3	41,384
	Percentage	63.4		97.1		63.7
Late	Number	23,599	99.9	16	0.1	23,615
	Percentage	36.6		2.9		36.3
	Total	**64,455**	**99.2**	**544**	**0.8**	**64,999**

Source: Statistics Botswana, 2014.

Table B.6.3 is an example of how late registrations can be illustrated in an alternative way. It shows the number of births in the years 2013-2016 by the year of registration. The numbers are for a real country but changed so that the specific country is not identified. We see that less than ¼ of the births are registered in the same year as they occurred and also that a significant proportion of the births were registered fully three years after the occurrence. The recommendation for this country would be to try to speed up registration of births to be able to publish more timely vital statistics. In addition, delayed registration of this magnitude is likely to miss many births due to infant deaths.

Table B.6.3 Births by year of occurrence and year of registration

| Year of registration | Year of Occurence | | | | |
	2013	2014	2015	2016	Total
2013	12 675	0	0	0	12 675
2014	37 130	13 670	0	0	50 800
2015	1 865	40 175	21 695	0	63 735
2016	4 830	1 960	29 205	17 945	53 940
Total	56 500	55 805	50 900	17 945	

	Per cent of births registered in each year			
2013	22 %	0 %	0 %	0 %
2014	66 %	24 %	0 %	0 %
2015	3 %	72 %	43 %	0 %
2016	9 %	4 %	57 %	100 %
	100 %	100 %	100 %	100 %

END BOX 6.

Box 7. Civil registration and population registers (BLUE BOX)

Confusion about population registers is common. United Nations (1969) defines the term "*population register*" as "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". A population register has information both about the vital *events* and the *status* of the population, usually the residents of the country. A complete population register should not only provide population data on a regular basis, provide vital statistics, most importantly, on a regular and permanent basis but also at low geographical levels. Relatively few countries, primarily the Nordic countries, have high-quality population registers that are used to produce vital and other statistics.

There are other registers that are sometimes misunderstood as being population registers. One type is a register of vital events, where registered births and deaths are recorded, computerized or paper-based. This is not a population register unless the register also includes information about the status of the total population of a country or region and this information is regularly updated with records of births and deaths as well as migration records, preferably both internal and external.

Another type of administrative register is a national identification register (or database), as part of the identity management system of a country. This usually includes data about all ID cards that have been issued to population above a certain age, usually 18 years. Such registers have been established in many countries in recent years, including Botswana, Kenya, South Africa, India (AADHAAR), Pakistan (NADRA) and Thailand. Such registers are not proper population registers, since they normally do not contain unique identification numbers for everybody and because they are usually not updated with deaths and migrations on a continuous or regular basis.

Registers of vital events and national identification cards have been merged in some countries, for example in Botswana and Lesotho, but are separate in most countries, such as Kenya, Ethiopia and India.

To conclude, civil registration is an essential and necessary condition for running a population register. However, civil registration data are usually not *sufficient* for establishing a population register, which should also include persons who have *not* experienced a vital event recently. This can be done by utilizing data from a recent population census or a special registration of everybody in the population. Nielsen and others (2014, pp. 8-9) describe the role that civil registration can play in the building up of a population register through various stages.

END BOX 7

Transfer of records and information flow in the civil registration system

Once the actual registration process has been described, it should be explained how the records are transferred from the local registration office (or medical institution) to a higher administrative level, regionally and/or nationally. In many countries, there are differences between the information flows of the vital events. If this is the case, the different processes should all be presented. A few key issues to consider are:

- *From which and to which office or institution are the records on vital events transferred? Is all information on the vital registration records transferred or only a part of them?*

For example, if the health sector is responsible for registration, are data from the vital registration records first transferred to the CR office at the local level or are they transferred directly to a regional health or CR office? These records can either be the original record of the registration document or a copy of this, or an aggregate of many records.

- *Are the transfers done electronically or on paper?*

In the previous chapter, specifications were made on how data were registered locally. If the registration was not done with an online system, are there different systems for recording the information at different organizational levels, e.g. on paper locally or regionally and electronically at the centre? Are all local offices reporting the civil events on paper or are some reporting electronically? Is the system electronic from the lowest administrative level where registration takes place to national level?

With regard to the following key points, there should be an agreement with the concerned stakeholder (CRO, MoH or NSO, etc.), preferably through a memorandum of understanding that should be updated from time to time.

- *If the information and data are transferred electronically, how is this done?*

What is the main approach for data transfer, online using Internet, by mobile phones or tablets, or offline with memory sticks or similar?

- *How often are the data transferred - daily, monthly, annually, or irregularly?*

Are there differences in the frequency of data transfer by reporting level and to whom the data are transferred? Are there regional differences in efficiency and delivery upon agreed time?

- *Are data transferred on an individual or aggregate level? How is confidentiality protected and maintained?*

This should also be presented for the different stages of the data transfer. Key information is whether the organization(s) that work on compiling vital statistics has access to micro data or not, and if yes, to which data they have access. This is because micro data make it easier to check for errors and prepare the relevant tables, as discussed in box 3. With aggregate data, there are very limited possibilities of checking the quality of the data received and it is usually not possible to design tables that deviate significantly from those received.

- *Are there systems for checking, editing and validating the data?*

Are there, for example, procedures for checking the quality of the information received from the local registration offices? If yes, which information and which offices? Who is responsible for the

checking? Are the checks done at the regional or central level of the civil registration agency? What is the role of the statistical office in checking the data quality? Does the responsible organization carry out field visits, etc.? Are there systems in place for statistical editing and validation of the received data? See box 10 for a quick overview of data quality issues.

- Are there systems for ensuring data security?

Are, for example, the paper forms stored securely after information has been entered electronically in such a way that a verification of records can be done several months or years later? Are the electronic data stored in safe locations with stable power supply? Is access to the data limited to specified persons and with secure passwords? Are there back-up solutions for the electronic data?

Organization of vital statistics production and dissemination

- *Once the data have been collected, who is responsible for processing and publishing the data?*

In most countries, there are two organizations at the national level that could be tasked with the processing and dissemination of vital statistics. These are either the civil registration authority or the national statistical office.

- In most countries, the statistical office has the main responsibility for compiling, analysing and publishing vital statistics. This is the case in countries such as Botswana, Ethiopia, Mozambique, Norway and Pakistan.
- In some countries, the production and dissemination of vital statistics is done by the civil registration agency (or the Ministry of Health) alone, as in India, or in collaboration with the NSO, as in in Kenya.
- In a few countries, both civil registration functions and the production and dissemination of vital statistics are the responsibility of the NSO, as in the Philippines. This was also the case in Norway from 1946 to 1964, when Statistics Norway was in charge of both. Between 1964 and 1990 the CPR was located within Statistics Norway and run jointly by the National Tax Administration (NTA) and Statistics Norway. The legal dimension of population registration was the main reason for its transfer from Statistics Norway to the Directorate of Taxes in 1991. There is, however, close cooperation between the two institutions and Statistics Norway receives daily a copy of all registration records.

Box 8. Importance of coordination and cooperation (BLUE BOX)
CRVS systems are multidisciplinary and multisectoral in nature. The systems require the engagement of a wide range of stakeholders to ensure their optimal functioning. This section emphasizes the importance of coordination and close cooperation between the health sector, local government, civil registration authorities, national statistical office, among other stakeholders. These institutions play very unique and fundamental roles in ensuring completeness in registration as well as producing high quality vital statistics. Some of these functions are briefly described below:

- The local health system often has first-hand knowledge about births and deaths occurring and can therefore help to improve the coverage and completeness of the CR system. In many countries, health institutions often play a role as CR informants. The CoD certification should also be carried out by skilled health personnel and their work coordinated and linked with the coding and production of these statistics. The health sector is also an important user of vital statistics for planning of health services.

- The civil registration authority is key to the recording of information on vital events and has the most detailed knowledge of the registration procedures. This knowledge is important when working with and processing the data for statistical compilation. They can also more easily provide direct feedback to the local offices so that they can improve or correct the data directly and thus increase quality in the longer run. On the other hand, it is important to have external users of the data such as the health sector and the statistical office, which can also provide important feedback. Input on how to process the data and improve their quality in an efficient way can also lead to a better system and reduce the time needed to work on improvements and to write the VSR.
- The NSO usually has broad knowledge and experience in processing and analyzing data. The office can be helpful in identifying errors and providing feedback to the civil registration agency, besides cleaning the data and tabulating the results. Cooperation with the statistical office also opens up access to more detailed comparison with the most recent population census figures. The input of the statistical office will be more useful if it has access to micro data from the CR system and a thorough knowledge of how it is operating, including how vital events are registered, coded, checked, stored, and transferred. Access to micro data for statistical offices is also discussed in Box 3.

END BOX 8

2.4 Incentives and disincentives for registration

It would be useful, but not absolutely necessary, to include a few paragraphs on factors which have influenced registration of vital events positively or negatively (often called incentives and disincentives) in the time period for which the report is valid. In box 9, we have included many examples of both incentives and disincentives which might provide input on what could be relevant for the contents of this chapter in the VSR.

Box 9: General and country examples of incentives and disincentives for registration (BLUE BOX)

People are more likely to register vital events if they are aware of the benefits that registration brings. In most settings, registration papers are the key to:

- Obtaining proof of place of birth and place of registration
- Obtaining identity papers needed for government services
- Establishing citizenship by showing the place of birth and origin of parents.
- Obtaining proof of age in relation to rights and obligations that are conditional upon reaching a certain age, such as schooling, military duties and pension entitlements
- Providing evidence of identity and age for marriage
- Obtaining a driving license, passport or other travel documents
- Obtaining evidence of death for use by the heirs of the deceased
- Having access to health services, such as vaccination
- Having access to utility services, such as water, electricity and gas
- Birth registration document needed for private services, such as
    - Working in the formal sector

o   Opening a bank account

o   Obtaining a loan or micro credit

Other factors having a positive effect on the frequency and magnitude of birth registration and issuance of birth certificates (incentives) include:

- Easy access to free registration
- Registration at health facilities so that the family can register a birth directly at the hospital before taking the baby home. It is also common for hospitals to report births to the CR office, and to provide the necessary papers for the family to forward to the office.
- Registration while receiving first vaccination of a child.
- Mobile health teams offering initial registration services (SMS notification, etc.).
- No payment for registration and issuance of documents.

Similar factors affect the registration of deaths. The share of people registering deaths could be increased if the heir of a deceased is required to document that a death has occurred, or if obtaining evidence of cause of death is important for insurance or legal purposes. Another incentive could be to only provide permission to transport the deceased to the burial place if the death has been registered. By linking death registration with permission to transport the deceased to the burial place, there is a direct incentive for the funeral director to register the death quickly. Relatives later receive the legal documents from the local civil registrar. Some countries provide monetary rewards for death registration.

Factors having a negative effect on birth and death registration and issuance of birth certificates (disincentives) include:

- Difficult access to registration offices
- Populations living in hard to reach areas.
- High travel and/or registration costs
- Different languages
- Illiteracy
- Long waiting queues
- Need to visit the office several times
- Cultural factors. In some countries, for example, a child who has not been given a name yet may not be registered. In other countries, the father needs to be present at the registration.

The CRVS resource kit (WHO, 2012) provides more examples which can be consulted for inspiration. In general, knowledge in the population about the benefits of registration and the drawbacks of not registering a vital event is likely to have an effect. If data have been collected about people's knowledge and awareness of the benefits of registration, they could be included here.

In some countries, for example the Cook Islands, there are small cash incentives for families to register births. In Brazil, maternity wards are given small monetary rewards for each child they register. In Nauru, families receive financial support for funeral arrangements when they register a death (CRVS resource kit). The Nordic countries are examples of systems where all social benefits, including child allowance, depend on registration.

Regular information and communication campaigns are also an important way of encouraging people to register vital events. Individuals should never be charged a fee to register vital events. Fees are a strong disincentive to public cooperation, particularly among poor and marginalized people. To encourage families to register, many countries issue an abridged copy of the birth or death certificate free of charge at the time of registration. However, it is reasonable to request payment for subsequent additional copies of birth and death certificates. In many societies, copies of birth certificates are commonly required for administrative purposes, and the income generated from issuing copies contributes to the running costs of the CR service.

In order to enforce civil registration law, many countries impose penalties for late registration or failure to register. It is important to monitor the unintended and potentially adverse effects of such penalties. For example, families may misreport dates of births or deaths to avoid penalties, resulting in inaccuracies in the resulting data, especially where a publicity campaign has led to a sudden increase in late registrations. In practice, penalties may discourage registration and can lead to false declarations which distort the data.

Finally, the report should mention plans to strengthen the CR system.

End Box 9.

Box 10. Data quality (BLUE BOX)

The quality of VS is defined in the UN Principles and Recommendations as follows (p 15): "The quality of VS is measured according to their completeness, correctness or accuracy, availability, and timeliness."

The most important aspect of the quality of vital events data is the completeness of civil registration, which is discussed in section 3.2. There is also a need to evaluate the quality of the CR data and check for errors. Errors are common in all systems, even the best, and may occur at any stage of the CRVS process, due to reporting errors, clerical errors, misprints, misunderstanding, errors in the computer code, tabulation errors, problems with the electricity supply, and perhaps also corruption. A quality assessment procedure is very important for data quality. Some national statistical systems have procedures for this. More thorough discussions of quality issues are presented in the *United Nations Principles and Recommendations* (pp. 129-140), and WHO (2010a, pp. 53-64).

As specified in chapter 3, it would be useful for the audience to know how the CR data are checked and verified for errors.

Checking for errors

The first task is to identify errors and present the methods of error detection. The office registering the information should ideally have a system for checking the data while they are being entered. However, external control mechanisms, such as random checks at the central CR level or other involved organizations, are also important. Common approaches are:

- *Checking against other time periods and sources of vital statistics*

A common way of detecting errors in data is to compare data against other time periods or sources of vital statistics. Consistency checks should always be carried out both on the raw data and on key indicators (e.g. birth and death rates) before they are used or made more widely available. Comparison of raw data can be done by checking against corresponding figures from previous years. If there are major changes from one period to another, this should be investigated further.

Most countries will have a number of censuses and surveys that include questions about vital events occurring in the population available. From these data, fertility and mortality estimates, by age and sex are usually available. These estimates should be compared with the age and sex-specific mortality and fertility calculated from vital registration. Data can also be checked for different regions or other subdivisions. Typically, vital events from censuses and surveys are higher than comparable rates from vital registration in countries where they are undertaken, suggesting an underreporting of deaths and births in the CR system. The CR completeness rate would provide further clues on this.

- *Checking proportion of missing values*

For each vital event, are all the specified variables recorded or are there missing values, e.g. for the date of birth of the mother of a child? What is the general picture? Is it, for example, the case that many variables lack information although they are specified as obligatory on the birth or death registration forms? Does the law stipulate anything on correcting errors?

