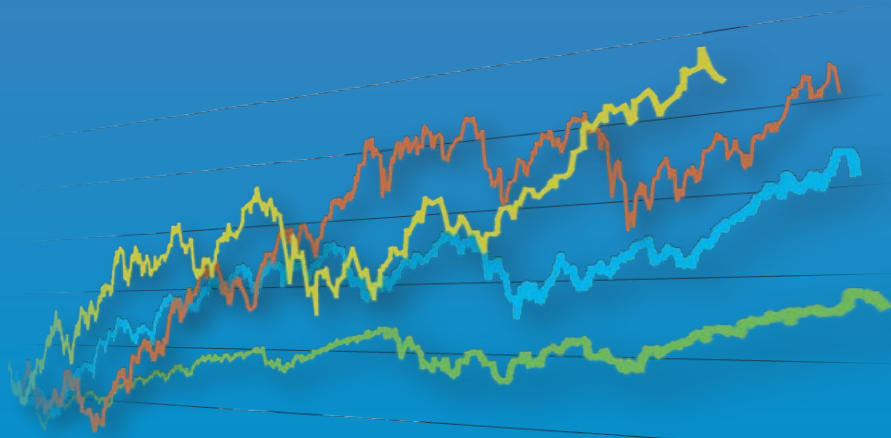**ADB**

ADMINISTRATIVE DATA SOURCES FOR COMPILING MILLENNIUM DEVELOPMENT GOALS AND RELATED INDICATORS

A Reference Handbook on Using Data from Education, Health, and Vital Registration Systems Featuring Practices and Experiences from Selected Countries

Asian Development Bank

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The handbook is a useful reference for practicing statisticians in the national statistics offices, and those working in the education, health, and vital registration agencies in developing countries. The discussions on strengths and weaknesses of different data sources have been carried out skillfully, citing country examples on the use of administrative data for compiling the Millennium Development Goals indicators and other relevant statistics. The handbook also provides data producers and users information to help them understand how different sources of data are harmonized to generate good statistics. It emphasizes the importance of effective coordination of statistical activities across the constituents of a national statistical system to produce relevant indicators and statistics needed for evidence-based decision making and to monitor the Millennium Development Goals. The handbook is indeed a useful tool that can be used for the training programs of the Statistical Institute for Asia and the Pacific, and I trust this will be widely used by many other stakeholders involved in building the statistical capacity of data producers and data users.

Davaasuren Chultemjamts
Director
Statistical Institute for Asia and the Pacific

The Millennium Development Goals (MDGs) have heightened interest in the role of indicators for monitoring global development progress, benchmarking national performance and helping to inform policy directions. This interest has led to the wider use of evidence to underpin decision making but also to further reflection on indicator methodologies and how they might be improved. At the same time, data users have expressed the need for greater transparency. Indeed, there is often a lack of knowledge about the methods and definitions comprising the international statistical framework for monitoring the MDGs. This guide helps to address these gaps by expertly documenting the methods and definitions underlying the indicators. It represents an excellent and essential reference for national statisticians, planners, and researchers who seek to better measure and monitor the MDGs.

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FOREWORD

Statistical data are essential for measuring the progress toward the attainment of the Millennium Development Goals (MDGs) and other national and international development goals. It is important to improve the capability of national statistical systems in many developing countries in the Asia and Pacific region to produce timely and reliable statistics that are needed for measuring progress. Capacity and resource constraints are some of the challenges in producing these statistics, and in many countries, donor-funded statistical surveys remain the major data source for tracking the MDGs—making data collection programs unsustainable.

In this context, administrative data generated and collected by line ministries and regulatory authorities of the government as a by-product of administrative processes are a potential and cost-effective source for compiling many MDG and other indicators. Unfortunately, in many developing countries, use of administrative data for statistical purposes has been limited due to poor data quality, biased reporting, and incomplete coverage.

With the objectives of advocating the use of administrative data, improving administrative data systems, and strengthening national capacity, the Development Indicators and Policy Research Division of the Economics and Research Department of the Asian Development Bank initiated a regional technical assistance (TA) on Improving Administrative Data Sources for the Monitoring of the MDG Indicators. Five countries in the Asia and Pacific region, namely, Mongolia, Nepal, Palau, Sri Lanka, and Viet Nam, participated in the TA. The TA activities included assessing existing administrative data reporting systems in the participating countries in terms of their use to compile MDG indicators, identifying the problems and weaknesses of these systems and making recommendations, undertaking pilot studies, and providing country training activities in collaboration with the Statistical Institute for Asia and the Pacific to strengthen the capacity of the practicing statisticians.

This handbook was developed under the TA to serve as a reference tool for data producers—statisticians and statistical managers in national statistical agencies—and to improve administrative data sources to compile the MDG and other indicators. Drawing on the experience from the five countries and from the standard guidelines and technical manuals produced by international agencies, the handbook discusses

three sources of administrative data, namely, education, health, and civil registration systems. Together with relevant reference population data, these can contribute to the annual compilation of a number of education- and health-related MDG and other relevant indicators for monitoring at national and subnational levels.

The handbook combines theoretical issues in using administrative data with the practical problems faced in their use as drawn from the experience of the five countries, and provides recommendations that will help improve current administrative data systems. At the same time, it provides alternative data sources for compiling the MDG and other indicators, citing their merits and limitations.

The handbook is a result of consultations in workshops organized under the TA, which were attended by statisticians and statistical managers from national statistics offices, ministries of education and health, and civil registration agencies in the participating countries; and experts from the Australian Bureau of Statistics and international agencies, such as the Health Metrics Network (HMN), the Statistical Institute for Asia and the Pacific (SIAP), the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), the United Nations Educational, Scientific and Cultural Organization (UNESCO), and the United Nations Population Fund (UNFPA). Country assessment studies prepared by national consultants, pilot studies, and training programs conducted for the practicing statisticians of the national statistics offices and line ministries in the five countries provided useful inputs on the current data situation, constraints, and the capacity-building needs.

The handbook will hopefully contribute to highlighting the significance of administrative data sources in a national statistical system and in enhancing their utility as sources of indicators and statistics.

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ACKNOWLEDGMENTS

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ABBREVIATIONS AND ACRONYMS

ABS DQF	–	Australian Bureau of Statistics Data Quality Framework
ADB	–	Asian Development Bank
DQA	–	data quality assurance
DQAF	–	data quality assurance framework
EFA	–	Education for All
EMIS	–	education management information systems
GASR	–	General Authority for State Registration
GDDS	–	General Data Dissemination System
HIS	–	health information system
HMIS	–	health management information system
ICD	–	International Statistical Classification of Diseases and Related Health Problems
ICD-10	–	International Statistical Classification of Diseases and Related Health Problems – 10th Revision
ICT	–	information and communications technology
IMF	–	International Monetary Fund
MDG	–	Millennium Development Goal
MMR	–	measles, mumps, and rubella
NSC	–	National Statistical Commission National Statistics Committee
NSO	–	national statistics office
NSS	–	national statistical system
PRISM	–	Performance of Routine Information System Management
prse	–	percentage relative standard error
RHIS	–	routine health information systems
SAVVY	–	Sample Vital Registration with Verbal Autopsy
SRS	–	sample registration system
UN	–	United Nations
UNDP	–	United Nations Development Programme
UNESCAP	–	United Nations Economic and Social Commission for Asia and the Pacific
UNESCO	–	United Nations Educational, Scientific and Cultural Organization
VER	–	vital event registration
WHO	–	World Health Organization

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

The demand for socioeconomic data, especially in developing countries, for evidence-based planning and policy making, monitoring, and evaluation of policies, plans, and programs has grown considerably. The last two decades have witnessed the acceptance of a holistic notion of development, which goes beyond the narrow perspective of economic growth and brings human welfare at the center of all development activities. Social and environmental goals are therefore being prioritized alongside economic goals. This was evident in a number of United Nations (UN) development conferences during the last decade, such as the

   (i) World Conference on Education for All - Jomtien, Thailand, 1990 (Education);

  (ii) World Summit for Children - New York, United States, 1990 (Children);

 (iii) United Nations Conference on Environment and Development - Rio de Janeiro, Brazil, 1992 (Environment);

 (iv) United Nations International Conference on Population and Development - Cairo, Egypt, 1994 (Population);

  (v) World Summit for Social Development - Copenhagen, Denmark, 1995 (Social Development); and

 (vi) Fourth World Conference on Women - Beijing, People's Republic of China, 1995 (Women).