- *Checking for duplicates*

Has information about some vital events been recorded or reported twice or more? Are there any records that are identical or almost identical?

- *Checking data that seem very improbable*

Are there any odd patterns of births (or deaths) by age of the mother or by month, out-of-range values for date of birth and age of the mother, or unrealistic values of crude birth and death rates for some regions?

- *Checking for digit preference or rounding*

Are there any values that occur more often than other without any specific reason? For example, when people are asked about their age there is often an over reporting on ages ending in 0 or 5, and sometimes also on other ages, such as 7. This is mostly a problem in census and surveys, but it may also occur in a CR system when (a) recording background information on parents which have not earlier been registered, (b) when clearing backlogs, and (c) for recording deaths of persons without birth registration. If data are presented in the VSR in age groups of 5 or more, this is of less importance. However, if variables are published for single ages this should be looked at more closely.

Dialogue with registration officers

If data control is carried out elsewhere than at the place of registration, for example at the central agency responsible for vital statistics, it is important to say something about how detected errors are reported back to the responsible registration officers. Do they receive information about key errors and are they expected to go through and improve data quality, if possible? Are they allowed to change the records?

Generally, focusing on errors that have the most impact on the results can be a useful approach. This is also true for differences between regions and between local offices. If one office has many errors and missing values, it might be useful to focus feedback and work to improve data in this specific office. The reason is that improved quality from poor performers often may lead to a significant change in the general quality of data. Different approaches on how quality checks and feedback is carried out can be useful information for the audience.

Correcting errors

There are different methods for correcting errors. The best approach is that the local registration officer goes through the records and fills in missing or erroneous information if possible and reports back to the central or regional level on these changes. This is not always possible. Other methods exist and can be considered. Some examples are briefly described below. Correction methods used should be described in the VSR.

- *Removing duplicates, errors and outliers*

If this is done, the original data set should first be saved and there should be methods for marking changes, such as flagging.

- *Imputation of missing or inconsistent values*

In this process, missing or deficient values may be imputed. A typical imputation algorithm is to use the value of similar observations or an average value for such cases. However, imputation should only be considered as a last option if absolutely necessary, after other methods have been attempted.

Imputation should be used with caution: It may make the producer of data look good but it does not really improve the data. If imputation is applied it should be thoroughly documented. It is also important that there is a high probability that the imputed value is close to the actual (unknown) value

END BOX 10.

Chapter 3. Data Quality, Completeness and Definitions

3.1. Quality of data

This chapter should first provide information about the approaches that are used when controlling data quality and processing data. The information about data quality may be short. Important information relates to:

- *Specifications in the legislation or overall statistical guidelines regarding data quality and how to make corrections*

There might be concrete specifications in the civil registration law. On a more general note, there might be guidelines within the national statistical system on how data should be cleaned. This will often be linked to quality assessment or quality assurance frameworks. If a specific method or system is used, this should be specified, as well as its main aspects.

- *Main procedures for checking for data errors*

    Are there routines for quality control at the local registration offices? Is data quality control carried out on regional or national level?

- *Key methods used for improving quality*

    A short description may be given of the measures that have been taken to improve data quality. If the data quality control is done at a central level, are there specific mechanisms for verification against the local level? (e.g., checks against original paper forms or with the persons who provided the information) How and how often? If not, have errors been corrected using other methods? Which ones?

In this template, we have included additional guidance in box 10 on how to check and improve data quality. The *United Nations Principles and Recommendations* for a VS system also provide useful information on quality assurance.

BOX 11. Coverage and completeness (BLUE BOX)

The two terms 'coverage' and 'completeness' are often used inconsistently. The term 'coverage' is sometimes used when 'completeness' would have been a more appropriate term. We therefore start with a definition of how the two terms are used in this document, based on WHO recommendations. Later in the document, we will mainly focus on completeness rates, but the term 'coverage' is in many countries also used as an indicator of the share of the population that is covered by the CR system. Moreover, some countries continue to use it to mean 'completeness', which is now considered to be the most appropriate term for the proportion of the actual number of births (or deaths) which is registered.

Definition of coverage

By *coverage* we mean the population in a geographical area that is covered by the CR system. It is an attempt to measure the proportion of the population of a country that has access to civil registration (geographical coverage). WHO (2010a) defines it as the number of people living in census enumeration districts with at least one civil registration office, expressed in per cent of the total national population.

Definition of completeness (or completeness of coverage)

CR *completeness* means the actual number of registered events divided by the estimated number of vital events (births or deaths). "Complete registration" has been achieved when every vital event that has occurred to the members of the population of a particular country (or area), in a specified time period, has been registered in the system. This means that the system has attained 100 per cent completeness within its area of coverage. Any deviation from completeness is measured by "completeness error". Vital statistics from registration data are complete when, in addition to registration of each event, there is a VSR, which is forwarded to the agency responsible for the compilation and production of vital statistics (United Nations (2014), para. 576).

Estimation of completeness rates

There are two approaches to estimating the completeness of civil registration: direct and indirect methods. The *direct* method entails matching registration records with records containing some or all of the same information from an independent source, such as CR records for other events, administrative and social records, and censuses and surveys. *Indirect* methods include comparisons with data from other sources or other time periods, such as censuses and (P&R, pp. 129-140). The methods described below for estimating completeness rates are indirect methods since they are not based on microdata.

The completeness rate is defined as the percentage of registered events out of the total number of events. The number of registered events is the number recorded by the CR system, whereas the number of actual events has to be estimated based on other data sources. Usually, the best source is the most recent population census. However, if it has been some time since this census took place and the population has grown significantly, the census numbers will be too low. In this case, the number of actual events should be estimated using population projections or by using information

from demographic fertility and mortality surveys. Projections are usually made by the NSO (see box 24). It is often useful to estimate the completeness rates at subnational levels.

The completeness of registration of live births rates can be calculated by:

$$(1)\ Completeness\ rate\ for\ births\ = \frac{Number\ of\ registered\ births\ within\ the\ year\ of\ occurence}{Estimated\ number\ of\ live\ births\ within\ the\ year} \times 100$$

The numbers of registered births are those from the CR system and reported before the cut-off date, as explained in Chapter 2. If a population census has been carried out recently, ideally in the same year as the data that are analysed, the data for total number of births can be used directly. Alternatively, if population estimates exist for the relevant year, these can be used. We recommend using national figures, typically from the NSO, if available. The population projections from the United Nations Population Division, http://esa.un.org/unpd/wpp/DataQuery/, are an alternative if there are no reliable national figures.

Similarly, completeness rates for deaths may be obtained by this calculation:

$$(2)\ Completenss\ rate\ for\ deaths = \frac{Number\ of\ registered\ deaths\ within\ the\ year\ of\ occurence}{Estimated\ number\ of\ deaths\ within\ the\ year} \times 100$$

The numbers of registered deaths are those from the CR system. The total number of deaths, as was specified for births, can either be obtained directly from the population census figures, or from population projections. Box 24 provides a description of how these calculations can be made if the total number of deaths is unavailable or of poor quality. If age data are non-existent or poor the *total* number of deaths may be estimated by multiplying the crude death rate (CDR) by the total population size (and dividing by 1000).

Use of other data sources to estimate completeness

Above, we have described how completeness rates can be calculated from registration data. We would recommend that this is carried out whenever completeness is less than universal. However, if available, other data on completeness may also be presented. In many countries, completeness rates may be obtained from sample surveys, such as the United Nations Children's Fund (UNICEF) Multiple Indicator Cluster Survey (MICS) and the Demographic and Health Surveys (DHS). Some of these surveys include questions on whether individuals have been registered with the CR authority, although the focus of interviews is often on mothers (or primary caregivers) of children under age 5. The completeness of birth registration for children aged under 5 years can be calculated as:

$$(3)\ Completeness\ rate\ for\ children\ under\ 5\ =$$
$$\frac{Number\ of\ children\ under\ 5\ years\ in\ a\ given\ year\ who\ had\ their\ birth\ registered}{Estimated\ number\ of\ children\ aged\ under\ five\ years\ old\ in\ a\ given\ year} * 100$$

This survey-based methodology can normally not provide estimates of the completeness by region or other subgroups of the population as the sampled regional populations are usually too small. Moreover, such surveys are too expensive and complicated to be taken frequently. The data are usually often older than the data analysed in the VSR. Finally, only a small proportion of a population is interviewed in a sample survey and the survey does not really reflect how well the CR system functions in practice. In addition, sample errors and question wording may influence the results. Another issue is that households are likely to over-report registration because they believe a birth notification form equals registration.

Other options include comparison with administrative sources such as lists from school districts. Another important data source is population censuses, which have historically not asked about whether household members are registered and possess a birth certificate, but this could possibly be done in the future (ESCAP, 2015). Countries such as Namibia and Tanzania have asked questions about deaths occurring in the household in the last 12 months and whether the death was registered. In a few countries, specific surveys are implemented to access the functioning of the CR system, including completeness rates. Nepal is currently doing such a survey and Cambodia is planning to do one in late 2016 or early 2017.

Completeness rate for the whole population

An interesting additional indicator is the birth registration completeness for the whole population. It can be calculated as follows:

$$(4) \: Completeness \: rate \: for \: births, whole \: population \: = \\ \frac{Number \: of \: persons \: alive \: who \: had \: their \: birth \: registered}{Estimated \: population \: size} * 100$$

As many countries have started quite recently ton improve their birth registration, this completeness rate will usually be lower than if only children are included in the calculations. However, many countries now issue ID cards for the adult population and this often demands a birth certificate, the birth registration of the adult population is likely to increase over time.

The three completeness rates for birth are all used as targets for completeness of the CR system in the regional action framework for CRVS in the ESCAP region (ESCAP 2015).

Presenting completeness rates

In this template we have chosen to present completeness rates separately, before statistics on the vital events results are presented in the next chapters. It is also a viable option to present completeness rates for each vital event together with the general vital event data in chapters 4 and 5 respectively.

End box 11.

3.2.   Completeness[12]

In this section, the completeness rates of birth and death registration at national and subnational level should be presented. This is important for two reasons:

- The rates alert the audience to discrepancies in completeness and provide a caution in the interpretation of statistics that are presented throughout the report, and
- They provide an objective baseline that can be used to measure and evaluate future progress in completeness.

Since the actual number of a vital event is usually not known, CR completeness needs to be calculated based on projections or estimates of the actual number (see Box 24 on how to calculate

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[12] Most of this section is based on the *Kenya Annual Vital Statistics Report, 2013* and on ESCAP (2015).

the estimates). It is particularly important to include estimates of the proportion of the total number of births (and deaths) that is registered in the country and in each region and local administration. These proportions are essential indicators about CR completeness. If the proportions are low, the vital statistics based on registrations are less useful for planning.

3.2.1. Completeness by group

The calculation of completeness rates should be done for the country as a whole and preferably for all the vital events presented in the report. Other groupings should also be considered if available:

- Gender
- Age
- Regional
- Urban/rural
- Place of occurrence
- Place of registration

However, it can be a challenge to get reliable and accurate denominator data at regional level especially if the census is not very recent. Moreover, subnational population projections tend to be quite inaccurate over time. Internal migration, for example, particularly rural-urban migration, is common in most countries but is not reported in most national registration systems. The estimated completeness rates may be influenced by unrecorded population changes caused by internal migration. It should be attempted to take this into account when the estimates are made.

The results can be shown using a table or a graph, such as Table 3.1 for live births.

Table 3.1. Number and share of registered live births by region

	Number of live births registered	Share of live births registered
Total		
Region 1		
Region 2		
Region 3		
…		
…		
…		
Region N		

Information on why there are differences between the different groups should be included, if available. For example, if there has been a campaign to improve birth registration in one region, this could be linked up with the regional completeness rate. Does it look like the completeness rate in this region is significantly higher than in other comparable regions? Other interesting issues to discuss relate to regional differences: how remote do people live, how is the access to health services in the region? What is the general level of education?

The illustrations from India and South Africa in Box 12 show how completeness can be presented.

Box 12. Examples of tables, graphs and maps showing completeness of birth registration (GREEN BOX)

If possible, it would be useful to include a graph showing both the registered and expected number of live births, as in this example from the *Kenya Annual Vital Statistics Report 2013*:

Figure B.12.1. Graph showing birth registration completeness in Kenya, 2010-2013

Figure 5: Number of births registered, number expected, and registration coverage, 2010–2013
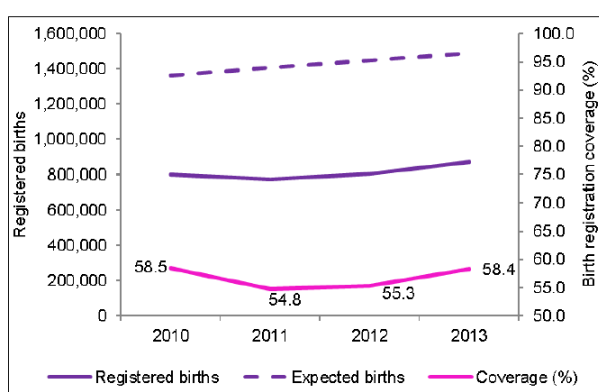
Source: Annual Vital Statistics Report, 2013, Kenya

Figure B.12.2. Map showing birth registration completeness in India, 2010
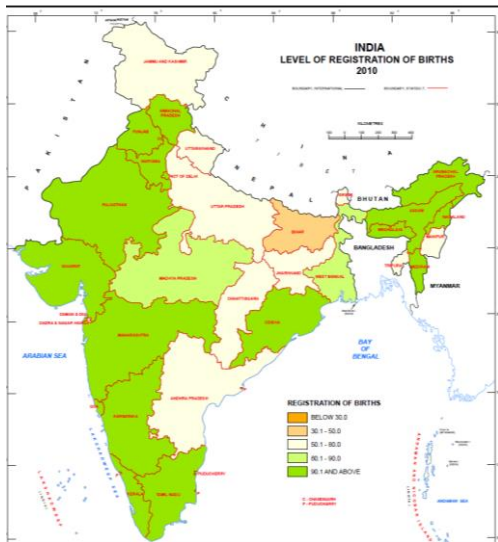
Source: Annual Vital Statistics Report, 2010, India

Figure B12.3. Map showing birth registration completeness in South Africa, 2014
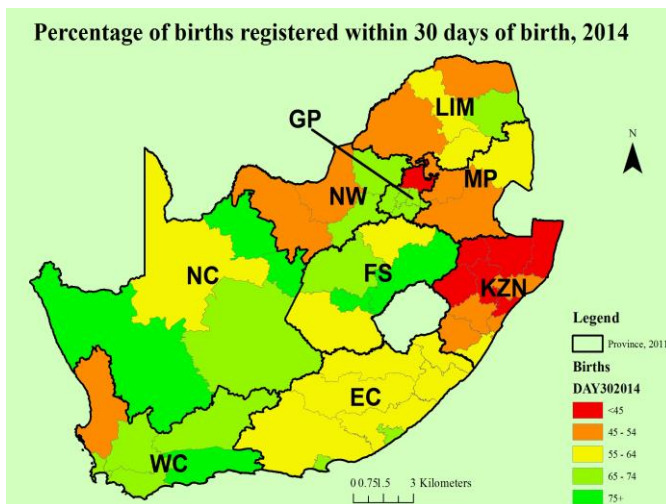
Source: Annual Vital Statistics Report, 2014, South Africa

Table B12.1 shows completeness rates for the Ivory Coast in 2014. The rates have been calculated by dividing the number of registered births by the number of births enumerated in the population and housing census taken on 1 August 2014. In the census all residents 12-49 years of age were asked if they had had a live birth in the 12 last months. The rates have been calculated both for births registered within the time limit of 90 days and for births registered later than that, for the autonomous districts and regions of the country. Generally, the completeness rates are quite high, especially for an African, but with significant regional variation, ranging from 28 to 150(!) per cent. Rates exceeding 100 per are due to a bias related to the residence status of the registered births, according to the VS report.