A significant result of these international summits was the setting up of goals and targets to be achieved and to be monitored by a set of identified indicators. In 1996, the Development Assistance Committee of the Organisation for Economic Co-operation and Development pioneered the International Development Goals, which included the three dimensions of development, namely, economic well-being, social development, and environmental sustainability and regeneration, with a set of quantifiable indicators identified under each goal.

The Millennium Declaration. In September 2000, the UN Millennium Declaration[1] was adopted at the largest-ever gathering of 189 heads of state. The declaration committed all countries—rich and poor—to doing all they can to eradicate poverty; promote human dignity and equality; and achieve peace, democracy, and environmental sustainability. To face the multidimensional challenges that have an adverse impact on the well-being of the majority of the population, certain time-bound goals were set, known as the Millennium Development Goals (MDGs) (Box 1.1). The MDGs cover various socioeconomic dimensions, such as poverty and hunger, education, health, gender equality, environmental sustainability, and global partnership in achieving the MDGs, and represent mutually reinforcing goals.

Box 1.1:   The Millennium Development Goals

Goal 1: Eradicate extreme poverty and hunger
Goal 2: Achieve universal primary education
Goal 3: Promote gender equality and empower women
Goal 4: Reduce child mortality
Goal 5: Improve maternal health
Goal 6: Combat HIV/AIDS, malaria and other diseases
Goal 7: Ensure environmental sustainability
Goal 8: Develop a global partnership for development

Source: United Nations. The official United Nations site for the MDG Indicators. http://mdgs.un.org/unsd/mdg/default.aspx

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The MDGs refer to the 8 goals and corresponding 18 targets and 48 indicators, which became effective from 8 September 2003, and were revised effective 15 January 2008. The revised framework consists of the same 8 goals, but the number of targets was increased to 21 and the number of indicators increased to 60. The three additional targets emphasize universal access to reproductive health, universal access to treatment for HIV/AIDS for the needy, and reducing biodiversity loss. The official list of MDG indicators is in Table 1.1.

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[1]   The full text of the Millennium Declaration can be accessed at http://www.un.org/millennium/declaration/ares552e.pdf

What do the MDGs represent? The MDGs, with their commitment at the national and international levels, represent an agenda for reducing poverty and improving people's lives through a global partnership by 2015, using 1990 as a benchmark year. The MDGs provide a common framework upon which the development community can work together to ameliorate the conditions of the poor in developing countries, and ensure that the development process will have less adverse implications and will provide for environmental sustainability. The adoption of the MDGs has led countries to integrate and reflect the MDGs in their national development plans and priorities.

Measuring the progress on the MDGs. The MDGs did not only provide a commitment in the form of goals and targets to be achieved, but also provided a framework with which to measure the progress toward their achievement through quantifiable targets to be achieved by 2015. Sixty quantitative indicators were identified to monitor international, regional, and national progress toward the attainment of the MDGs—highlighting quantitative measurement of results and the need for internationally comparable data. This led to the process of identifying the data gaps and the statistical issues that developing countries faced in collecting data and compiling timely and reliable indicators based on international standards.

1.2 STATISTICAL NEEDS FOR MEASURING DEVELOPMENT GOALS AND TARGETS

Because of the quantitative measurement of development outcomes, the demand for timely, reliable, and accurate statistics has grown—bringing the attention of the national and international community to the statistical needs of measuring development. It also increased awareness to the data gaps and weaknesses in national statistical systems (NSS), especially in developing countries. The adoption of the MDG agenda was the most significant development that brought the role of official statistics at the center of human development. The MDGs, being a common agenda to address the economic, social, and environmental dimensions of the development process, highlighted the importance of well-coordinated NSSs that can produce timely, accurate, and reliable statistics for compiling the MDG indicators in different sectors.

The MDG indicators simultaneously brought increased demands and pressure on the national statistics offices (NSOs) and statistical agencies in the line ministries in developing countries to meet the growing data needs. Many developing countries in the Asia and Pacific region have weak statistical capacities, scarce budgetary resources for collecting data, and low professional statistical skills. These countries continue to be plagued by their governments' low priority for the needs of the statistical systems during budgetary allocations, leading to a dependence on donor funding for major data collection activities.

So that the data needed to monitor the progress of the attainment of the MDGs and the needs for national developmental planning will be met in a timely and cost-effective manner, statistical agencies must examine data generated from all sources for constructing needed indicators. The major sources of data in any statistical system comprise (i) censuses, (ii) surveys, and (iii) administrative data. While censuses and surveys are conducted to collect data on specific subjects to meet statistical needs, administrative data are collected by line ministries or other authorities of a country in the routine discharge of their administrative or regulatory duties. Administrative data are thus a by-product of the administrative process and though not generally designed for statistical purposes, these data are a potentially rich source of information for compiling many socioeconomic indicators, including the MDG indicators.

Compared with censuses and surveys, administrative data are collected more frequently at a much lower cost and can be presented at various levels of disaggregation, such as by geographical location or by age and gender. For developing countries with thin resources for statistical programs, administrative data are potential and cost-effective sources for statistics and for compiling development indicators. In most developing countries, however, administrative data remain underutilized because of their poor quality as a result of incomplete coverage, biased reporting, and other data quality issues.

Data availability, data gaps, data comparability, methods and standards followed by countries, and the national capacity in compiling MDG indicators for international comparability were assessed by the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP 2006) and the Inter-Agency and Expert Group on Millennium Development Goals Indicators (United Nations 2007). It was concluded that NSOs are too dependent on survey data, particularly from surveys driven by donors and that administrative data are not used effectively despite these being potential sources of data for many MDG indicators.

1.3 OBJECTIVES AND SCOPE

Approach and methodology. This handbook has been developed as an output of the Asian Development Bank (ADB) regional technical assistance on Improving Administrative Data Sources for the Monitoring of the Millennium Development Goal Indicators (ADB 2006). The work for the handbook was accomplished using an eclectic approach—combining regional and country-level workshops on the use of administrative data sources; literature review of manuals and handbooks, guidelines, and recommendations by UN agencies; discussions with official statisticians working in the NSOs and line ministries in the region; and consultations with experts of development agencies in the region. This was supplemented with five country studies

for Mongolia, Nepal, Palau, Sri Lanka, and Viet Nam on the use of administrative data sources in compiling the MDG indicators. The studies also provided a broad assessment of the administrative data sources in three key areas of administrative statistics—education, health, and vital registration.

These five countries are also referred to as case study countries in this handbook and are often quoted in the chapters to illustrate country practices. The deficiencies and strengths in administrative data collection systems identified in the five countries are used as illustrations.

Objectives. The main objective of this handbook is to provide a reference tool for data producers—statisticians and managers in NSOs and in the statistical units of government ministries engaged in planning, organizing, and implementing administrative data collection programs and deriving statistical indicators, including the MDG indicators. It provides references to the standard methods and tools of the UN and its specialized agencies—concepts, definitions, and classification schemes on the subject matter coming under their purview, guidelines, manuals, handbooks, and other reference documents. For example, the United Nations Educational, Scientific and Cultural Organization has developed technical guidelines and standards for collecting and compiling statistics and indicators on education, the International Labour Organization has prescribed standards on collecting and compiling statistics on labor and employment, the UN Statistics Division has developed standards for collecting vital statistics and compiling national accounts statistics, and the Food and Agriculture Organization has developed standards on collecting and compiling statistics on agriculture and related activities. Most of these standard publications from the UN agencies can be downloaded for free from the websites of these agencies. While adopting international standards, the national statistical agencies can modify these methods and tools to suit national priorities and data needs.

Scope of the handbook. This handbook combines theoretical and conceptual issues with the practical problems and limitations encountered in compiling MDG and other indicators using administrative data from education, health, and vital registration. While the MDGs include indicators that cover many areas of economic, social, and environmental statistics, the scope of the handbook is limited to three areas of administrative data—education, health, and vital registration. The merits and demerits of using administrative data vis-à-vis alternative data sources are presented, with suggested recommendations for improving their utility. The handbook incorporates the experiences of the five case study countries in compiling the MDG and other indicators using administrative data in education, health, and vital statistics. Examples on the weaknesses in the data, as well as good initiatives and practices from these countries have been cited and supplemented with examples of good practices in other countries.

The handbook uses the MDG indicators that can be sourced from administrative data in the areas of education, health, and vital statistics as the core framework for discussion. Nevertheless, much of the discussion for improving administrative data is also relevant for indicators other than the MDG indicators.

Administrative data sources cannot be discussed in isolation from the other major sources of data, such as sample surveys and censuses. Data produced through these sources should be viewed as complementary, designed to meet the needs for policy planning and evaluating government programs and policies. The handbook, therefore, includes the role of censuses and sample surveys along with their advantages and limitations in measuring MDG and other indicators.