Table B12.4. Birth registration rates for Ivory Coast 2014

AUTONOMOUS DISTRICTS AND REGIONS	ENUMERATED BIRTHS	BIRTHS REGISTERED BY CIVIL REGISTRATION IN 2014	REGISTRA-TION RATE (1)	REGISTRA-TION RATE (2)

	POPULATION AND HOUSING CENSUS 2014 (1)	WITHIN THE TIME LIMIT (2)	AFTER THE TIME LIMIT	TOTAL (3)	(4) = (2) / (1) * 100	(5) = (3) / (1) * 100
DISTRICT AUTONOME D'ABIDJAN	145 450	133 508	4 952	138 460	91,8	95,2
DISTRICT AUTONOME DE YAMOUSSOUKRO	15 261	13 096	22	13 118	85,8	86
REGION DE L'AGNEBY-TIASSA	22 706	16 253	3 457	19 710	71,6	86,8
REGION DU BAFING	7 475	7 202	51	7 253	96,3	97,0
REGION DE LA BAGOUE	17 143	15 330	201	15 531	89,4	90,6
REGION DU BELIER	10 343	7 867	1 683	9 550	76,1	92,3
REGION DU BERE	18 037	11 853	491	12 344	65,7	68,4
REGION DU BOUNKANI	10 982	5 920	716	6 636	53,9	60,4
REGION DU CAVALLY	18 437	14 079	835	14 914	76,4	80,9
REGION DU FOLON	3 846	3 215	253	3 468	83,6	90,2
REGION DU GBEKE	39 200	35 232	1 295	36 527	89,9	93,2
REGION DU GBOKLE	15 190	4 534	51	4 585	29,8	30,2
REGION DU GOH	34 101	15 031	2 043	17 074	44,1	50,1
REGION DU GONTOUGO	24 859	17 355	2 311	19 666	69,8	79,1
REGION DES GRANDS-PONTS	11 641	8 647	369	9 016	74,3	77,5
REGION DU GUEMON	37 159	19 120	696	19 816	51,5	53,3
REGION DU HAMBOL	17 553	17 124	295	17 419	97,6	99,2
REGION DU HAUT-SASSANDRA	50 858	24 511	8 647	33 158	48,2	65,2
REGION DE L'IFFOU	9 539	8 392	889	9 281	88,0	97,3
REGION DE L'INDENIE-DJUABLIN	21 433	10 811	558	11 369	50,4	53,0
REGION DU KABADOUGOU	7 032	10 133	438	10 571	144,1	150,3
REGION DE LA ME	15 879	15 428	1 157	16 585	97,2	104,4
REGION DU LOH-DJIBOUA	25 829	16 440	322	16 762	63,6	64,9
REGION DE LA MARAHOUE	31 672	17 491	1 830	19 321	55,2	61,0
REGION DU MORONOU	14 200	10 110	875	10 985	71,2	77,4
REGION DE LA NAWA	46 171	13 143	487	13 630	28,5	29,5
REGION DU N'ZI	9 539	8 702	859	9 561	91,2	100,2
REGION DU PORO	37 129	32 442	1 450	33 892	87,4	91,3
REGION DE SAN-PEDRO	35 016	8 896	751	9 647	25,4	27,6
REGION DU SUD-COMOE	22 468	18 601	1 163	19 764	82,8	88,0
REGION DU TCHOLOGO	19 217	15 422	151	15 573	80,3	81,0
REGION DU TONKPI	35 942	27 494	940	28 434	76,5	79,1
REGION DU WORODOUGOU	10 994	8 050	511	**8 561**	73,2	77,9
ENSEMBLE CÔTE D'IVOIRE	**842 302**	**591 432**	**40 749**	**632 181**	**70,2**	**75,1**

Source: Table 4.3, ANNUAIRE DES STATISTIQUES D'ETAT CIVIL 2014, MINISTERE D'ETAT, MINISTERE DE L'INTERIEUR ET DE LA SECURITE, 2014.
End box 12

If available, completeness rates for other sub-populations, including vulnerable groups, could also be estimated and presented. Typical examples of this could be:

- Remote and hard to reach areas of the country
- Certain population groups (e.g. specific ethnic groups or refugees),
- Age of mother
- Previous number of births
- Level of education of mother and father

In order to estimate the levels of completeness for these sub-populations, data on the size of these subgroups are also needed, which is not always the case.

As emphasized earlier, it would improve the VSR if the results are discussed and analysed and not merely presented. This is important because it will provide the CR administration and policymakers with information on which areas or groups need special attention in order to achieve increased completeness.

3.2.2. Completeness rates over time

If VSRs have been published before or CR data are available for more than one year, the change in completeness over time should be presented and discussed, as shown in Figure 3.5.

Table 3.2. Share of registered live births over time and by region

Share of live births registered	Year 1	Year 2	…	Year N
Total				
Region 1				
Region 2				
Region 3				
…				
Region N				

Another aspect of completeness over time is linked to late registrations. In many countries, many births are not registered in the year of delivery, but one or more years later. It is therefore common that the completeness rates for children born a specific year increases over time. If available and relevant, a table or graph could be included which shows the increase in completeness over time for births occurring in one specific time period. This can give decision makers an understanding of when children are registered and possibly take action to improve timely registration. There are many ways of displaying this. Box 6 provides an example where the year of occurrence is tabulated against the year of registration. An alternative way is to present the data as shown in Table 3.3. below. With this approach, regional differences in late registration would also be visualized.

Table 3.3. Number of births by year of registration and region

Share of live births registered	Year X	Year X+1	…	Year X+N
Total				
Region 1				
Region 2				
…				
Region N				

Box 13. Tabulation plan (Blue box)

One of the first steps when planning a vital statistics report is to make a tabulation plan. To make sure that the plan is realistic it is useful to start the planning by going through and checking that the most important variables are available for making tables. The Principles and Recommendations (P&R) include an extensive list of key topics and themes that can be studied with civil registration data, see the list in Annex 1. It may also be useful to record the years for which the variables are available.

These topics are defined and explained in more detail in Principles and Recommendations, Chapter III.D., pp. 24-56.

The next step could be to go through the tables recommended in the UN Principles and Recommendations (P&R) and other tables proposed in these guidelines. For each table it should be checked if it can be made on the basis of data from the civil registration system or other data sources in the country. Lists for each vital event are presented in Annex 2, in addition to a list of summary tables. Most of the tables are taken from the Principles and Recommendations. We have modified the lists somewhat to make sure that the most important tables are included, dividing the tables into first and second priority tables. We have also proposed a set of tables on completeness of vital events registration and on vital events indicators.

Some of the tables should include time series for a few essential items, such as for the number of births by sex, preferably for as many years as possible (years XXXX- 20YY). In addition, there should be more detailed tables for the most recent year with available data (year 20YY), such as for the number of births for the most relevant regions in the country.

Place of usual residence is commonly considered to be the most important location variable. The number of administrative units to be included depends on the administrative structure of the CR system and the number of units. If the number of units is large a more detailed table may be included as an annex to the vital statistics report and/or a web table.

The choice of tables for a vital statistics report will depend on the availability if data, the complexity and resources for making them, and which tables are considered important for the country by policy makers, planners and the general public.

The table below is an example of the beginning of a tabulation plan for births for a hypothetical country, based on Annex 2.

Table B13.1 Example of tabulation plan for live births

Table number	Table no. in P&R	Table content	Possible	Possible if CR data are combined with data from other sources	Year(s)
		First priority tables			
4.1	IB-1	Total number of live births by sex, incl. sex ratio at birth and site of delivery	Yes		2005-2015
4.2	ST-3	Live births by place of residence and urban–rural residence of the mother[1]	Yes		2015
4.3		Crude Birth Rate	Yes	Pop. size from censuses and projections	2010-2014
4.4	LB-9	Live births by age of mother (15-19, 20-24 … 45-49)	Yes		2015
4.5	LB-1	Live births by place of occurrence[1] and sex of child1	No		
4.6	LB-2	Live births by place of occurrence and place of usual residence of mother	No		
:					

[1] May also include the sex ratio at birth.

END BOX 13

3.3. Definitions and specifications

This section could also be called metadata, or information about the data. It is important for users to know the national definition of vital events and related background variables of all involved in the registration and processing of vital events data. This needs to be clearly specified either generally in an introductory chapter or for each of the vital events chapters, along with international definitions for comparison. The definitions and specifications are useful both for international stakeholders as it will clarify whether the data are comparable to data from other countries, and for national stakeholders in case there are different approaches nationally. Two examples:

- *Births: Which births are included, only live births or also still births? If live births, is the international definition used or are there national amendments? What about foetal deaths?*

The WHO definition of a live birth is as follows: "Live birth refers to 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 - e.g. beating of the heart, pulsation of the umbilical cord or definite movement of voluntary muscles - whether or not the umbilical cord has been cut or the placenta is attached. Each product of such a birth is considered live born."

- *Regional: Are the same definitions used for regional and local units by all Government bodies? Is there official agreement about the borders of all regions in the country?*

These questions might be especially relevant for smaller divisions. Also, urban and rural births may be defined differently. If yes, how it is defined in the report, if used, should be specified.

Box 14. Presenting data (BLUE BOX)

In general, the vital statistics tables and graphs that can be produced depend on the information recorded by the local registration office and forwarded to the Vital Statistics Compiling Office, which is usually the central Civil Registration Authority, the Central Statistics Office, or the Ministry of Health. This information is usually the same as the information on the registration form.

When presenting the data, efforts should be made to do it in a user-friendly manner, or in other words: in ways that are understandable to non-statisticians. Policymakers and others will to a greater extent understand and make use of the data if the tables and graphs do not contain too much information and if common disaggregations and rates or ratios are used. Attention should be paid to the following key points. They may seem elementary but mistakes are nevertheless very common. More tips and suggestions can be found in the Statistics Norway publication "User-friendly presentation of statistics", available from http://www.ssb.no/en/omssb/samarbeid/internasjonalt-utviklingssamarbeid/a-handbook-on-dissemination-of-statistics, which is available in Arabic, French, English Portuguese and Russian.

Including completeness rates where relevant

In most countries, especially in Africa and Asia, far from all vital events are registered. When presenting data on vital events, one needs to make sure that data are understood correctly. For example, if there is large variation in completeness rates between different regions or groups of the population, this may have an effect on the interpretation of the vital event figures.

Even though completeness rates have been presented in chapter 3, we recommend that VSR writers should also comment on the completeness rates in this and the following chapters.

Tables and graphs

Tables and graphs should not include too much information as this may make them difficult to understand. Readability and simplicity are important.

The tables and graphs should present the most factual picture of the relationships. In a graph, it is in most cases best to start with 0 on the x or y axis if the range is numerical. If a smaller range is presented, this could give the audience the impression of a stronger change than is actually the case. It is also useful to include a separate column for missing and unknown values if their shares are a significant proportion of the total.

Figure 3.3. Birth registration figures for two regions, X-axis starting on zero
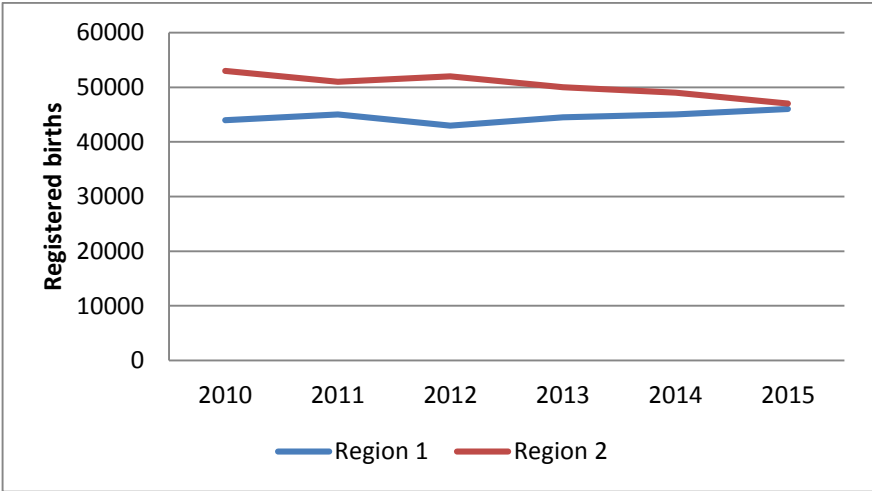
Figure 3.4 Birth registration figures for two regions, X-axis starting on 40 000
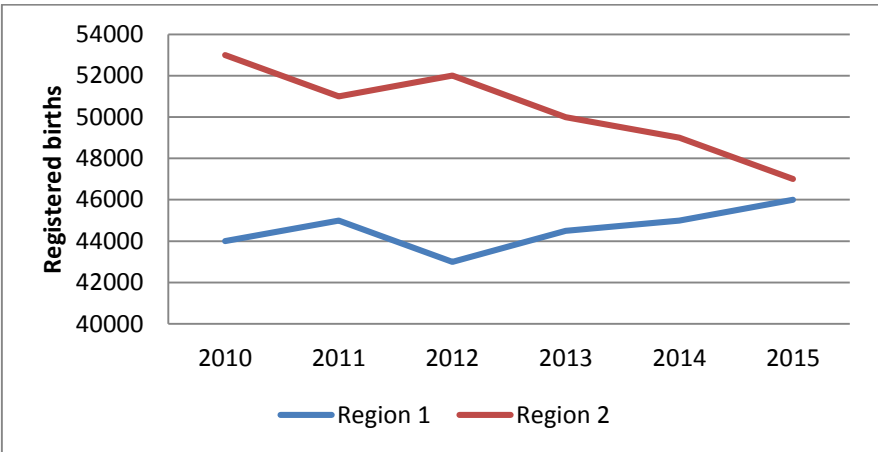
Figures 3.3 and 3.4 contain exactly the same data, but the X-axes have different starting points. We would strongly recommend the first version (figure 3.3) as this gives a more realistic presentation of the development in registration figures over time. The second gives an exaggerated impression of substantial change over time, which is not really the case.