Improving the administrative data systems in a developing country is a long-term process, and sample surveys are needed to fill the data gaps for monitoring attainment of the MDGs. Censuses provide benchmark data on the structure and other basic characteristics of the population under study. The handbook provides a comparative picture of the three types of data sources so that these can be used in conjunction with each other, and at the same time avoid duplications of efforts.

Prospective users of the handbook. The handbook has been produced as a reference tool for use at the country level. The primary audience of the handbook are the statisticians and managers in the NSOs and the statistical agencies in the line ministries involved with the production and use of MDG and other social indicators. The discussion in the chapters presents the data needs for monitoring of development and policy making at the country level, so that staff in statistical units who collect and compile statistics can relate the significance of their work to the development process. Staff involved in compiling and collecting statistics will also benefit from the discussions on data issues of common interest across agencies, which can lead to constructive collaborations among the constituents of the system.

In particular, the handbook is useful to producers and users of data generated from the administrative process of the education, health, and vital registration systems in any country. The staff of the NSOs who coordinate with the line ministries and agencies to meet the data needs of the NSO, or who coordinate the MDG statistical reporting will benefit from the discussions in different chapters. It will also be useful for decision makers and managers in the sectoral ministries who do not have in-depth background on an NSS and the different sources of data and their interrelations, and who need to have a general overview of the NSS as they represent themselves in multidisciplinary teams and committees in their country.

Planners and policy makers may also indirectly benefit from this handbook by acquiring a better understanding of the issues associated with the statistical systems and their components, which could lead them to champion the cause of improving the data sources for better policies and programs. Managers of statistical agencies in the line ministries who may want to review the existing data collection systems for national and/or subnational monitoring purposes will also find the handbook useful. Finally, the handbook will be a useful reference material for the training units of NSOs and line ministries as well as the regional training agencies, such as the United Nations Statistical Institute for Asia and the Pacific and other organizations involved in capacity building.

1.4 SUMMARY OF CHAPTERS

The handbook has seven chapters. Chapter 1 is the introductory chapter. Chapters 2 and 3 discuss different sources of data available in an NSS and their utility as complementary sources of information to compile the MDG and other indicators. Chapter 4 deals with administrative data systems in education; chapter 5 discusses administrative data systems in health; and chapter 6 deals with administrative data systems in vital registration. Chapter 7 reviews the practices regarding the use of different types of data sources and the extent of use of administrative data in the process of MDG monitoring in the five case study countries. A summary of the seven chapters is given below.

Chapter 1: Introduction

Chapter 1 describes the growing demand for timely and reliable statistics to support the monitoring of the national and international development goals and targets, such as the MDGs. It presents the objectives of the handbook and briefly describes the contents of the handbook.

Chapter 2: Sources of Socioeconomic Statistics: Censuses and Household Surveys

Chapter 2 briefly outlines the institutional mechanisms for collecting data in an NSS and major sources of data, such as censuses, sample surveys, and administrative data systems to meet the data needs of policy makers and other users. The chapter presents the role of censuses and sample surveys as sources of data and their relative advantages and limitations. The utility of censuses and different types of household surveys in monitoring the MDG progress is presented. Administrative data as a source of statistics is briefly introduced. The importance of quality aspects of statistical

data produced from different sources is emphasized through the six dimensions of quality—relevance, accuracy, timeliness, accessibility, interpretability, and coherence.

Chapter 3: Sources of Socioeconomic Statistics: Administrative Data

Chapter 3 covers in detail the third major source of data, i.e., the administrative data systems. The definition of administrative data, various types of administrative data, and the advantages and limitations of using administrative data for statistical purposes are presented. The chapter also highlights the immense potential of administrative data as an important source of socioeconomic statistics and indicators and their specific use in compiling the MDG indicators. The chapter cautions the readers on the challenges in using administrative data for statistical purposes and highlights the importance of active coordination of statistical activities across different constituents of the NSS to strengthen and improve the quality of existing data sources and to avoid duplication of efforts. Lastly, it emphasizes that in an NSS, data produced through sample surveys, censuses, and administrative data systems by NSOs and line ministries should be viewed as complementary efforts in meeting diverse data needs. Together, they can be more effective in explaining a phenomenon by drawing from the strengths of one another.

Chapter 4: Administrative Data for Education Statistics

Education statistics is one area where administrative data have been the major source of statistics in most countries. This chapter examines various sources of education statistics with a focus on the data collected by the education authorities through annual school surveys or censuses for compiling a range of indicators used in planning, monitoring, and evaluating school education programs. The education-related MDG and other standard indicators are discussed in the context of their compilation using data collected from the schools. Drawing on the experiences of the five case study countries, common issues affecting the quality of these data are discussed, with suggestions and recommendations to improve them. Illustrations from the country studies are provided to present data weaknesses as well as good initiatives and practices that can be useful for other developing countries.

Chapter 5: Administrative Data for Health Statistics

The improvement of the health status of the population is a major goal in the health sector of developing countries, and monitoring the attainment of the goal calls for adequate, timely, and reliable health statistics. Administrative data collected largely through routine reporting by health ministries and/or authorities offer much

potential for tracking the health resources, inputs, outputs, and outcomes. This chapter examines different sources of health statistics, with emphasis on statistics collected through routine regulation in the health sector. It presents the MDG indicators that can be regularly compiled using health administrative data. The data quality issues in the collection and compilation of health statistics from administrative sources in developing countries are discussed based on experiences of the five case study countries. Recommendations and suggestions for improving the routine production of health statistics are provided.

Chapter 6: Civil Registration Systems and Vital Statistics

The records of vital events from the civil registration system are a major source of vital statistics needed for the planning of human development. Reliable data on births and deaths is an essential requirement for population projections for inter-censal years. While population censuses and household demographic surveys are other sources of statistics on population, there is no substitute for regular information on vital events obtained from civil registration systems. Unfortunately, these systems are poorly developed in most developing countries. This chapter examines the organization of civil registration systems and the legal basis for their institutional setup. The role of vital statistics as a source for compiling key MDG indicators, such as maternal mortality, and infant and child mortality is discussed. The major issues in the vital registration systems as a source for vital statistics are discussed drawing from the experience of the five case study countries and suggestions are made for their improvement. Given that improvements in the vital registration systems are a long-term and resource-intensive process, interim methods developed and practiced, such as the sample registration system in India, and the People's Republic of China's Disease Surveillance Points System are presented. These methods can be used as interim measures before the development of a fully functional vital registration system. Other recommendations are provided to resolve the problems and issues for improving coverage and data quality.

Chapter 7: A Review of Practices in Compiling the Millennium Development Goals Indicators in Selected Countries

Chapter 7 briefly introduces the monitoring mechanism of MDG progress at the international, regional, and national levels. This chapter highlights the data requirements for the compilation of the indicators prescribed under the MDG framework. The recommended sources of data for constructing the indicators are presented. The compilation of MDG indicators and the data sources used in the five case study countries is reviewed—which provides insights into the extent of use of different sources of data in the national MDG monitoring process. This review shows the sources of data preferred by the countries in compiling the same indicators.

Some countries have relied more on administrative data while others have relied on surveys in monitoring the MDG progress. Examples are quoted from the country experiences on the nationalization of MDGs. The reasons for differences in the MDG indicators in the national and international data sets are also presented. The countries that are more dependent on administrative data for monitoring MDGs must strive to improve the coverage, quality, timeliness, and disaggregation of data, while the countries more dependent on survey data must strive to improve their administrative data systems for more frequent compilation of MDG and other indicators.

Table 1.1:   Official List of the Millennium Development Goals Indicators[a] (Effective 15 January 2008)

Millennium Development Goals (MDGs)	
Goals and Targets (from the Millennium Declaration)	**Indicators for Monitoring Progress**
Goal 1: Eradicate extreme poverty and hunger	
Target 1.A: Halve, between 1990 and 2015, the proportion of people whose income is less than one dollar a day	1.1 Proportion of population below $1 (PPP) per day [b] 1.2 Poverty gap ratio 1.3 Share of poorest quintile in national consumption
Target 1.B: Achieve full and productive employment and decent work for all, including women and young people	1.4 Growth rate of GDP per person employed 1.5 Employment-to-population ratio 1.6 Proportion of employed people living below $1 (PPP) per day 1.7 Proportion of own-account and contributing family workers in total employment
Target 1.C: Halve, between 1990 and 2015, the proportion of people who suffer from hunger	1.8 Prevalence of underweight children under-five years of age 1.9 Proportion of population below minimum level of dietary energy consumption
Goal 2: Achieve universal primary education	
Target 2.A: Ensure that, by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling	2.1 Net enrolment ratio in primary education 2.2 Proportion of pupils starting grade 1 who reach last grade of primary 2.3 Literacy rate of 15–24 year-olds, women and men
Goal 3: Promote gender equality and empower women	
Target 3.A: Eliminate gender disparity in primary and secondary education, preferably by 2005, and in all levels of education no later than 2015	3.1 Ratios of girls to boys in primary, secondary and tertiary education 3.2 Share of women in wage employment in the nonagricultural sector 3.3 Proportion of seats held by women in national parliament

Table 1.1 continuation

Goals and Targets (from the Millennium Declaration)	Indicators for Monitoring Progress
Goal 4: Reduce child mortality	
Target 4.A: Reduce by two-thirds, between 1990 and 2015, the under-five mortality rate	4.1 Under-five mortality rate 4.2 Infant mortality rate 4.3 Proportion of 1 year-old children immunised against measles
Goal 5: Improve maternal health	
Target 5.A: Reduce by three quarters, between 1990 and 2015, the maternal mortality ratio	5.1 Maternal mortality ratio 5.2 Proportion of births attended by skilled health personnel
Target 5.B: Achieve, by 2015, universal access to reproductive health	5.3 Contraceptive prevalence rate 5.4 Adolescent birth rate 5.5 Antenatal care coverage (at least one visit and at least four visits) 5.6 Unmet need for family planning
Goal 6: Combat HIV/AIDS, malaria and other diseases	
Target 6.A: Have halted by 2015 and begun to reverse the spread of HIV/AIDS	6.1 HIV prevalence among population aged 15–24 years 6.2 Condom use at last high-risk sex 6.3 Proportion of population aged 15–24 years with comprehensive correct knowledge of HIV/AIDS 6.4 Ratio of school attendance of orphans to school attendance of non-orphans aged 10–14 years
Target 6.B: Achieve, by 2010, universal access to treatment for HIV/AIDS for all those who need it	6.5 Proportion of population with advanced HIV infection with access to antiretroviral drugs
Target 6.C: Have halted by 2015 and begun to reverse the incidence of malaria and other major diseases	6.6 Incidence and death rates associated with malaria 6.7 Proportion of children under 5 sleeping under insecticide-treated bednets 6.8 Proportion of children under 5 with fever who are treated with appropriate anti-malarial drugs 6.9 Incidence, prevalence and death rates associated with tuberculosis 6.10 Proportion of tuberculosis cases detected and cured under directly observed treatment short course
Goal 7: Ensure environmental sustainability	
Target 7.A: Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources Target 7.B: Reduce biodiversity loss, achieving, by 2010, a significant reduction in the rate of loss	7.1 Proportion of land area covered by forest 7.2 CO_2 emissions, total, per capita and per $1 GDP (PPP) 7.3 Consumption of ozone-depleting substances 7.4 Proportion of fish stocks within safe biological limits 7.5 Proportion of total water resources used 7.6 Proportion of terrestrial and marine areas protected 7.7 Proportion of species threatened with extinction

Table 1.1 continuation

Goals and Targets (from the Millennium Declaration)	Indicators for Monitoring Progress
Target 7.C: Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation	7.8 Proportion of population using an improved drinking water source 7.9 Proportion of population using an improved sanitation facility
Target 7.D: By 2020, to have achieved a significant improvement in the lives of at least 100 million slum dwellers	7.10 Proportion of urban population living in slums [c]
Goal 8: Develop a global partnership for development	
Target 8.A: Develop further an open, rule-based, predictable, non-discriminatory trading and financial system Includes a commitment to good governance, development and poverty reduction – both nationally and internationally Target 8.B: Address the special needs of the least developed countries Includes: tariff and quota free access for the least developed countries' exports; enhanced programme of debt relief for heavily indebted poor countries (HIPC) and cancellation of official bilateral debt; and more generous ODA for countries committed to poverty reduction Target 8.C: Address the special needs of landlocked developing countries and small island developing States (through the Programme of Action for the Sustainable Development of Small Island Developing States and the outcome of the twenty-second special session of the General Assembly) Target 8.D: Deal comprehensively with the debt problems of developing countries through national and international measures in order to make debt sustainable in the long term	Some of the indicators listed below are monitored separately for the least developed countries (LDCs), Africa, landlocked developing countries and small island developing States. **Official development assistance (ODA)** 8.1 Net ODA, total and to the least developed countries, as percentage of OECD/DAC donors' gross national income 8.2 Proportion of total bilateral, sector-allocable ODA of OECD/DAC donors to basic social services (basic education, primary health care, nutrition, safe water and sanitation) 8.3 Proportion of bilateral official development assistance of OECD/DAC donors that is untied 8.4 ODA received in landlocked developing countries as a proportion of their gross national incomes 8.5 ODA received in small island developing States as a proportion of their gross national incomes **Market access** 8.6 Proportion of total developed country imports (by value and excluding arms) from developing countries and least developed countries, admitted free of duty 8.7 Average tariffs imposed by developed countries on agricultural products and textiles and clothing from developing countries 8.8 Agricultural support estimate for OECD countries as a percentage of their gross domestic product 8.9 Proportion of ODA provided to help build trade capacity **Debt sustainability** 8.10 Total number of countries that have reached their HIPC decision points and number that have reached their HIPC completion points (cumulative) 8.11 Debt relief committed under HIPC and MDRI Initiatives 8.12 Debt service as a percentage of exports of goods and services

Table 1.1 continuation

Goals and Targets (from the Millennium Declaration)	Indicators for Monitoring Progress
Target 8.E: In cooperation with pharmaceutical companies, provide access to affordable essential drugs in developing countries	8.13 Proportion of population with access to affordable essential drugs on a sustainable basis
Target 8.F: In cooperation with the private sector, make available the benefits of new technologies, especially information and communications	8.14 Telephone lines per 100 population 8.15 Cellular subscribers per 100 population 8.16 Internet users per 100 population

CO_2 = carbon dioxide, DAC = Development Assistance Committee, GDP = gross domestic product, HIPC = heavily indebted poor countries, MDRI = Multilateral Debt Relief Initiative, ODA = official development assistance, OECD = Organisation for Economic Co-operation and Development, PPP = puchasing power parity.
[a] All indicators should be disaggregated by sex and urban–rural as far as possible.
[b] For monitoring country poverty trends, indicators based on national poverty lines should be used, where available.
[c] The actual proportion of people living in slums is measured by a proxy, represented by the urban population living in households with at least one of the four characteristics: (i) lack of access to improved water supply, (ii) lack of access to improved sanitation, (iii) overcrowding (three or more persons per room), and (iv) dwellings made of non-durable material.
Source: United Nations. Millennium Development Goals Indicators. The official United Nations site for the MDG Indicators. http://mdgs.un.org/unsd/mdg/Host.aspx?Content=Indicators/OfficialList.htm

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CHAPTER 2

SOURCES OF SOCIOECONOMIC STATISTICS: CENSUSES AND HOUSEHOLD SURVEYS

This chapter discusses institutional arrangements in national statistical systems (NSSs), and the role of national statistics offices (NSOs) and statistical agencies in ministries and other government agencies. The methods of collecting data are discussed, along with the role of censuses and household surveys in an NSS in compiling socioeconomic indicators to monitor development goals in general, and the Millennium Development Goals (MDGs) in particular. The chapter also discusses the comparative advantages and limitations of these data sources and general data quality considerations.

2.1 INSTITUTIONAL ARRANGEMENTS IN NATIONAL STATISTICAL SYSTEMS

Why Do We Need Statistics?

The demand for socioeconomic data especially in developing countries has grown significantly in the past few decades as a result of the emphasis on evidence-based policy making, planning, and monitoring socioeconomic development. Government policy makers, planners, decision makers, and international development agencies need to have information on how the resources and inputs employed—for example, in eradicating poverty, providing primary education, and providing health facilities and services—are translated into intended outputs, outcomes, and impacts.

The availability of timely and quality data is essential in improving the decision-making process and in effectively using resources in areas where they are most needed and would result in high benefits. The public also needs to be informed, through timely and credible statistics, on the progress made by the government in implementing its development goals and targets. These data needs of different stakeholders are fulfilled by a variety of data collection methods in an NSS. These

methods and their uses in compiling statistical indicators, including those for the MDGs, are presented in this chapter and the next.

Role of the National Statistics Office

Institutional arrangements for producing official statistics in countries refer to the roles and responsibilities of the different players in an NSS. Generally, countries have a central statistics agency or an NSO, either constituted independently as an autonomous institution, or as an agency under a government ministry that collects, compiles, and disseminates key statistics in the country.