Percentage vs percentage point

When explaining change from one period to another, it is a very common mistake to use the percentage change when there is actually a change in percentage points. To give an example: If the registration completeness rate has increased from 60 percent in one year to 70 per cent in another year, there is a change of 10 percentage points, while the percentage change is about 17 per cent.

End box 14

Chapter 4. Births

In this chapter, data on registered live births should be presented. A combination of tables, graphs, maps and explanatory text will be useful for the audience. Linking back to earlier chapters, especially if completeness rates are low, should also be considered.

The tables and graphs to be presented will naturally depend on the variables collected when registering a birth. Box 15 provides a short overview of which variables are considered most important.

Box 15. Key birth registration variables (BLUE BOX)

The topics on live births to be presented in the VSR are based on the information that is collected on births in the CR system. This usually includes the topics listed in Annex 1, which are taken from the *United Nations Principles and Recommendations* (pp. 18-19) (P&R), but numbered for these Guidelines. The high-priority topics are indicated by boldface, as in P&R. However, some of the high-priority topics may be missing or too complicated to be included in an early vital statistics report, such as educational attainment, occupation and socioeconomic status of the parents, as such information is rarely collected when a birth is registered.

In practice, individual-level information on the recommended topics is supplemented by other information required to permit identification of the persons and events under consideration, including (a) registration serial number; (b) place of registration; (c) identification of the registrar; (d) name and surname of the person or persons directly involved in the event, with personal identification number if available; and (e) information on the characteristics of the informant.

The table below is an example showing the beginning of the list of birth registration variables for a hypothetical country, based on Annex 1.

Table B15.1. Example of birth registration variables

Source: Table III.1, pp. 18-19, UN Principles and Recommendations, 2014

Number	Topic	Available from CR of births	Available from other sources	Not available	Year(s) available
(i)	**Characteristic of the event**				
a	**Date of occurrence**	Yes			2015
2015	**Date of registration**	Yes			
c	**Place of occurrence**	Yes			2015
d	**Locality of occurrence**	Yes			2015
e	**Urban/rural occurrence**	No			
f	**Place of registration**	Yes			2015
g	**Type of birth (i.e., single, twin, triplet, quadruplet or higher-multiple delivery)**	Yes			2015
h	**Attendant at birth**	No		X	
i	Type of place of occurrence (hospital, home, etc.)	Yes			2015
(ii)	**Characteristics of the newborn**				
a	**Sex**	Yes			2015

b:	**Weight at birth**		No		X	

Several of these variables are usually only available for hospital births in health facilities. They are important for health purposes, but not for civil birth registration, in particular: "Attendant at birth", "Weight at birth", "Children born alive to mother during her entire lifetime", "Birth order or parity", "Foetal deaths to mother during her entire lifetime", "Date of last previous live birth" and "Interval since last previous live birth".

The recommendation to register "Child born in wedlock (legitimacy status of the child)" is problematic as it may be discriminatory. In many national CR systems, a child may be saddled for life with the label "illegitimate".

End box 15.

When considering which tables on births to include in the VSR, it is useful to look at the "Minimum list of tabulations" on live births in the *United Nations Principles and Recommendations*, as shown in Annex 2. This box includes a long list of detailed tables on births. If possible, all these tables should be included in the report. However, as mentioned in the previous box, some of the variables may not be available for some countries, especially for births which occur outside the health facilities. Some tables are also less important than others. Consequently, we are proposing a set of tables that we consider to be the most essential, especially in the first VSR(s) for a country. This set of essential tables is based on information usually available on birth notifications, registration sheets or birth registers. We have also considered the practice in countries in Africa and Asia that have already published VSRs. Gradually, the number and detail of the tables can be expanded, depending on the capacity of the CRVS authorities, the availability and quality of the data, and the needs of the country for planning, monitoring of the health sector, and other purposes.

It is important to make it clear in the VSR what the chapter on births covers. This template recommends that the chapter provides data on registered births. It is also important to emphasize that the chapter concerns live births only, if this is the case. Unless most of the births are registered by medical institutions, still births are probably so seriously underreported that it would be of little value for statistics, but they should at a minimum be reported by sex, data, maternal age and location, if available.

The main indicator, the total number of registered live births, should be published for as many years in the past as possible. The VSR could also present brief comments on the development of the number of registered live births in recent years. If possible there could be an attempt to distinguish changes in this number that are due to changes in the registration completeness, the number of women 15-49 years, and the changing fertility level (Total Fertility Rate). In addition to tables, graphs are an excellent way of communicating results.

As the list of tables recommended by the United Nations in Annex 2 indicates, live births should be presented for different subgroups. It is recommended that the totals are divided into subgroups for only one subgroup at a time in each table, as the table otherwise might be too complicated and difficult to grasp for the users. If the number of births in a subgroup is not known for all births, the

number of unknowns (missing data) should be entered in a special column, marked *Unknown*, *Other* or *Missing*.

In the following section, more detail for some of the subgroupings are provided. Presentation of additional subgroups should be considered depending on data availability and stakeholder interests.

Region (province, district or municipality as appropriate)

The regional level to be chosen for tables and maps on regional division depends on:

- Administrative structure of the country
- Number and size of the administrative units. The most common names for administrative units in English are state, province, district, county and municipality. There may be special sub-divisions in large cities
- Availability of data and the general interest in regional data on live births. If there is a need to publish births for a large number of regional units, covering more than one page, the table could be put in an annex. Note that registration completeness may vary strongly between different regions. If possible, the registration completeness should be included together with the number of live births.

Tables could be made for one or more of three different definitions of region of birth:

- Place of occurrence
- Place of usual residence of the mother
- Place of registration

"Place of residence" is the most common definition when classifying births by place. Data on the number of births by place of usual residence are useful for studying the geographical distribution of birth. Birth rates, which can be calculated at subnational levels, are important for program planning, evaluation and research in many fields of application, such as health, education, population estimates and projection, and social and economic policy (*United Nations Recommendations*, p. 28). It is usually more important to have information about the geographical distribution of where women giving birth usually live, than where they happened to deliver or register the child.

However, United Nations (2014) also mentions that it may be useful to classify data on births by *both* place of occurrence and place of usual residence of the mother. This information may be used to see whether mothers are giving birth in the same civil division as that of their residence or in other geographical locations (*United Nations Recommendations*, p. 28).

Please note that in Annex 2 most tables on fertility relate to place of usual residence of the mother. However, many countries do not collect information on place of usual residence of the mother and even if they do, they are not amenable to geographic coding and hence tabulation. In any case, it should always be specified when presenting a table or graph, which variable has been used for regional division. It may not be meaningful to compute fertility rates by place of occurrence as it is difficult to delineate and know the size of the population using the health facilities.

Table 4.1. Total number of live births by sex, incl. sex ratio at birth and site of delivery, 2012-2014

	Total	Health facility	At home	Other
:				
2012				
2013				

2014				

Source: Civil registration data

In this table, the place of occurrence is presented explicitly. This is useful for evaluating the need to expand a medical institution in an area, and also for assessing infant and maternal mortality. If data are available for more than one year, it is useful to present this so that changes and trends over time become more visible. Graphs can also be considered in this case.

Table 4.2. Live births by place of residence, region and urban–rural residence of the mother 201x

	Total	Sex ratio	Completeness
Total			
Region 1			
Region 2			
Region 3			
:			

Specify here how the births have been divided by regions, whether it is based on place of occurrence, place of registration or usual residence of the mother.

As shown in Table 4.4, live births by region may be supplemented by other variables of interest, such as regional pattern in the sex ratio at birth registration completeness, if available. The table may also be combined with data on related variables, such as infant mortality.

Urban – rural

The definition of urban and rural can vary and needs to be specified. It is most common to define urban and rural areas according to the administrative designation of some municipalities as cities, rather than on population size or density. Since the CR system is set up as a part of the administrative organization of the country, it is most likely that the classification of events as rural and urban will be linked to the existing administrative classification. There is usually little or no scope for the CR office or the NSO to redefine or reclassify events as rural and urban.

Table 4.3. Crude Birth Rate, 2012-2014

	Total	Urban	Rural	Not known
:				
2012				
2013				
2014				

Since this is a simple table it would be useful to include numbers for as many years as possible, to be able to study the time trends.

Gender
Table 4.4 Registered live births by age of mother, 201x

	Total
15-19 (and below 15)	
20-24	
25-29	
30-34	

35-39	
40-44	
45+	
Total	

The sex ratio at birth is calculated as the number of boys per 100 girls. This number is usually in the order of 103-107 boys per 100 girls. Numbers very different from this range may indicate faulty registration procedures or gender-selective abortions. There may also be under-registration of girls (or boys) in some areas, although there is little evidence that this actually happens.

Birth indicators

If data are available, the Vital Statistics report should also present common birth-related indicators such as:

- Crude birth rate
- Sex ratio at birth
- Low (or very low) birth weight (per cent)
- Preterm live births (per cent)

How they can be calculated is presented in box 16

Box 16. Calculating birth indicators (Blue box)

Crude Birth Rate (CBR)

The Crude Birth Rate is the number of live births for a specific area during a specified period divided by the total population for that area (usually mid-year) multiplied by 1,000:

*Total live births / Total Population * 1,000*

The CBR (see also Box 24) is a basic measure of fertility. It is usually calculated for a calendar year. There are other fertility measures that are more specific to the population at risk and more comparable across time and geography, such as general fertility rate and total fertility rate (TFR).

Note: The CBR is NOT the same as the pregnancy rate, which is the total number of pregnancies (including live births, induced abortions, and foetal deaths) per 1,000 women aged 15 to 44 years for a specified geographical area (country, state/province, county, etc.) during a specified time period. The pregnancy rate is rarely estimated.

Sex Ratio at Birth(SBR)

The sex ratio at birth is the number of male live births for a specific area during a specified period divided by the number of resident female live births for that area and period multiplied by 100:

# of male live births X 100
# of female live births

The sex ratio at birth is an important demographic indicator on the distribution of boys and girls at birth. SRB outside the range 100-110 boys per 100 girls is an indication that there is either sex differences in the birth registration or that there are practices such as sex-selective abortions or infanticide. Figure 4.9 for India 2010 shows that 16 percent more male than female births and 40

percent more male than female deaths were registered. Thus, there is a clear bias toward registering male events more frequently than female events.

The SRB also affects some critical demographic measures, such as the number of years required for a population to double in size given a rate of population growth, and the balance between men and women at the most common ages at marriage.

Low (or Very Low) Birth Weight (Per cent)
The number of live births for a specific area during a specified period with a birth weight of less than 2,500 grams (1,500 for very low birth weight) grams divided by number of live births for that area and period multiplied by 100 to obtain a percentage:

# of resident live births < 2,500 grams X 100
# of resident live births

Low and very-low-birth-weight births are often associated with negative birth outcomes and poor health and may be an indicator of problems in access to quality health services and the need for prenatal care services.

Preterm Live Births (Percent:
The number of live births for a specific area during a specified period with a gestational age of less than 37 completed weeks[13] divided by number of live births for that area and period multiplied by 100 to obtain a percentage:

   # preterm (< 37 weeks) live births X 100
   # of resident live births

This figure requires rather detailed information about how far along the mother is in the pregnancy when giving birth. The information is available in most high-income countries, but not considered a necessity for all countries to present.

Age-Specific Birth Rate (ASBR)
The age-specific birth rate is the number of resident live births to women in a specific age group for a specific area during a specified period divided by the total population of women in the same age group for that area and period multiplied by 1,000 to obtain a rate:

      # resident live births to women in a specific age group X 1,000
      # of women in the same age group

The ASBRs are usually calculated for 5-year age groups: 15 to 19 (may include below 15), 20 to 24, 25 to 29, 30 to 34, 35 to 39, 40 to 44, and 45 and older, but also for 1-year age groups if the data are available. The age-pattern at birth is clearer if 1-year age group are used.

General Fertility Rate (GFR)
The GFR is the number of resident live births for a specific area during a specified period divided by the female population age 15 to 49 years (usually estimated at mid-year) for the same area and period multiplied by 1,000:

---

[13] The definition of 'preterm birth' varies from country to country.

$$\frac{\text{\# of live births} \quad X \ 1{,}000}{\text{\# of females aged 15-49}}$$

The general fertility rate is easy to calculate and widely used because it matches often readily available numerator and denominator data in a broad age range that covers most of the female reproductive years and thus represents the population at greater likelihood of giving birth. On the other hand, there is no intuitive interpretation of the level of the general fertility rate, such as for the TFR.

Total Fertility Rate(TFR)

The TFR is the sum of the age-specific birth rates (ASBR) (usually for 5-year age groups between 15 and 49) for female residents of a specific area during a specified period multiplied by 5:

5 x ΣASBR, where the ASBRs are 5-year birth rates. It can also be calculated as the sum of 1-year ASBRs for ages 15-49.

The TFR is an estimate of the number of children a hypothetical cohort of 1,000 women in the specified population would bear if they all went through their childbearing years experiencing the same ASBRs as measured for a specified time period. TFR is probably the most commonly used standardized fertility measure because it is well suited for comparative purposes and is a comprehensive summary measure that is readily interpreted and understood. A disadvantage of TFR is that it is a hypothetical measure. It measures the fertility level of a population during a given period, usually a calendar year. The *actual* number of children of a cohort of women requires many years of data to estimate. Another disadvantage of TFR is that it assumes that no women die before the end of the reproductive period (49 years).

END BOX 16.

Characteristics of the mother

Many characteristics of the mother recommended by P&R are rarely registered by civil registration, such as completed education, but if data are available, the educational level and the occupational status of the mother can be very useful information for policymakers.

The most commonly available information about the mother is:

- Age of mother
- Marital status
- Number of previous live births

As mentioned above, marital status of the mother can be discriminatory, leading to a serious problem for a person who has been given the label "illegitimate".

Table 4.5 Registered live births by age of mother, 201x

	Total	Urban	Rural	Age-specific fertility rates
10-14				
15-19				
20-24				
25-29				
30-34				

35-39				
40-44				
45-49				
50+				
Not known				
Total				

Age is usually defined as the age of the mother in completed years at the time of the delivery. Alternatively, age at the end of the year may be used. This is calculated as year of event (delivery) minus the mother's year of birth.