The NSOs usually conduct population censuses and various sample surveys of households and establishments and compile key economic statistics, such as national accounts and price statistics. They also publish statistics produced by other ministries in statistical year books and in the form of other publications and products for dissemination. The NSOs mostly take the lead in guiding and providing technical support to the other ministries in establishing their data collection systems and in setting national standards consistent with the international concepts, definitions, classifications, and methods of collecting data.

Role of the Line Ministries and Other Government Agencies

Sectoral and line ministries or departments often have statistical, planning and / or monitoring agencies or units that collect, compile, and disseminate data on their respective sectoral concerns. These agencies collect substantial amounts of information in the routine discharge of their administrative and regulatory duties. The data these agencies collect can be effectively used for statistical purposes. For example, administrative systems on child birth registration could provide valuable information on the number of children born alive, along with other information, such as weight at birth, place of birth, and medical attendance at birth. This information, captured in administrative records for registering a birth and granting a certificate of birth, is a valuable source for statistical purposes.

In general, the NSO plus all the statistical agencies in other ministries and government agencies in the central and provincial levels and below comprise an NSS. The statistics produced as a result of the activities of the NSS generally constitute the official statistics produced in a country, although arrangements may vary from country to country.

Country Example

While the institutional arrangements for an NSS may vary widely from one country to another, the administrative records of the sectoral and line ministries are a

key source of statistical data. Box 2.1 provides a list of major central agencies in Nepal that are involved in producing statistics. The Central Bureau of Statistics is the central statistics agency in Nepal, but a number of other central agencies collect data in their respective sectors. The involvement of central agencies in the production of statistics is found to be more or less similar in the other case study countries of Mongolia, Palau, Sri Lanka, and Viet Nam. However, they differ in (i) legal and institutional arrangements; (ii) statistical reporting arrangements; (iii) statistical coordination mechanisms; (iv) roles and responsibilities of the NSO vis-à-vis other statistical data producers and users; (v) position of NSO and its

Box 2.1: Key Agencies Producing Official Statistics in Nepal

Organization	Major Statistics Produced
Central Bureau of Statistics	National accounts, population census, household surveys, establishment surveys (manufacturing and non-manufacturing)
Ministry of Finance	Revenue, public expenditure, trade statistics
Ministry of Home Affairs	Crime, natural disaster, other social security statistics
Ministry of Health and Population	Health, family planning statistics
Ministry of Education and Sports	Education statistics
Ministry of Agriculture and Cooperative	Agriculture statistics, food balance sheets
Ministry of Tourism and Civil Aviation	Tourism statistics
Ministry of Local Development	Vital event registration
Nepal Rastra Bank (central bank)	Monetary statistics, balance-of-payment, price statistics
Ministry of Labour and Transport Management	Foreign labor statistics, transport statistics
Ministry of Industry, Commerce and Supply	Industrial statistics, commerce statistics
Ministry of General Administration	Civil servants statistics
Ministry of Environment, Science and Technology	Environment statistics, information technology-related statistics
Ministry of Information and Communication	Newspapers, telecommunications, and cable TV statistics
Ministry of Physical Planning and Works	Roads and buildings statistics, water and sanitation statistics
Ministry of Water Resources	Irrigation statistics
Ministry of Land Reform and Management	Land statistics, bonded labor statistics
Ministry of Forest and Soil Conservation	Forest statistics, parks and wildlife statistics
Trade Promotion Centre	Trade statistics

Source: Asian Development Bank. 2009. *Country Report of Assessment Study for Improving Administrative Data Sources for the Monitoring of MDG Indicators, Nepal*. Consultant's report. Manila (TA 6356-REG).

head in the government hierarchy; and (vi) legal and administrative provisions for collecting, compiling, processing, and disseminating data.

Statistics Legislation and Statistical Coordination

As there are several actors in an NSS, the roles and responsibilities of its different constituents should be stipulated in a statistics legislation. Statistics legislations exist in many countries and in a variety of forms. In some countries, statistical activities are carried through administrative decrees. The central statistical agency or the NSO generally coordinates statistical activities across all statistical agencies. Often, provisions of a national statistical council, and/or a national statistics coordination committee in the statistics legislation help in bringing about the statistical coordination. In the absence of legal or administrative arrangements, coordination is often based on conventions that are developed in the evolution of any statistical system. Institutional arrangements enabling the NSO to bring about coordination in the NSS are needed for developing a harmonized and an integrated NSS. Such a system will produce statistics based on uniform standards set by the NSO and will also avoid duplication of efforts in the production of statistics.

The *United Nations Handbook of Statistical Organization* (United Nations 2008a) deals with the fundamentals of national systems of official statistics—data collection and respondent policies, principles of organization and management, and dissemination guidelines—and is a comprehensive document on the operational and organizational issues of a statistical agency. This handbook describes different kinds of institutional arrangements that exist in the structure of statistical systems, coordination tools, the role of the chief statistician, the role of the national statistical council, statistics law (including an annotated model of National Statistics Act), financing the statistical system, users and their needs, and other operational and organizational issues. Although not prescriptive, it is a useful reference for heads of statistical agencies in the government and those charged with oversight of official statistics functions, and provides a set of examples to illustrate how suggested principles can be put into practice in certain typical contexts.

The Fundamental Principles of Official Statistics (FPOS) were adopted by the United Nations Statistical Commission in 1994. These 10 principles redefine the role of official statistics and emphasize to governments and users of statistics that a good system of official statistics must meet certain general criteria. The FPOS (Appendix 2.1) are also incorporated by some countries in their statistics legislation as the guiding principles for their NSS.

The producers of official statistics are also the major users of the information that they generate. For example, in compiling national accounts statistics, the NSOs use

the data that they and other ministries produce. On the other hand, to monitor development programs and plans and to formulate policies, the line ministries rely on their own statistics and those that NSOs produce.

Sources of Socioeconomic Data

The major sources and methods of collecting socioeconomic data are broadly grouped under (i) **censuses**, (ii) **sample surveys,** and (iii) **administrative data sources.**

While the censuses and surveys are discussed in this chapter, the administrative data sources are dealt with in detail in the chapter that follows.

2.2 CENSUSES

A census is a complete enumeration of all units in the population under study. The population units under study could be persons, households, housing units, agricultural holdings, and establishments and enterprises. Countries usually conduct censuses related to population, housing, agriculture, and establishments and enterprises. The census is usually undertaken at 10-year intervals because of the complexity and cost of undertaking such large statistical operations, which usually cover the entire country.

Censuses provide reliable baseline data on the structure and key characteristics of the target population from which changes through time can be measured. In general, censuses are suitable for collecting data on variables that do not change rapidly over time. A complete enumeration of the target population allows variables of interest to be aggregated at the lowest administrative or geographical levels. Census data are also used to generate sampling frames for the design of surveys that can be undertaken in the future.

Types of Censuses

There are several types of socioeconomic censuses. The more popular ones are (i) population census, (ii) housing census, (iii) census of agriculture, and (iv) economic census.

A **population census** is the total process of collecting, compiling, evaluating, analyzing, and publishing or otherwise disseminating demographic, economic, and social data pertaining to a specified time to all persons in a country or in a well-delimited part of a country. It is the primary source of basic benchmark statistics on the size, distribution, and composition of population, covering not only the settled population but also homeless persons and nomadic groups. Data from population

censuses allow presentation and analysis in terms of statistics on persons and households and for a wide variety of geographical units, ranging from the country as a whole to individual small localities or city blocks (United Nations 2008b).

A **housing census** is the total process of collecting, compiling, evaluating, analyzing, and publishing or otherwise disseminating statistical data pertaining, at a specified time, to all living quarters and occupants thereof in a country or in a well-delimited part of a country. It provides information on the supply of housing units together with information on the structural characteristics and facilities that have a bearing on the maintenance of privacy and health and the development of normal family living conditions. Demographic, social, and economic data concerning the occupants are collected to describe housing conditions and also to provide basic data for analyzing the causes of housing deficiencies and for studying possibilities for remedial action. In this connection, data obtained as part of the population census, including data on homeless persons, are often used in presenting and analyzing the results of the housing census (United Nations 2008b).

An **agricultural census (or census of agriculture)** is a statistical operation for collecting, processing, and disseminating data on the structure of agriculture, covering the whole or a significant part of the country. Typical structural data collected in a census of agriculture are size of holding, land tenure, land use, crop area harvested, irrigation, livestock numbers, labor, and other agricultural inputs. In an agricultural census, data are collected directly from agricultural holdings, but some community-level data may also be collected. A census of agriculture normally involves collecting key structural data by completely enumerating all agricultural holdings in combination with more detailed structural data using sampling methods (Food and Agriculture Organization 2005).