Five-year age groups are the most common. One-year age groups may also be used. There are usually very few births below age 15 and above age 49, implying that these rows can usually be deleted. There are also commonly used indicators linked to the characteristics of the mother. These are:

- Age-specific fertility rate
- General fertility rate
- Total fertility rate.

These indicators are important for several purposes, such as making population projections, and for assessing the number of births by women in high-risk groups, i.e., the youngest (under 20) and oldest (over 45). Box 16 specifies how these indicators can be calculated.

Box 17. Country examples of birth registration tables and graphs (GREEN BOX)

The table and figures below provide examples of how birth statistics may be presented.

Table B.17.1. provides a summary of the most important birth statistics for Botswana in recent years, including births according to marital status, completeness rate, and mean maternal age at birth.

Table B.17.1. Summary Statistics on Births, Botswana: 2011-14

Births	2011	2012	2013	2014
Male	19,748	20,738	22,732	21,142
Female	19,620	20,118	22062	20,599
Total	39,368	40,856	44794	41,741
Total number of Births 1	51,871	54,947	52,670	50,188
Sex ratio	100.7	103.1	103.3	102.6
Nuptial births	23.2	23	22.5	23.6
Ex-nuptial births	76.8	77	77.5	76.4
Mean age of mother at birth	27.3	27.3	27.3	27.6
Birth registration	75.9	74.4	85	83.2
Health facility deliveries	99.3	99.7	99.2	99.5

Source: Botswana Vital Statistics Report 2014, http://www.cso.gov.bw/images/vital.pdf

Figure B.17.1. gives an overview of live births by different ethnic groups in Malaysia. The illustrations are one of several included in their vital statistics report. As there is no substantial difference

between the two years, it might be better to just present figures for the last year. When comparing over time, longer time series would be recommended.

Chart 2: Live births by ethnic group, Malaysia, 2014 and 2015
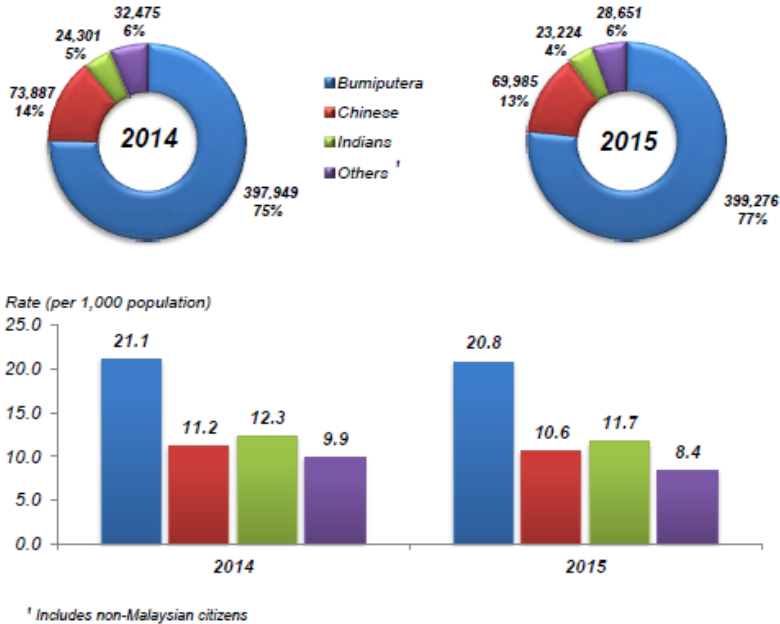
Source: Vital statistics report 2015, Malaysia. (Department of Statistics Malaysia)

Figure B.17.2. is a line diagram with number of births according to registration status for South Africa from 1994 to 2014, including the number of late registered births. We see that there is a downward trend in late registration. There should be an explanation of this decline: Is it because more people are aware of the need to register their child or are there other reasons? Why is the total number of registered births declining? Are there fewer births in total, or are fewer people registering the births of their children? To address the last question one should look at completeness rates.

Figure B.17.2. Birth Registrations According to Registration Status, South Africa: 1994–2014
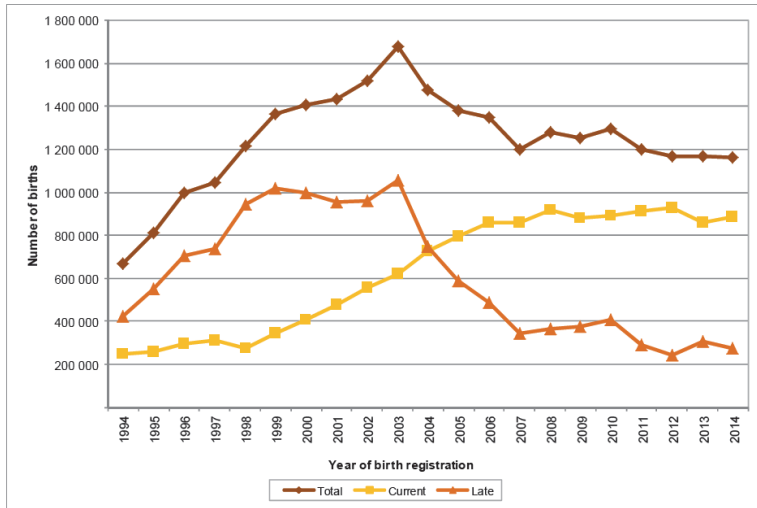
Source: Recorded live births 2014, Statistics South Africa (2015),
http://www.statssa.gov.za/?page_id=1854&PPN=P0305

Figure B.17.3. is a bar diagram of number of registered births in India from 1981 to 2010. It is interesting because it shows the development in registration rates. It would have been interesting to depict the completeness rate—the share of births registered out of the total number of births—with it.

Figure B.17.3. Registered Births, India: 1981-2010 (in 100,000)
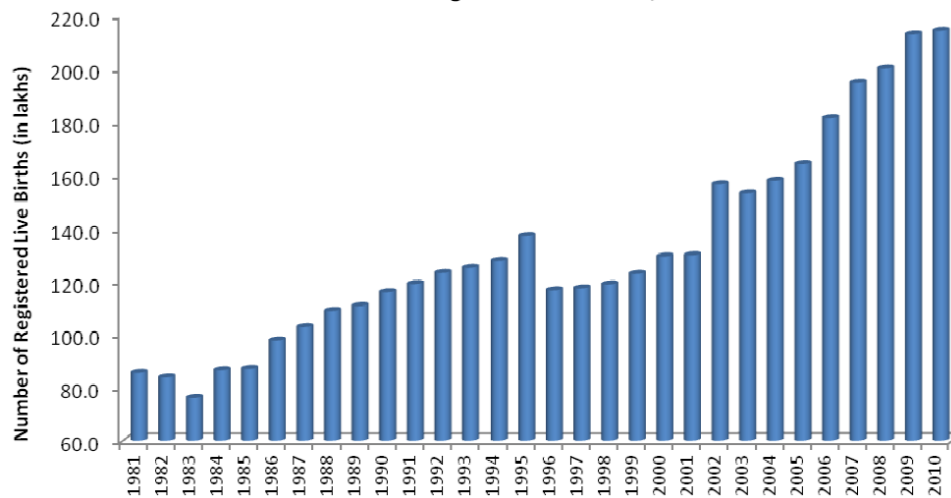
Source: [Vital Statistics for India 2010. http://www.censusindia.gov.in/2011-Common/vitalstatistics.html.

Figure B.17.4. shows the share of male and female births registered in India. The figures are interesting as they show a clear gender difference in birth registration. It is, however not clear from the figure whether this is related to a difference in number of births or whether the share of male vital events is higher. Registration completeness rates for both sexes might therefore be added.

Figure B.17.4. Distribution of Registered Births and Deaths, India: 2010
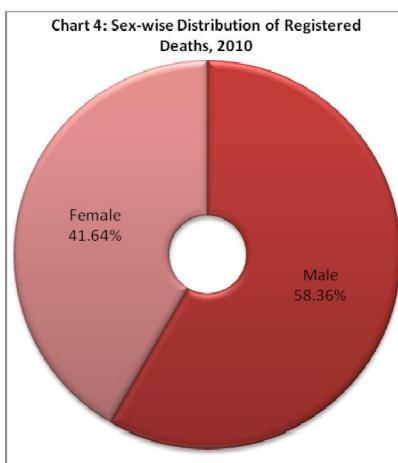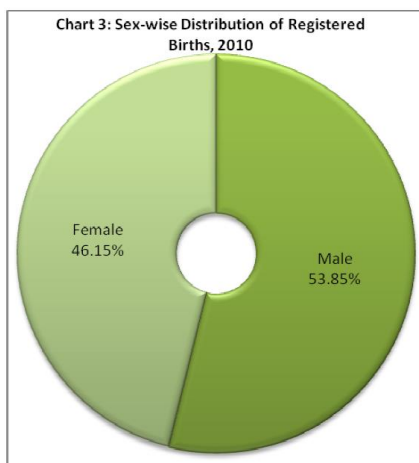
Chart 3: Sex-wise Distribution of Registered Births, 2010

Female 46.15%

Male 53.85%

Chart 4: Sex-wise Distribution of Registered Deaths, 2010

Female 41.64%

Male 58.36%

Source: Vital Statistics of India Based on the Civil Registration System 2010. New Delhi
http://www.censusindia.gov.in/2011-Common/vitalstatistics.html

END BOX 17.

Chapter 5. Deaths

In this chapter, the available registration data on deaths should be presented. A combination of tables, graphs and explanatory text will be useful for the audience. The data to be presented will naturally depend on the variables collected and their quality. As a guide, variables which are recommended by the United Nations are presented for deaths and for foetal deaths in box 18.

Box 18. Key death registration variables (BLUE BOX)

The topics on death to be investigated in the VSR are based on the information that is collected on death in the CR system. This usually includes the topics listed in Annex 1, which are taken from the *United Nations Principles and Recommendations*, pp. 20-21, and numbered for these Guidelines. The high-priority topics are indicated by boldface, as in P&R. However, some of the high-priority topics may be too complicated to be included in an early vital statistics report, such as educational attainment, occupation and socioeconomic status of the decedent, as such information is rarely collected when a birth is registered.

In practice, information on the recommended topics are supplemented by other information required so as to permit identification of the persons and events under consideration, including (a) registration serial number; (b) place of registration; (c) identification of the registrar; (d) name and surname of the person or persons directly involved in the event, with personal identification number if available; and (e) information on the characteristics of the informant.

Information on cause of death will only be of good quality if the cause of death has been certified according to ICD standards.

Deaths are usually under-registered as compared to births. This is, among other reasons, due to lack of incentives for registering deaths and to more deaths occurring outside medical institutions. Knowledge about the number of deaths are, nevertheless, very important for monitoring health trends and health sector planning, and for population projections. Unless the completeness is very high, completeness rates should be presented together with the death registration figures to enlighten the audience about the quality of the data presented.

Data on deaths from a comprehensive and well-functioning system is the preferred source of mortality estimates because it is cost-effective to collect the statistics and the analysis is direct, timely, and can be tailored to any time period and to any administrative unit (Kenya VSR, 2013). Other sources of death data such as censuses and surveys have serious limitations, such as recall and sampling errors and the need to apply indirect methods. Censuses and surveys are also expensive to conduct and are usually taken infrequently. Furthermore, detailed information on causes of death, including key disaggregations, cannot be obtained from such sources because of sample size limitations and the limitations of lay reporting for determining cause of death.

Since CoD is considered an important aspect of death registration, especially as a source for planning and policymaking, this template suggests a division between the presentation of statistics on deaths (chapter 5) and CoD statistics (chapter 6). The last chapter can be skipped if such information is unavailable or is of too poor quality. However, all countries should aim for complete registration of all deaths and recording of minimum information including the sex and age of the decedent, place and date of occurrence and usual residence.

The topics on deaths to be investigated in a VSR are based on the information that is collected on deaths in the CR system. This usually includes the topics listed in Annex 1. The statistics on deaths should be presented in tables, graphs and maps in this chapter. Also, the death registration form for the country should be annexed at the end of the report.

If data on causes of death are available and included in the VSR, the completeness rates and quality of these data should be presented and assessed in this chapter.

When deciding which tables to present, just as for births, it us useful to look at the recommendations of the United Nations Statistical Division, which presents a "Minimum list of tabulations" on deaths (United Nations, 2014, p. 158), as shown in Annex 2. However, some of these tables may be too extensive and complicated to make for some countries, especially in the first VSR. For births, we are therefore proposing a few essential tables on registered deaths below.

END BOX 18

Table 5.1 Registered deaths by age and gender, 201x

Age	Total	Male	Female
0			
• Neonatal (< 7 days)			
• Late neotatal (7-28 days)			
• Post neonatal (28-265 days)			
1-4			
5-9			
10-14			
15-19			
20-24			
…			
…			
95-99			
100+			
Not known			
Total			

Deaths by age and gender as in Table 5.1 are basic. They are needed for many purposes, including to study infant mortality and to make a life table. The age and sex distribution of deaths may also be shown in a graph.

Table 5.2. Number of registered deaths by place of death, 201x

	Total	Completeness	Urban	Rural	Not known
:					
2012					
2013					
2014					

This table is necessary for studying urban-rural differences in mortality, which would also require estimates of the population size in urban and rural areas are required.

Table 5.3 Registered deaths by region, 201x

	Total	Completeness	Died in medical institution	Died elsewhere	Not known
Total					
Region 1					
Region 2					
Region 3					
:					

This table is useful for studying regional mortality differences.

Table 5.4 Registered deaths by month of death, 201x

	Total	Male	Female
January			
February			
March			
April			
May			
June			
July			
August			
September			
October			
November			
December			
Not known			
Total			

This table provides information about the seasonal pattern of deaths. Monthly data on total deaths by broad age groups can help to identify unusual seasonal patterns due, for example, to extreme climate conditions. See "European monitoring of excess mortality for public health action" for examples of charts (http://www.euromomo.eu/).

Death indicators

In addition to the general presentation of registered deaths, there are a few rates and indicators which are often used and demanded both by national and international stakeholders. Many are also part of the Sustainable Development Goals presented in the introductory guidelines, chapter IV, such as:

- Crude death rate
- Infant mortality rate (IMR)
- Under five mortality rate (U5MR)
- Maternal mortality rate (MMR)
- Age-specific mortality rates
- Death rates by age and sex (q_x)

- Life expectancy at birth (LE, e_0)

It may be very demanding to calculate these indicators, both regarding data requirements and methodology. Some of them are dependent on CoD information, such as the maternal mortality ratio. Box 19 provides short descriptions and how to calculate each of them. If available, these rates could be presented. However, if completeness rates are low and the quality of the rates uncertain, postponement of publication of these rates until later, perhaps in a separate report.

Again, it should be emphasized that in settings with weak CR systems the top priority is to collect and disseminate data on all deaths by age, sex, data of occurrence and location. The example from South African (see box 20 below) shows age- and sex-specific mortality rates that can track the decline in HIV-related mortality.

Box 19. Calculating death indicators (Blue box)

Crude Death Rate (CDR)
The CDR is defined as the number of resident deaths for a specific area during a specified period divided by the total population (mid-year estimate) for the same area and period multiplied by 1,000

$$\frac{\text{\# of resident deaths X 1,000}}{\text{Total Population}}$$

CDR is a very general indicator or index of the health status of a geographic area or population. This type of crude rate is generally not appropriate for comparison of different populations or areas because of the significant effect of age on mortality and the highly different age distributions in different populations. Age-adjusted mortality (standardized death rates) or the life expectancy should be used for comparative analysis.

Age-Specific Death Rate (ASDMR)
The age-specific death rate is the number of deaths for a specific age or age group in a specific area during a specified period divided by the population of the same age or age group in the same area and period multiplied by 100,000 (or 1,000):

$$\frac{\text{\# of resident deaths in specified age or group X 100,000}}{\text{Total population in same specified age or group}}$$

Infant Mortality Rate (IMR)
The IMR is defined as the number of new-born dying before they reach 1 year of age for a specific area during a specified period divided by the number of resident live births for the same area/period multiplied by 1,000, or the probability of dying before age 1:

$$\frac{\text{\# of resident infant deaths X 1,000}}{\text{\# of resident live births}}$$

Maternal Mortality Ratio (MMR)
The maternal mortality ratio is the number of maternal deaths (the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes) in a specific area during a specified period divided by the total number of live births for the same area and period multiplied by 100,000.

$$\frac{\text{\# of resident maternal deaths X 100,000}}{\text{\# of resident live births}}$$

The maternal mortality ratio is an SDG indicator (Goal 3.1) and is considered a primary and important indicator of an area's overall health status or quality of life. The maternal mortality ratio can also be used as an indicator of access to prenatal and obstetrics care (where additional resources may be needed).

Because maternal deaths are rare in some countries, large samples would be needed to collect information about maternal mortality in surveys. Having access to this information through a register with International Classification of Diseases (ICD) coding of sufficient quality is therefore of great use.

Life Expectancy at Birth(e_0)
The life expectancy is most often referenced to as at birth and is derived using life table calculations, as described above, although such calculations allow for estimation of life expectancy at various ages, (an example is shown in table B.19.1 in the next box). The life expectancy at birth is a standardized summary measure sometimes used as an overall gauge of health based on a population's mortality experience. As such, it is an index of the level of mortality within a population, and it represents a hypothetical number of years a newborn would live, on average, if he or she experienced the prevailing level of mortality in each age group as he or she ages.

END BOX 19.

Box 20. Country examples of death registration tables and graphs (Green box)
The figure below shows the number of deaths in South Africa for the years 1997-2008. The well-known age pattern is clear, but it is not clear why the deaths have increased in most age groups. The reason is probably an increase in the population *size* and not in the mortality. A figure showing the death rates would have illuminated this.

Figure B.20.1. Example of age and sex specific mortality rates from South Africa

Male deaths 1997 - 2008, South Africa

Female deaths 1997 - 2008, South Africa

Source: Stats SA data
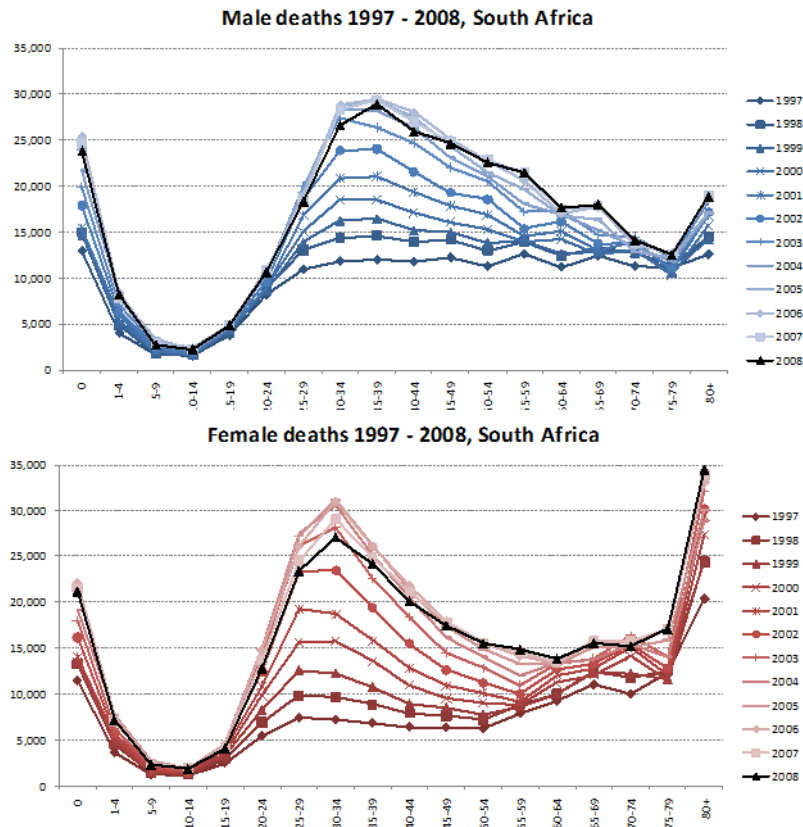
The figure below shows the change over time in the infant mortality rate in Algeria.

Figure B.20.2. Infant Mortality Rate, Algeria: 1980-2015

Evolution du TMI de 1990 à 2015 (en ‰)

Source: http://www.ons.dz/IMG/pdf/Demographie2015.pdf
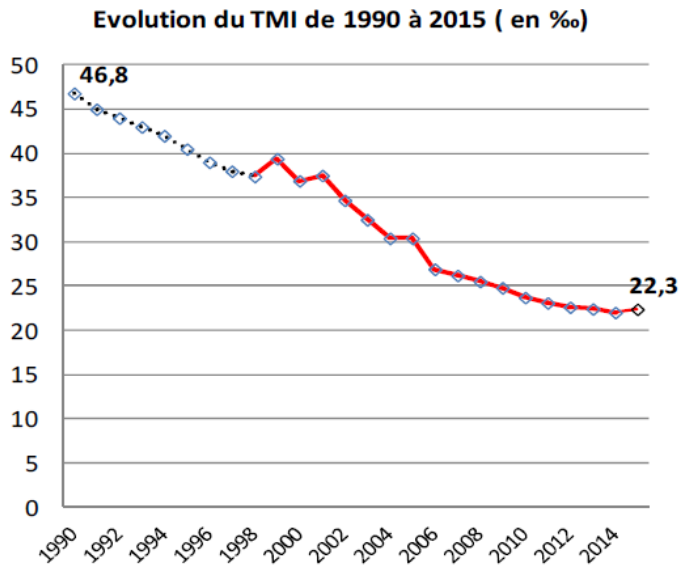
The table below is an example of a life table from the UK in 1985. It contains several interesting indicators: the probability of dying, the probability of surviving, number of survivors, number of deaths, person years lived in the interval, total person lives and life expectancy. Not all indicators

have to be included, but if more guidance is needed on how to calculate them, this can be found in the link below the table.

Table B.20.1. Example of life table (abridged, i.e. for age groups)

x	n	$_nq_x$	$_np_x$	l_x	$_nd_x$	$_nL_x$	T_x	e_x
0	1	0.008252	0.991748	100 000	825	99 258	7 756 261	77.563
1	4	0.001630	0.998370	99 175	162	396 311	7 657 003	77.207
5	5	0.000905	0.999095	99 013	89	494 842	7 260 692	73.331
10	5	0.000935	0.999065	98 924	93	494 388	6 765 850	68.394
15	5	0.001409	0.998591	98 831	139	493 808	6 271 462	63.456
20	5	0.001534	0.998466	98 692	152	493 080	5 777 654	58.542
25	5	0.001818	0.998182	98 540	179	492 253	5 284 574	53.629
30	5	0.002826	0.997174	98 361	278	491 110	4 792 321	48.722
35	5	0.004410	0.995590	98 083	432	489 335	4 301 211	43.853
40	5	0.007199	0.992801	97 651	693	486 523	3 811 876	39.036
45	5	0.012348	0.987652	96 958	1 197	481 798	3 325 353	34.297
50	5	0.020831	0.979169	95 761	2 005	473 793	2 843 555	29.694
55	5	0.035455	0.964545	93 756	3 324	460 470	2 369 762	25.276
60	5	0.058507	0.941493	90 432	5 291	438 933	1 909 292	21.113
65	5	0.087310	0.912690	85 141	7 434	407 120	1 470 359	17.270
70	5	0.139189	0.860811	77 707	10 816	361 495	1 063 239	13.683
75	5	0.220993	0.779007	66 891	14 782	297 500	701 744	10.492
80	5	0.352367	0.647633	52 109	18 362	214 640	404 244	7.758
85		1.000000	0.000000	33 747	33 747	189 604	189 604	5.618

Source: Population Analysis for Policies & Programmes,
http://papp.iussp.org/sessions/papp101_s07/PAPP101_s07_030_010.html

The figure below shows the life expectancy at birth for men and women in Norway since 1850. It exhibits several interesting developments, including the Spanish Flu in 1918, the effects of the second world war 1940-45 on men, and the catching up of male life expectancy in the past 30 years, which is partly due to changing smoking habits.

Figure B.20.3. Life expectancy at birth for males and females sex in Norway 1850-2015
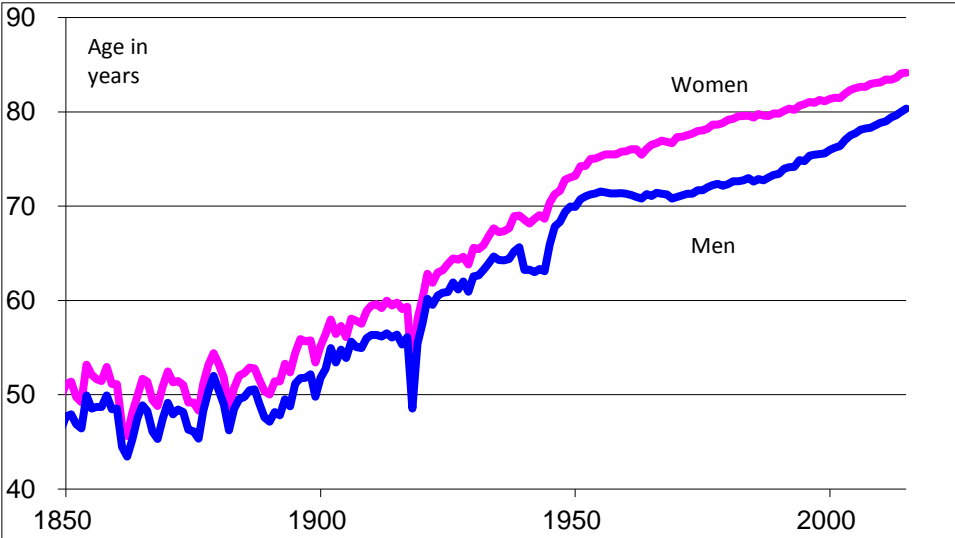
Source: Statistics bank, Statistics Norway

END BOX 20

Chapter 6. Causes of death

Many countries have poor or non-existent CoD data. One reason for this is that a good determination of cause of death can only be done by a medical doctor. Most CR systems do not register medical certificates. CoD can also be ascertained by a verbal autopsy but this is of questionable reliability.

Nevertheless, with the same justification as for publishing incomplete data on births and deaths, beginning to publish what is available on CoD should be considered. This might increase the focus on data quality and the need for improvements in the registration system.

Several countries have chosen to publish CoD reports separately because the availability of data does not always concur with the availability of birth and death data. This is linked to differences in institutional arrangements and responsibilities. South Africa, for example, publishes statistics on deaths and cause of death together in a special report. See http://www.statssa.gov.za/?page_id=1856&PPN=P0309.3&SCH=6377. This template and guideline does not cover this topic as thoroughly as births and deaths, but there are plans to publish a separate CoD guide and template.

According to WHO (2010a), "A frequently used indicator of the quality of cause-of-death data is the percentage of all deaths for which the cause is classified as ill-defined (chapter XVIII of the ICD-10). Ill-defined causes are of no public health value. Also, where they are common, they will make the cause-of-death distribution unreliable, because the true causes of death are hidden and hence underestimated. Generally, it is often mentioned that the percentage of deaths for which the cause is ill-defined should be less than 10 per cent at ages 65 years and over, and less than 5 per cent at ages below 65 years. If the percentage of ill-defined causes has declined significantly, caution must be exercised when interpreting trends in specific causes (such as cancers or heart disease), because changes in death rates from these causes may be largely or entirely due to the redistribution effect from ill-defined to more-specific causes."

WHO has published several publications on cause of death statistics that should be consulted, including *International Classification of Diseases* (WHO 2010), *Analysing mortality levels and causes of death (ANACoD)* (WHO 2011), and *Application of ICD-10 for low-resource settings initial cause of death collection: The Startup Mortality List* (WHO 2014). Moreover, the Training Course on Civil Registration and Vital Statistics Systems developed by the International Statistics Program of CDC, also has several modules addressing cause-of-death statistics. See http://www.cdc.gov/nchs/isp/isp_fetp.htm.

If causes-of-death statistics are to be included in the VSR, there should be a presentation of issues and statistics such as:

- System for classifying causes of death (preferably ICD-10)
- Reported causes of death
- Method of ascertaining the cause of death
- Broad groups of the underlying causes of death:
    - communicable/perinatal/maternal
    - non-communicable
    - external causes
- Natural and non-natural causes of death
- Deaths by cause, age, and sex
- Major groups of causes of death as per Global Burden of Disease

- Broad groups of natural causes of death
- Non-natural causes of death
- Comparison between immediate, contributing and underlying causes of death

Box 21. Country examples summary causes of death (GREEN BOX)

Two country examples of cause of death publications are provided in this box. The first example is from Kenya while the second is from Malaysia.

Kenya

Below is an excerpt from the Kenya VSR for 2013.