An **economic census** is periodically undertaken in many countries to generate detailed small area statistics for enterprises and establishments with nonagricultural activities, to generate a limited set of demographic statistics for those units related to their location, year of establishment, size of employment, value of sales or turnover, ownership structure, intra-establishments relationship, etc. (Havinga and Markhonko 2007).

NSOs usually undertake population and housing censuses, agricultural censuses, and industrial or economic censuses. A housing census is commonly conducted along with the population census (at the stage of house listing). Some countries also integrate economic and/or establishment censuses with the housing and population census. The number of countries undertaking these censuses has been increasing over the years. Among the different types of censuses, the population census is the most popular because of its tremendous advantages in administrative, policy, and planning

needs. During the 2000 round of population census, over 190 countries conducted a population census.

A few countries have installed good population registers (Box 2.2) and other administrative registers, and conduct a register-based population census. This removes the need for conducting a traditional census exercise involving door-to-door enumeration of the entire population. Denmark and Norway are examples of two countries that use a register-based population census. In most countries however a population census is conducted once in 10 years based on the traditional approach. In developing countries, the register systems either do not exist, or are very weak and the traditional census methods may have to continue for a long time.

Box 2.2:   Population Register and Register-Based Population Census

The population register is a mechanism for the continuous recording of selected information pertaining to each member of the resident population of a country or area, making it possible to determine up-to-date information about the size and characteristics of the population at selected points in time. Because of the nature of a population register, its organization, as well as its operation, should have a legal basis. Population registers start with a base consisting of an inventory of the inhabitants of an area and their characteristics, such as date of birth, sex, marital status, place of birth, place of residence, citizenship, and language. To help locate a record for a particular person, household, or family in a population register, an identification number is provided for each entity.

The main administrative functions of population registers are to provide reliable information for the various purposes of government, particularly for program planning, budgeting, and taxation; for issuing unique personal identification numbers; for establishing the eligibility of individuals for voting, education, health, military service, social insurance, and welfare and the pension system; and for police and judicial references.

Population registers are also useful for population estimation, census planning, census evaluation, and for sampling frames of household surveys. Some countries use population registers to produce census-type tables every 5 or 10 years in place of conducting regular census operations. If complete, population registers can produce data on both internal and international migration through the recording of changes of residence as well as the recording of international arrivals and departures.

Population registers represent one of the independent sources of data with which the population census results can be compared as part of the process of evaluating the accuracy of the census. To correct either the census or the population register, aggregates compiled from the two sources can be compared, or the corresponding records of the individuals can be matched one-to-one.

Source: United Nations. 2008. *Principles and Recommendations for Population and Housing Censuses,* Revision 2. New York: United Nations. p.75.

Advantages of Censuses

A census is considered to be the most comprehensive source of information about the population of a country. A number of advantages are specific to censuses and they are briefly summarized below.

(i) **Main source of population statistics.** Censuses provide the basic benchmark data on size, structure and profile, and other characteristics of the entire population under study for the census year or for a fixed date of the census year. These also form the basis for population projections for the intercensal years.

(ii) **Use in policy, research, and business.** Being a comprehensive source of data on populations, census data have a wide range of use in policy making, planning, administrative processes, and research; business and industry; and electoral boundary delimitation. In many developing countries, the demographic analysis required for policy making relies heavily on population census data.

(iii) **Provides area and/or list frame for sample surveys.** A census (population census in particular) operation requires much pre-census work of dividing the country into small enumeration areas. It provides records for use as a sampling frame for household and/or establishment surveys conducted during the intercensal years. Enumeration areas carved out in a population census also serve as the basic enumeration areas for organizing other censuses and multistage area-based sample surveys.

(iv) **Assesses bias in surveys**. Complete enumeration of the population is a unique attribute of censuses, which means that census data could be used to assess the effects of coverage bias in surveys.

(v) **Only source of population data for small areas.** Censuses provide the population data for the smallest administrative areas of the country, which are not available from surveys and any other data sources. Data on key characteristics of the population (e.g., human, livestock, agricultural holdings, or establishments) are required to effectively plan and monitor policies at the local levels.

Limitations of Censuses

The limitations of censuses as a source of data include the following:

(i) **Restricted periodicity.** Because of high costs and staffing considerations, NSOs or census authorities cannot conduct censuses frequently. Usually, censuses are conducted once in 10 years after much pre-census preparation.

(ii) **Long time lag in producing results.** The processing of census data to provide detailed tabulations usually takes a long time and final census results

are released after some time lag, often more than 1 year after the census.

(iii) **Restricted subject coverage.** Usually, the nationwide scope and coverage of censuses entails massive mobilization of human and financial resources and requires the use of relatively short questionnaires with a restricted number of topics and items of data canvassed. This reduces the scope of analysis that can be undertaken with the resulting census data.

(iv) **Prone to data collection errors.** The involvement of a large number of enumerators and supervisors makes it difficult to completely avoid errors when collecting data. Lack of uniform understanding of concepts, definitions, and instructions by all the enumerators seems to persist despite intensive training of enumerators and supervisors and use of manuals and guides.

(v) **Lack of comparability.** As a result of improvement in census methodologies and revisions in definitions and coverage, census questionnaires and methods of enumeration are often modified between censuses. This improves and strengthens census methodologies, but also results in loss of comparability for trend analysis in the variables.

(vi) **Incomplete coverage.** Although the principal objective of a census is to enumerate the entire population of the subject under study, some special groups (such as expatriates, homeless, or displaced persons) may intentionally or unintentionally be excluded.

Censuses in Case Study Countries

The censuses conducted in the five case study countries are presented in Table 2.1. The population census is clearly the most popular census type in these countries. Mongolia, Nepal, Palau, and Sri Lanka have a fairly long tradition of undertaking population censuses, with their programs starting in the early 20th century. Sri Lanka's first census dates back to 1871. Given the importance of livestock in Mongolia's economy, the NSO of Mongolia has been conducting livestock censuses annually since 1961. Viet Nam's experience with censuses is relatively more recent, with the first population census of independent Viet Nam undertaken in 1979.

2.3 THE ROLE OF POPULATION CENSUSES IN THE COMPILATION OF THE MILLENNIUM DEVELOPMENT GOALS INDICATORS

Among the different types of censuses, the census of population is the most widely undertaken and used. The population count, structure, and growth obtained from population censuses are the data most needed for policy and programming. The population census is a unique basic source of benchmark demographic data, such as number of persons by age and gender. Moreover, some MDG and socioeconomic

indicators are expressed on a per person or per capita basis. Population censuses are the most important source of data on the reference population used for the denominator of this type of indicators, which may be compiled at national and subnational levels and disaggregated by age and sex, where applicable. For non-census years, population projections of the reference population are used.

Table 2.1: Population, Agriculture, and Economic Censuses Conducted in Mongolia, Nepal, Palau, Sri Lanka, and Viet Nam

Type of Census	Mongolia	Nepal	Palau	Sri Lanka	Viet Nam
Census of Population	1918, 1935, 1944, 1956, 1963, 1969, 1979, 1989, 2000	1911, 1920, 1930, 1941, 1952/54, 1961, 1971, 1981, 1991, 2001	1920, 1930, 1980, 1986, 1990, 1995, 2000, 2005	1871, 1881, 1891, 1901, 1911, 1921, 1933, 1946, 1953, 1963, 1971, 1981, 2001	1979, 1989, 1999, 2009
Census of Agriculture[a]	1922, 1936, 1944, 1955 Annual livestock census from 1961	1961/62 1971/72, 1981/82, 1991/92, 2001	–	1921, 1946, 1952, 1962, 1973, 1982, 2002	1991, 1996, 2001, 2006
Economic census, including census of manufacturing, etc.	1991, 1996, 2005	1999/00, 2005/06	–	1963, 1983, 2003/04	1995, 2002, 2007

– = information not available or census not conducted.
a   Livestock census for Mongolia.
Source: Asian Development Bank regional technical assistance 6356 (Asian Development Bank. 2006. *Regional Technical Assistance on Improving Administrative Data Sources for Monitoring of the Millennium Development Goal Indicators.* Manila) national consultants, and respective countries' statistics office websites: http://www.nso.mn/v3/index2.php; http://www.cbs.gov.np/index.php; http://www.palaugov.net/stats/; http://www.statistics.gov.lk/home.asp; http://www.gso.gov.vn/default_en.aspx?tabid=491

Apart from using population censuses as source for the denominator for compiling some MDG indicators, population censuses are also a potential source for compiling some MDG indicators that require population census data for both the numerator and the denominator, provided appropriate questions are included in the census questionnaire. The most common MDG indicator in this category is the literacy rate of 15–24 year olds. Other MDG indicators for which both numerator and denominator could be sourced from population censuses are (i) employment-to-population ratio, (ii) share of women in wage employment in the nonagriculture sector, (iii) proportion of population using an improved drinking water source, (iv) proportion of population using an improved sanitation facility, and (v) proportion of urban population living in slums.