Table B.21.1 The ten leading causes of death in Kenya, 2013

Table 8: Top 10 leading causes of death by sex, 2013

	Cause (male)	Male Percent	Male Number	Cause (female)	Female Percent	Female Number	Cause (both)	Total Percent	Total Number
1	Malaria	11.8	12,721	Malaria	12.8	11,068	Malaria	12.2	23,789
2	Pneumonia	11.5	12,392	Pneumonia	12.2	10,526	Pneumonia	11.8	22,918
3	Other Cause	7.9	8,537	HIVAIDS	7.5	6,477	HIVAIDS	7.4	14,465
4	Tuberculosis	6.7	7,243	Cancer	6.9	5,928	Other Cause	7.1	13,720
5	HIVAIDS	6.4	6,895	Tuberculosis	6.8	5,869	Cancer	6.3	12,287
6	Cancer	6.2	6,663	Other Cause	6.3	5,392	Tuberculosis	5.9	11,448
7	Sudden death	5.2	5,579	Sudden death	5.2	4,523	Sudden death	5.8	11,186
8	Anemia	3.8	4,088	Anemia	4.7	4,037	Anemia	4.2	8,125
9	Road traffic accid.	3.3	3,552	Heart disease	2.9	2,493	Heart disease	2.5	4,942
10	Other accidents	3.2	3,471	Meningitis	2.6	2,270	Meningitis	2.5	4,898
	All other Cause	34.2	36,991	All other Cause	32.0	27,617	All other Cause	34.2	66,554
	Total	100.0	108,132	Total	100.0	86,200	Total	100.0	194,332

Source: Kenya Annual Vital Statistics Report, 2013.

If CoD statistics are published, it is important to discuss the quality and completeness of the data. This is done in the *Kenya Annual Vital Statistics Report,2013*:

"The CRD collects information on causes of death recorded on Forms D1 and D2, medical certification and lay reporting of cause of death, respectively."

"The monthly tally list has several limitations. First, the causes of death from both registration forms are tallied together, with no way to distinguish the lay-reported causes by assistant chiefs from those that are medically certified by clinicians. Second, the comprehensive list of possible causes on the tally sheet includes a total of 46 causes of deaths, including the category "other causes." This list contains most of those 24 causes listed on the D2 form and some other causes. Again, the list of tallied causes of death is not a standard list, and it is not known how or why those causes were selected over others.

Kenya does not use medical certification widely, a conclusion based on a previous assessment that used 2011 information on ICD-10 certified and coded data from MOH. For example, only 1 to 2 per cent of health facilities (i.e., 46 out of a total of 3,412 health facilities that are responsible for notifying births and deaths to CROs) reported ICD-10 coded deaths [MEASURE Evaluation–PIMA and CRD, 2013]. This information shows that 9,497 ICD-10 certified and coded deaths were reported by these institutions in 2011, out of a total of 411,641 expected deaths (2 to 3 per cent of deaths)."

Three points should be emphasized regarding the table on the ten leading causes of death in Kenya, which emphasize the need to improve cause of death statistics in Kenya further:

- The proportion of medically certified deaths is very low, only 2-3 per cent.
- The list of causes does not abide by any international list of aggregated causes of death.
- There is a high proportion of non-specific causes, "Other causes" and "All other causes", which sum up to 41.3 per cent for both sexes.

Malaysia

Another country which publishes causes of death information is Malaysia. The annual publication provides detailed information about causes of death for the population in general, but also for specific sub-groups of the population. This includes causes of infant and maternal deaths. Figure B21.1. is a figurative illustration of the 10 most common medically certified causes of death in Malaysia in 2014. They also specify that for non-medically certified causes of death, old age was the principal cause of death in 2014 with 52.2%. This division into medically and non-medically certified causes of death is a useful specification which should be included where there is a significant difference between the two.

Figure B.21.1. Ten principal causes of deaths in Malaysia, 2014.

2014

1.Ischaemic heart diseases, 13.5% (10,432)

2.Pneumonia, 12.0% (9,250)

3.Cerebrovascular diseases, 7.1% (5,474)

All causes (77,365)

10.Malignant neoplasm of breast, 1.4% (1,061)

9.Certain conditions originating in the perinatal period, 1.6% (1,219)

8.Chronic lower respiratory diseases, 1.6% (1,219)

7.Diseases of the liver, 1.8% (1,395)

6.Malignant neoplasm of trachea, bronchus and lung, 2.3% (1,741)

5.Transport accidents, 5.6% (4,304)

4.Septicaemia, 6.1% (4,698)

Source: Statistics on causes of death, Malaysia 2014. (Department of Statistics, Malaysia)

END BOX 21

Chapter 7. Marriages and Divorces

In this chapter, statistics on marriages, divorces and other marital changes may be presented if data on such events are registered. A combination of tables, graphs and explanatory text will be useful. Linkages to earlier chapters, especially the one on completeness, should also be considered.

It may be useful to start this section by mentioning how a marriage is defined in the country. The *United Nations Principles and Recommendations* say that a marriage is "the act, ceremony or process by which the legal relationship of spouses is constituted. The legality of the union may be established by civil, religious or other means as recognized by the laws of each country." The Principles says that "Countries may wish to expand this definition to cover civil unions if they are registered..." and that "It is necessary to take into account customary unions (which are legal and binding under customary law) and extralegal unions, known as de facto or consensual unions."

A divorce is defined as "the final legal dissolution of a marriage, that is, that separation of spouses which confers on the parties the right to remarriage under civil, religious and/or other provisions, according to the laws of each country."

A legal contract of marriage may be dissolved by: (a) the death of one of the spouses, (b) a divorce decree or (c) cancellation (annulment).

The tables and graphs to be presented on marriage and divorce will depend on the variables collected when registering a birth. Annex 1 provides an overview of the variables that are considered most important; so if available, these should be considered when presenting information. Annex 2 included a list of tables recommended by P&R as well as some tables if indicators.

Box 22. Why marriage and divorce statistics? (blue box)

The vital events marriages and divorces are registered in many countries, but in far from all. Marriages and divorces are important events in people's lives. The registration of them is necessary to obtain certificates, which may be of great legal and human rights significance. Examples include property rights, inheritance, custody of children and the right to remarry. Particularly women and children in families where the spouses are not married may be in a much weaker economic and legal position if one of the parents dies or if the non-marital union is split.

It is worth noting that the marriage institution and its importance vary from country to country. In the Scandinavian countries, for example, marriage is far less important than it used to be. It has become socially acceptable for couples to live together and have children without being married. Still, most couples are marrying sooner or later. In some countries virtually everybody marries and non-married couples and especially their children may be ostracized, whereas in other countries it is common not to marry and not being married does not carry any social stigma.

Many countries do not publish marriage and divorce statistics. The reasons for this can be a lack of availability of data if marriages and divorces are not registered, or a lack of social significance of marriage.

END BOX 22.

Box 23.: Examples of tables and figures on marriages and divorces in Botswana (GREEN BOX)

Below are some examples of marital tables and figures from Botswana, taken from Statistics Botswana: Vital Statistics Report, 2014, Gaborone, March 2016. Available from http://www.cso.gov.bw/images/vital.pdf, where more examples can be found.

VSRs for most countries do not include marriages and divorces. This is the case for countries like Kenya, Namibia, South Africa and India.

Figure B.23.1. Total number of marriages registered, Botswana, 2005-2014
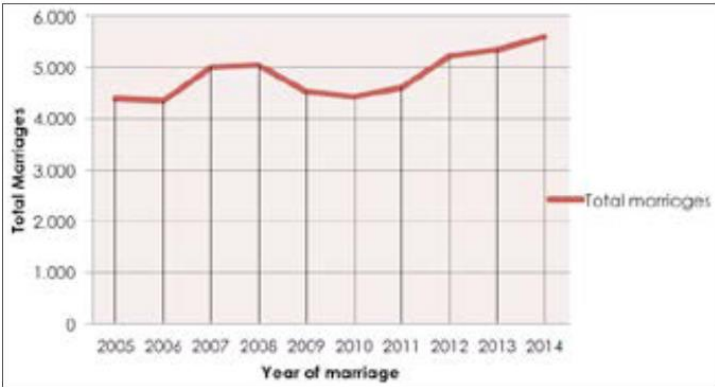
Figure B.23.2. Registered marriages by month of registration, Botswana, 2014
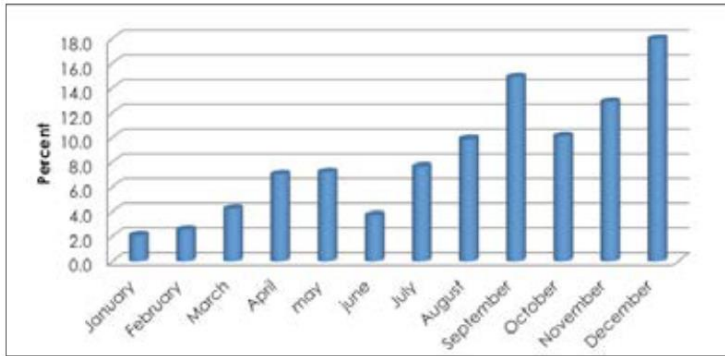
Table B.23.1. Mean age at first marriage, Botswana 2005-2014

Year	Bachelor	Spinster
2014	39	34
2013	39.1	34.1
2012	38.2	33.2
2011	37.6	32.6
2010	38.4	32.6
2009	37.9	32.1
2008	37.6	31.9
2007	36.8	31.5
2006	36.9	31.4
2005	37.3	31.7

End box 23

Chapter 8. Summary Tables

At the end of the VSR, there may be a few summary tables that show the development of the major vital statistics indicators over time, for as many years as possible. United Nations (2014, p. 159) proposes a list of summary tables which also can be found in Annex 2.

The tables recommended by the United Nations are important and efforts should be made to include as many as possible. Data on some of these variables may, however, not be available at all or there may be serious under-registration, in particular of foetal deaths, infant deaths, marriages and divorces. If data are not available by place of residence, the numbers may be tabulated by place of occurrence or registration.

The most essential of these tables is the last one, ST-9. See Table 7.1.

Table 8.1 Time series of vital events, 201x

Year	Live births	Deaths	Infant deaths	Marriages	Divorces
:					
2012					
2013					
2014					

If there are data on internal or external migrations they could be included in this table. Another essential summary table is one showing vital *rates*, based on the calculation explained in section 3.2. See Table 7.2.

Table 8.2. Time series of vital rates, 201x

Year	Crude Birth Rate	Crude Death Rate	Population size	Population growth
:				
2012				
2013				
2014				

To make this table, it is necessary to use denominators with counts or estimates of the population size. Section 3.2 explains how this can be done from population censuses and population projections.

Box 24. Expected population size (BLUE BOX)

If there are no available data on total births and deaths, estimates of the total population size are required to estimate the number of expected births or deaths, and to estimate crude birth and death rates. The number of expected births or deaths may be calculated using either crude birth and death rates or age-specific birth and death rates. Age-specific rates yield more accurate estimates of expected events because they control for age, and therefore, all of the completeness rates should preferably be generated using age-specific information.

Sex and age-specific birth and death rates may be estimated from the most recent census, or from a sample survey such as Demographic and Health Surveys (DHS). If there are clear time trends, the rates should be projected. If no age-specific rates are available and there are no relevant data to

estimate them, they may be taken from the database of United Nations Population Division. See http://esa.un.org/unpd/wpp/DataQuery/.

Estimates of the population size by age and sex may be taken from population projections, which are usually based on the most recent census. If reliable national population projections are not available, they may be taken from the database of United Nations Population Division. See http://esa.un.org/unpd/wpp/DataQuery/.

Crude birth and death rates can be calculated in the following way:

a) Crude Birth Rate (CBR) = Estimated number of expected births / Total population x 1000.
b) Crude Death Rate (CDR) = Estimated number of expected deaths / Total population x 1000.

Estimates of crude rates are of considerable interest in itself, as they say something about fertility and mortality trends. These numbers may be included in the summary tables.

The expected numbers of births may be calculated using the most recent age-specific birth rates of women in reproductive age (15–49 years) multiplied by the corresponding projected female populations by age, or by the crude birth rate multiplied by the total population size.

END BOX 24

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Annex 1: Civil registration variables

Source: Table III.1, pp. 18-19, UN Principles and Recommendations.
Definitions and specifications are presented in Chapter III.D, pp. 24-48, P&R. Core topics are indicated by boldface (from P&R).

Number	Topic	Available from CR of births	Available from other sources	Not available	Year(s) available
	Birth registration variables				
(i)	**Characteristic of the event**				
a	**Date of occurrence**				
b	**Date of registration**				
c	**Place of occurrence**				
d	**Locality of occurrence**				
e	**Urban/rural occurrence**				
f	**Place of registration**				
g	**Type of birth (i.e., single, twin, triplet, quadruplet or higher-multiple delivery)**				
h	**Attendant at birth**				
i	Type of place of occurrence (hospital, home, etc.)				
(ii)	**Characteristics of the newborn**				
a	**Sex**				
b	**Weight at birth**				
(iii)	**Characteristics of the mother**				
a	**Date of birth**				
b	**Age**				
c	**Marital status**				
d	**Child born in wedlock (legitimacy status of the child)**				
e	**Educational attainment**				
f	Literacy status				
g	Ethnic and/or national group				
h	Citizenship				
i	Economic activity status				
j	Usual occupation				
k	Socioeconomic status				
l	**Place of usual residence**				
m	**Locality of residence**				
n	**Urban/rural residence**				
o	**Duration of residence in usual place**				
p	Place of previous residence				
q	**Place/country of birth**				
r	**Migrant status**				
s	Date of last menstrual cycle of the mother				
t	Gestational age				

			Available from CR of deaths	Available from other sources	Not available	Year(s) available
u		Number of prenatal visits				
v		Month of pregnancy prenatal care began				
w		**Children born alive to mother during her entire lifetime**				
x		**Birth order or parity**				
y		Foetal deaths to mother during her entire lifetime				
z		Date of last previous live birth				
aa		**Foetal deaths to mother during her entire lifetime**				
ab		**Date of last previous live birth**				
ac		**Interval since last previous live birth**				
ad		**Date of marriage**				
ae		**Duration of marriage**				
(iv)		**Characteristics of the father (if known)**				
a		**Date of birth**				
b		**Age**				
c		**Marital status**				
d		**Educational attainment**				
e		Literacy status				
f		Ethnic and/or national group				
g		Citizenship				
h		Economic activity status				
i		Usual occupation				
j		Socioeconomic status				
k		**Place of usual residence**				
l		**Locality of residence**				
m		**Urban/rural residence**				
(v)		**Characteristics of population at risk**	See P&R p. 48			

Death registration variables

Number	Topic	Available from CR of deaths	Available from other sources	Not available	Year(s) available
(i)	**Characteristics of the event**				
a	**Date of occurrence**				
b	**Date of registration**				
c	**Place of occurrence**				
d	**Locality of occurrence**				
e	**Urban/rural occurrence**				
f	**Place of registration**				
g	**Cause of death**				
h	Manner of death				
i	Whether autopsy findings were used to establish cause of death				
j	Death occurring during pregnancy, childbirth and puerperium (for females 15-49 years of age)				
k	**Certifier**				