Other MDG indicators for which population censuses could be a potential source of data if appropriate questions were included are (i) infant mortality rate, (ii) under-5 mortality rate, (iii) maternal mortality ratio, (iv) death rates associated with malaria and tuberculosis, (v) telephone lines per 100 population, (vi) cellular subscribers per 100 population, and (vii) internet users per 100 population.

Table 2.2 provides a summary of the data needed for compiling MDG indicators for which population estimates can be sourced from population censuses.

Table 2.2: Use of Population Census Data for the Millennium Development Goals Indicators

Goal and Indicator		Required Data
Goal 1: Eradicate extreme poverty and hunger		
1.5	Employment-to-population ratio ▲	Working-age population – total and employed
1.9	Proportion of population below minimum level of dietary energy consumption	Total population
Goal 2: Achieve universal primary education		
2.1	Net enrollment ratio in primary education	Total number of children of official primary school age
2.3	Literacy rate of 15–24-year-olds, women and men ▲	Population aged 15–24 years – total and literate
Goal 3: Promote gender equality and empower women		
3.1	Ratio of boys to girls in primary, secondary, and tertiary education	Total population in the official age for primary, secondary, and tertiary education
3.2	Share of women in wage employment in the nonagricultural sector ▲	Population in nonagriculture wage employment – total and female
Goal 4: Reduce child mortality		
4.1	Under-5 mortality rate ☉	Deaths by age; live births
4.2	Infant mortality rate ☉	Deaths by age; live births
4.3	Proportion of 1-year old immunized against measles	Total population of children in the target group
Goal 5: Improve maternal health		
5.1	Maternal mortality ratio ☉	Deaths by age, sex, and cause of female deaths; live births
5.4	Adolescent birth rate	Total population of women aged 15–19 years
Goal 6: Combat HIV/AIDS, malaria, and other diseases		
6.1	HIV prevalence among population aged 15–24 years	Total population aged 15–24 years
6.6	Incidence and death rates associated with malaria ☉	Total population
6.9	Incidence, prevalence, and death rates associated with tuberculosis (TB) ☉	Total population
Goal 7: Ensure environmental sustainability		
7.2	CO_2 emissions, total, per capita and per $1 GDP (PPP)	Total population
7.8	Proportion of population using an improved drinking water source ▲	Population – total and using an improved drinking water source
7.9	Proportion of population using an improved sanitation facility ▲	Population – total and using an improved sanitation facilty

Table 2.2 continuation

Goal and Indicator		Required Data
7.10	Proportion of urban population living in slums ▲	Urban population – total and living in slums
Goal 8: Develop a global partnership for development		
8.14	Telephone lines per 100 population ⊙	Total population
8.15	Cellular subscribers per 100 population ⊙	Total population
8.16	Internet users per 100 population ⊙	Population - total and internet users

Key:
▲ = both numerator and denominator for compiling the indicator can be sourced from population and housing censuses
⊙ = population and housing censuses are a potential source for the indicator (refers only to death rates for indicator 6.6 and 6.9)
CO_2 = carbon dioxide, GDP = gross domestic product, PPP = purchasing power parity.
Sources: United Nations. 2008. *Principles and Recommendations for Population and Housing Censuses*, Revision 2. New York: United Nations; Compiled from the United Nations. Millennium Development Goals Indicators. The official United Nations site for the MDG Indicators MDG metadata. http://mdgs.un.org/unsd/mdg/Metadata.aspx

2.4 SAMPLE SURVEYS

A **survey** is a method of collecting quantitative or qualitative information on members of a population. A survey can be conducted as a census or a sample survey. In contrast to a census where all units in the population are studied, a **sample survey** collects data from only a fraction of the units of the population under study, with the objective of drawing inferences about the whole population.

Types of Surveys in a National Statistical System

Government statistical agencies conduct different types of sample surveys, determined by the target population for which estimates are required. Statistical agencies conduct these surveys to estimate characteristics of different kinds of population, such as households, establishments, dwelling units, tourists, trees in forests, etc. Household and establishment surveys are the most commonly conducted surveys for collecting socioeconomic data. A large number of developing countries depend heavily on household surveys for the data required to compile MDG indicators.

Household and establishment surveys. Surveys of households and establishments have come into prominence during the past few decades, with the development and refinement of survey sampling methodologies. This has come simultaneously with the increasing demand for better data on employment, consumption, and living standards of households in developing countries to monitor their progress in the attainment of the MDGs, national poverty reduction strategies, and the countries' developmental planning needs.

There are different methods—i.e., sampling designs—for selecting a sample of units. The choice of sampling design often depends on the purpose, resources available, and characteristics of the population under study. The sampling designs used by statistical agencies are mostly one among many conventional probability sampling designs. **Probability sample surveys** use probability techniques to assign a known probability of selection to each unit in the population and ensure that the sample is representative of the population. However, sometimes owing to lack of resources or relative rarity of the target population, statistical agencies adopt purposive (non-probability) selection methods. These purposive methods consist of a selection of a set of units that are thought to be "representative" of the target population. These are also referred to as "judgment sampling," "convenience sampling," "snowball sampling," and "quota sampling," and are applicable to different situations.

Advantages of Sample Surveys

The advantages of sample surveys include:
  (i) **Cost effectiveness.** Sample surveys are a cost-effective means of collecting data in situations where a complete enumeration is not practical or data from administrative sources are not available.
 (ii) **Wider scope.** It is possible to carry out a detailed inquiry by asking multiple questions on characteristics of interest of the target population. Sample surveys can be used to collect qualitative and quantitative data in the same inquiry.
(iii) **Provide means of measuring accuracy.** In probability sample surveys, standard statistical techniques can be adopted to determine the validity, reliability, and statistical significance of reported results.
(iv) **Better non-sampling error control.** Well-trained interviewers and supervisors can be employed to ensure high-quality data collection to minimize non-sampling errors.

Limitations of Sample Surveys

Limitations in survey data arise due to many factors and the effect of some can be controlled but not completely eliminated. A few general issues include:
  (i) **Subject to sampling error.** Sample surveys are subject to sampling error, which is a function of the sampling design and sample size. There is always a trade-off between the sampling design, the required sample size, and the cost of the survey.

(ii) **Require up-to-date sampling frame.** An important requirement in undertaking a sample survey is the availability of a complete and updated list of population units or complete sampling frame for selection of samples. Use of incomplete and/or outdated sampling frames can produce seriously biased estimates of the population parameters.

(iii) **Non-response.** The success of a sample survey depends on the percentage of response from the sampled population to the questionnaire(s) used in the inquiry. A high response rate is desired.

(iv) **Comparability over time.** Comparability of estimates of key variables derived from sample surveys over time may require similar sampling designs, and the same set of questions and method of canvassing used in previous surveys.

(v) **Subject to response bias.** In any sample survey, the quality of data collected ultimately depends on the respondents' ability to recall, their honesty, and their motivation to respond to the set of questions in the survey questionnaire.

(vi) **Need for adequately trained manpower.** Survey interviewers and supervisors should be adequately trained to collect data using the survey instruments. In multicultural situations, adopting standardized methods and techniques to effect desired quality standards become a serious concern, and may be difficult to resolve.

(vii) **Limited utility for smaller domains.** The sample size of surveys undertaken by national statistical agencies is usually determined to provide estimates of population parameters at the national level. Producing reliable subnational estimates from sample surveys requires very large sample sizes, and hence large costs. This limits the utility of sample surveys in providing subnational estimates of parameters with disaggregations, such as age, sex, ethnic minorities, or rural–urban.

Role of Household Surveys in National Statistical Systems of Developing Countries

Among the different types of surveys conducted by national statistical agencies to collect data on various socioeconomic characteristics of the population, household surveys are the most popular ones. These are conducted to capture data on income, consumption, living standards, morbidity, mortality, labor and employment, migration, and other household characteristics. In developing countries, these surveys have become a major form of collecting data to monitor poverty, living standards, and the MDGs. Table 2.3 summarizes the purpose, objectives, and key features of the most commonly conducted household surveys used as data source for most MDG indicators.