		Topic				
	l	**Type of certification**				
	m	Type of place of occurrence (hospital, home, etc.)				
(ii)		**Characteristics of the decedent**				
	a	**Date of birth**				
	b	**Age**				
	c	**Sex**				
	d	**Marital status**				
	e	Educational attainment				
	f	Literacy status				
	g	Ethnic and/or national group				
	h	Citizenship				
	i	Economic activity status				
	j	Usual occupation				
	k	Socioeconomic status				
	l	Whether birth was registered (for deaths under 1 year of age)				
	m	Born in wedlock (for deaths under 1 year of age)				
	n	Legitimacy status (for deaths under 1 year of age)				
	o	**Place of usual residence**				
	p	**Place of usual residence of the mother (for deaths under 1 year of age)**				
	q	**Locality of residence**				
	r	**Urban/rural residence**				
	s	Duration of residence in usual (present) place				
	t	Place of previous residence				
	u	Place of birth				
	v	Migrant status				
(iii)		**Characteristics of population at risk**	See P&R p. 48			

		Foetal death registration variables				
Number		**Topic**	**Available from CR of births**	**Available from other sources**	**Not available**	**Year(s) available**
(i)		**Characteristics of the event**				
	a	**Date of occurrence (of foetal delivery)**				
	b	**Date of registration**				
	c	**Place of occurrence**				
	d	**Locality of occurrence**				
	e	**Urban/rural occurrence**				
	f	**Place of registration**				
	g	Type of birth (i.e., single, twin, triplet, quadruplet, or higher-multiple delivery)				
	h	Attendant at birth				
	i	Certifier				
	j	Type of certification				
	k	Cause of foetal death				

		Type of place of occurrence (hospital, home, etc.)				
(ii)		**Characteristics of the foetus**				
	n	**Sex**				
	a	Delivered in wedlock				
	b	Legitimacy status				
	c	Weight at delivery				
	d	Date of last menstrual period of the mother				
	e	Gestational age				
(iii)		**Characteristics of the mother**				
	a	**Date of birth**				
	b	**Age**				
	c	Number of prenatal visits				
	d	**Children born alive to mother during her entire lifetime**				
	e	**Birth order or parity**				
	f	Children born to mother during her entire lifetime and still living				
	g	**Foetal deaths to mother during her entire lifetime**				
	h	**Date of last previous live birth**				
	i	**Interval since last previous live birth**				
	j	**Date of marriage**				
	k	**Duration of marriage**				
	l	Educational attainment				
	m	Literacy status				
	n	Economic activity status				
	o	Usual occupation				
	p	Socioeconomic status				
	q	Ethnic and/or national group				
	r	Citizenship				
	s	**Place of usual residence**				
	t	**Locality of residence**				
	u	**Urban/rural residence**				
	v	Duration of residence in usual (present) place				
	x	Place of previous residence				
	y	Place of birth				
	z	Migrant status				
(iv)		**Characteristics of the father**				
	a	**Date of birth**				
	b	**Age**				
	c	Education attainment (30) ¦				
	d	Literacy status (31) ¦				
	e	Economic activity status (34) ¦				
	f	Usual occupation (35) ¦				
	g	Socioeconomic status				
	h	**Place of usual residence**				

Number		Topic	Available from CR of marriages	Available from other sources	Not available	Year(s) available
	i	**Locality of residence**				
	j	**Urban/rural residence**				
	k	Duration of residence in usual (present) place				
	l	Place of previous residence				
	m	Place of birth				
	n	Migrant status				
	o	Ethnic and/or national group				
	p	Citizenship				
(v)		**Characteristics of population at risk**	See P&R p. 48			

Marriage registration variables

Number		Topic	Available from CR of marriages	Available from other sources	Not available	Year(s) available
(i)		**Characteristics of the event**				
	a	**Date of occurrence (of foetal delivery)**				
	b	**Date of registration**				
	c	**Place of occurrence**				
	d	**Locality of occurrence**				
	e	**Urban/rural occurrence**				
	f	**Place of registration**				
	g	Type of marriage				
(ii)		**Characteristics of bride and groom (separately)**				
	a	**Date of birth**				
	b	**Age**				
	c	Marital status (previous)				
	d	Number of previous marriages				
	e	Marriage order				
	f	Educational attainment				
	g	Literacy status				
	h	Economic activity status				
	i	Usual occupation				
	j	Socioeconomic status				
	k	Ethnic and/or national group				
	l	Citizenship				
	m	**Place of usual residence**				
	n	**Locality of residence**				
	o	**Urban/rural residence**				
	p	Duration of residence in usual (present) place				
	q	Place of previous residence				
	r	Place of birth				
	s	Migrant status				
(iii)		**Characteristics of population at risk**	See P&R p. 48			

Divorce registration variables

Number		Topic	Available from CR of divorces	Available from other sources	Not available	Year(s) available
(i)		**Characteristics of the event**				
a		**Date of occurrence**				
b		**Date of registration**				
c		**Place of occurrence**				
d		**Locality of occurrence**				
e		**Urban/rural occurrence**				
f		**Place of registration**				
(ii)		**Characteristics of divorcees (husband and wife separately)**				
a		Date of birth				
b		Age				
c		Type of marriage being dissolved				
d		Number of dependent children of divorced persons				
e		Number of children born alive to the marriage being dissolved				
f		**Date of marriage**				
g		**Duration of marriage**				
h		Mode of dissolution of previous marriage				
i		Number of previous marriages				
j		Marriage order				
k		Educational attainment				
l		Literacy status				
m		Economic activity status				
n		Usual occupation				
o		Socioeconomic status				
p		Ethnic and/or national group				
q		Place of usual residence				
r		Locality of residence				
s		Urban/rural residence				
t		Duration of residence in usual (present) place				
u		Place of previous residence				
v		Place of birth				
w		Migrant status				
x		Place of occurrence of marriage being dissolved				
(iii)		**Characteristics of population at risk**	See P&R p. 48			

Annex 2: Tabulation plan

This annex includes the tables recommended by *Principles and Recommendations* as well as other tables proposed in these Guidelines. It may be useful to go through these lists when making the tabulation plan and to include the years(s) for which the tables can (or should) be made. The choice and numbering of the tables is up to the country.

Place of usual residence is commonly considered to be the most important location variable.

The number of administrative units to be included depends on the administrative structure of the CR system and the number of units. If the number of units is large a more detailed table may be included as an annex to the vital statistics report and/or a web table.

The most important of the completeness tables are the national estimates of completeness rates for each vital event. They should be estimated for as many years as possible and by sex if the data are available. The regional rates are important for monitoring the registration level at regional levels, but should be given second priority. They are also more complicated to estimated and usually less reliable, since regional population estimates are usually not so easily available, unless a census has recently been conducted.

A2.1 Completeness tables

Table number	Number in P&R	Completeness rate for / Table content	Possible: Yes/ No	Possible if CR data are combined with other data sources	Year(s)
		First priority tables			
C-1		Completeness of registration of births			
C-2		Completeness of registration of births by sex and region			
C-5		Completeness of registration of deaths			
C-6		Completeness of registration of deaths by sex and region			
		Second priority tables			
C-3		Completeness of registration of children under 5			
C-4		Completeness of registration of children under 5 by sex and region			
C-7		Completeness of registration of causes of death			
C-8		Completeness of registration of causes of deaths by sex and region			
C-9		Completeness of registration of marriages			
C-10		Completeness of registration of marriages by sex and region			
C-11		Completeness of registration of divorces			
C-12		Completeness of registration of divorces by sex and region			

A2.2 Live births tables

Table number	Number in P&R	Table content	Possible: Yes/ No	Possible if CR data are combined with data from other sources	Year(s)
		First priority tables			
4.1	IB-1	Total number of live births by sex, incl. sex ratio at birth and site of delivery[1]			

4.2	ST-3	Live births by place of residence[1] and urban–rural residence of the mother[1]			
4.3	LB-9	Live births by age of mother (15-19, 20-24 … 45-49)			
4.4	LB-1	Live births by place of occurrence and sex of child[1]			
4.5	LB-2	Live births by place of occurrence and place of usual residence of mother			
		Second priority tables			
	LB-3	Live births by place of registration, month of occurrence and month of registration			
	LB-9	Live births by place of usual residence and age of mother, sex of child and live-birth order			
	LB-11	Live births by place of birth, place of usual residence and age of mother			
	LB-13	Live births by place of occurrence, site of delivery and attendant at birth			
	LB-4	Live births by month, place of occurrence and place of usual residence of mother			
	LB-5	Live births by age, place of usual residence and marital status of mother			
	LB-6	Live births by age of father			
	LB-7	Live births by place of usual residence, age and educational attainment of mother			
	LB-8	Live births by educational attainment and age of mother, and live-birth order			
	LB-10	Live births by live-birth order and interval between last and previous live births to mother			
	LB-12	Live births by place of usual residence and age of mother and legitimacy status			
	LB-14	Live births by site of delivery, attendant at birth and birth weight			
	LB-15	Live births by birth weight and place of usual residence and educational attainment of mother			
	LB-16	Live births by gestational age, place of usual residence of mother and birth weight			
	LB17-	Live births by birth weight, place of usual residence of mother and month in which prenatal care began			
	LB-18	Live births by age and place of usual residence of mother and month in which prenatal care began			
	LB-19	Live births by live-birth order, place of usual residence of mother and month in which prenatal care began			
	LB-20	Live births by place of usual residence of mother and duration of residence at the LB-current usual residence			

[1] May also include the sex ratio at birth.

Table A2.3. Indicators of Live Births

Table number	Number in Guidelines	Table content	Possible: Yes/No	Possible if CR data are combined with data from other sources	Year(s)
		First priority tables			
	IB-1	Crude Birth Rate (CBR)			
	IB-2	Age-specific Birth Rates (ASBR) for 5-year age groups			
	IB-3	Total Fertility Rate (TFR)			
		Second priority tables			

	IB-4	General Fertility Rate (GFR)			
	IB-5	Net Reproduction Rate (NRR)			
	IB-6	Mean (or median) age at childbearing			
	IB-7	Mean (or median) age at first birth			
	IB-8	Proportion of births born in marriage			
	IB-9	Children Ever Born			

A2.4 Death tables

Table number	Number in P&R	Table content	Possible: Yes/No	Possible if CR data are combined with data from other sources	Year(s)
		First priority tables			
	DE-1	Deaths by place of usual residence and sex of decedent			
	DE-2	Deaths by place of occurrence and place of usual residence and sex of decedent			
	DE-4	Deaths by place of registration, month of occurrence and month of registration			
	DE-5	Deaths by place of occurrence and site of occurrence			
	DE-6	Deaths by place of usual residence, age and sex of decedent			
		Second priority tables			
	DE-3	Deaths by month and place of occurrence and place of usual residence of decedent			
	DE-7	Deaths by age, sex, place of usual residence and marital status of decedent			
	DE-8	Deaths by place of usual residence, age, sex and educational attainment of decedent			
	DE-9	Deaths by sex, cause of death, place of usual residence and age of decedent			
	DE-10	Deaths by month of occurrence and cause of death			
	DE-11	Deaths by place of occurrence, sex of decedent and type of certification			
	DE-12	Maternal deaths by cause of death and age of woman			
	DE-13	Deaths by age and type of usual activity of decedent			

A2.5 Indicators of deaths tables

Table number	Number in P&R	Table content	Possible: Yes/No	Possible if CR data are combined with data from other sources	Year(s)
		First priority tables			
	ID-1	Total number of deaths by sex			
	ID-2	Crude Death Rate (CDR)			
	ID-3	Infant Mortality Rate (IMR)			
	ID-4	Under 5 Mortality Rate (U5MR)			
	ID-5	Maternal Mortality Rate (MMR)			
	ID-6	Age-specific Death Rates (m_x) for 5-year age groups by sex			
	ID-7	Life expectancy at birth (e_0)			
		Second priority tables			
	ID-8	Life table for each sex			

A2.6 Marriages and divorces tables

Table num-ber	Num-ber in P&R	Table content	Pos-sible: Yes/ No	Possible if CR data are combined with data from other sources	Year(s)
	MA-1	Marriages by place of usual residence of groom and month of occurrence			
	MA-2	Marriages by place of usual residence of groom and age of bride and of groom			
	MA-3	Marriages by age and previous marital status of bride and of groom			
	MA-4	Marriages by educational attainment of bride and of groom			
	MA-5	Marriages by occupation of bride and of groom			
	DI-1	Divorces by place of usual residence of husband			
	DI-2	Divorces by age of husband and wife			
	DI-3	Divorces by duration of marriage and age of husband and of wife			
	DI-4	Divorces by duration of marriage and number of dependent children			
	DI-5	Divorces by educational attainment of husband and of wife			
	DI-6	Divorces by occupation of husband and of wife			
	DI-7	Divorces by number of previous marriages of husband and of wife			
	ST-7	Time series of marriages by place of usual residence of groom (past 10 years)			
	ST-8	Time series of divorces by place of usual residence of husband (past 10 years)			

A2.7 Indicators of marriages and divorces tables

Table num-ber	Number in Guide-lines	Table content	Pos-sible (Yes/ No)	Possible if CR data are combined with data from other sources	Year(s)
		First priority tables			
	MI-1	Crude Marriage Rate and Crude Divorce Rate			
	MI-2	Mean age at first marriage			
	MI-3	Mean age at divorce			
		Second priority tables			
	MI-4	Proportion of marriages ending in divorce			

A2.8 Summary tables

The tables marked with a star may be more appropriate in the chapter on each vital event.

Table num-ber	Num-ber in P&R	Table content	Pos-sible: Yes/ No	Possible if CR data are combined with data from other sources	Year(s)
	ST-1	Live births, deaths, infant deaths, foetal deaths, marriages and divorces by place of usual residence			
	ST-2	Crude birth rate, crude death rate, infant mortality rate by sex, foetal mortality rate, crude marriage rate and crude divorce rate, by place of usual residence			
	ST-3	Time series of live births by place of usual residence of mother (past 10 years)*			
	ST-4	Time series of deaths by place of usual residence of decedent (past 10 years)*			

	ST-5	Time series of infant deaths by place of usual residence of mother (past 10 years)*			
	ST-6	Time series of foetal deaths by place of usual residence of mother (past 10 years)*			
	ST-7	Time series of marriages by place of usual residence of groom (past 10 years)*			
	ST-8	Time series of divorces by place of usual residence of husband (past 10 years)*			
	ST-9	Times series of vital events in the country (past 10 years)			

Annex 3: Registration forms

The VSR should attach the notification and registration forms for births and deaths and other relevant CRVS forms and documents, including forms for transferring aggregate data to the statistical office. The forms should be the original forms in the official language(s) of the country, with translations into English if available.

Annex 4: Definitions

It is useful to include a list of definitions used in the VSR, especially for terms with varying definitions internationally, such as for live births and completeness of vital registration, including the formula for estimating the completeness rates.