Table 2.3:   Key Features of the Most Common Household Surveys

Survey Type and/or Title	Purpose and/or Objectives	Key Features
Household Income and Expenditure Surveys (HIES)	• To provide weights for consumer price indexes. • To provide direct measures of household consumption for the system of national accounts. • To analyze welfare and poverty.	• Collected in two ways: (i) household interviews consisting of retrospective questions regarding consumption, and (ii) diary where the household records the consumption and expenditure on a daily basis. • Typically employs a multistage sampling design with primary sampling units being census enumeration areas or administrative units, such as communes, villages, or wards.
Labor Force Surveys (LFS)	• To measure the levels and trend of employment, unemployment, and underemployment. • To collect data on wage incomes. • To provide qualitative information on non-wage activities.	• Permits reliable comparisons of the labor force indicators across countries and between different rounds of the survey in the same country as core questionnaires and definitions were developed by the International Labour Organization. • Generally adopts a panel design where households are visited for consecutive quarters for some period, thus, variations in unemployment estimates are captured more precisely.
Demographic and Health Surveys (DHS)	• To produce measures of fertility, mortality, contraceptive use, maternal and child health, and other demographic indicators. • To produce indicators on HIV/AIDS, sexually transmitted diseases (STDs), anthropometrics, and child malnutrition.	• Use of consistent sampling methodologies and questions, ensuring comparability among countries and over time while still maintaining flexibility to meet individual country needs.
Living Standards Measurement Surveys (LSMS)	• To collect household data that can be used to assess household welfare, to understand household behavior, and to evaluate the effect of various government policies on the living conditions of the population. • To produce indicators of household well-being, such as consumption, income, savings, employment, health, education, fertility, nutrition, housing, and migration.	• Multi-topic questionnaires: household questionnaire, community characteristics questionnaire, price questionnaire, school or health facility questionnaire. • Extensive quality control procedures to minimize interviewer error: (i) screening questions are extensively used, (ii) questions are written out exactly as they are to be asked, and (iii) data that can be entered into the computer straight from the completed questionnaire. • Highly decentralized fieldwork and data entry. • Use of small samples to minimize non-sampling error, often ranging from 1,600 to 3,200 households and rarely more than 5,000 households. • Use of personal computers in the field, where all the stages of data collection, data entry, and editing are carried out. • Data entry checks and corrections are done in the field. • Quick turnaround between the completion of fieldwork and the availability of data for analysis, thus, contributing to the relevance of the data to policy making.

Table 2.3 continuation

Survey Type and/or Title	Purpose and/or Objectives	Key Features
Core Welfare Indicator Questionnaires (CWIQ)	• To monitor poverty and the effects of development policies, programs, and projects on living standards. • To identify through simple indicators who is and who is not benefiting from various actions designed to improve the social and economic status of the poor.	• National annual survey that is quick and easy to implement. • Rapid monitoring of key indicators for different population subgroups. • Part of an overall monitoring package. • Short questionnaire and single visit. • Multiple choice questions for easy and rapid data collection. • Scannable data entry to eliminate data entry bottlenecks. • Complete validation specifications and programs. • Standard tabulation plan and programs. • Employs as large a sample as feasible, given national statistical resource constraints and the need for rapid results.
Multiple Indicator Cluster Surveys (MICS)	• To measure and monitor health, education, child protection, and HIV/AIDS indicators.	• Typically carried out by government organizations, with the support and assistance of the United Nations Children's Fund (UNICEF) and other partners. • Survey tools developed by UNICEF upon consultations with relevant experts. • Survey questions and modules are harmonized with the demographic health survey (DHS) to ensure a coordinated approach to survey implementation. • Survey questionnaires are modular tools that can be adapted to the needs of the country.

Sources: Compiled from Achikbache, Bahjat, Misha Belkindas, Mustafa Dinc, Graham Eele, and Eric Swanson. 2002. Strengthening Statistical Systems. In *A Sourcebook for Poverty Reduction Strategies, Vol 1: Core Techniques and Cross Cutting Issues*. Washington, DC: World Bank; United Nations. 2003. *Indicators for Monitoring the Millennium Development Goals: Definitions, Rationale, Concepts and Sources*. New York: United Nations; United Nations. 2005. *Household Sample Surveys in Developing and Transition Countries*. New York: United Nations; MEASURE. DHS Brochure. http://www.measuredhs.com/aboutdhs/; United Nations Children's Fund. http://www.childinfo.org/mics.html

The United Nations Statistics Division's publication, *Household Sample Surveys in Developing and Transition Countries* (United Nations 2005), presents state-of-the-art information on several important aspects of conducting household surveys in developing and transition countries, including sampling design, survey implementation, non-sampling errors, survey costs, and analysis of survey data. The handbook is a useful material to help national survey statisticians design household surveys in an efficient and reliable manner and to allow users to make greater use of survey-generated data.

Household Surveys Conducted in Case Study Countries

Major household surveys conducted in Mongolia, Nepal, Palau, Sri Lanka, and Viet Nam are presented in Table 2.4. Sri Lanka has a long tradition on conducting household surveys, with the household consumer finance surveys dating back to 1953. In Mongolia, the household income expenditure survey has been conducted

Table 2.4: Major Household Surveys Conducted in Mongolia, Nepal, Palau, Sri Lanka, and Viet Nam

Type of Survey	Mongolia	Nepal	Palau	Sri Lanka	Viet Nam
Demographic and Health Survey (DHS)/ Reproductive Health Survey (RHS)/ Fertility/Family Planning (FP)/Family Health Survey	RHS 1998, 2003, 2008	Fertility/FP surveys 1976, 1981, 1986, 1991 Family Health Survey 1996 DHS 2001, 2006	Family Health Survey 2003 Population and Environment Survey 2003	DHS 1973, 1987, 1998, 2000, 2006/07	DHS 1997, 2002, 2005 Population Dynamics Survey 2001–2008
Labor Force Survey (LFS)	Started annually in 2002/2003 then quarterly from 2006/2007 onwards	1998/99, 2008	–	1990 onwards (quarterly and annual)	Started annually in 1997 then every six months from 2001 onwards
Household Income and Expenditure Survey (HIES)/Consumer Finances Survey (CFS)/ Socioeconomic Survey (SES)/ Household Budget Survey (HBS)	HIES 1966 onwards (annual)	HBS 1995/96, 2006/07 Employment, Income Distribution and Consumption Pattern Survey 1983	HIES 2006, 2009 (includes labor force data)	CFS 1953, 1963, 1973, 1978/79 SES 1968/69, 1980/81, 1985/86, 1990/91, 1995/96, 1999, 2002, 2006/07	Multipurpose Household Survey 1994, 1995, 1996, 1997, 1999
Living Standard Measurement Survey (LSMS)	1995, 1998, 2002/03, 2007/08[a]	1995/96, 2003/04	–	–	1993, 1998, 2002, 2004, 2006, 2008
Child Development Survey (CDS)/Child Labour Survey (CLS)/ Multiple Indicator Cluster Survey (MICS)	1995, 2000, 2003, 2005	1995–1998, 2001[b]	–	1998/99	1995, 2000, 2006

– = Survey not conducted in the country.

[a] Household Socio-Economic Survey 2007/2008.

[b] 1995–1998: Nepal Multiple Indicator Surveillance and in 2001: Between Census Household Information, Monitoring and Evaluation System (BCHIMES).

Sources: Asian Development Bank regional technical assistance 6356 (Asian Development Bank. 2006. *Regional Technical Assistance for Improving Administrative Data Sources for the Monitoring of the Millennium Development Goal Indicators*. Manila.) national consultants, and respective countries' statistics office websites: http://www.nso.mn/v3/index2.php; http://www.cbs.gov.np/index. php; http://www.palaugov.net/stats/; http://www.statistics.gov.lk/home.asp; http://www.gso.gov.vn/default_en.aspx?tabid=491; country reports of assessment study for improving administrative data sources for the monitoring of MDG indicators for Mongolia, Nepal, Palau, Sri Lanka, and Viet Nam (ADB 2009a, 2009b, 2009c, 2009d, 2009e).

since 1966 but surveys on other subjects started only in the latter half of the 1990s. In Nepal, while Household Budget Survey conducted by the Nepal Rastra Bank (central bank) dates back to 1973, other surveys had been infrequent. Viet Nam's experience with household surveys began mostly in the latter half of 1990s, while in Palau, household surveys are of recent origin. In many cases, these surveys have been supported by technical assistance programs sponsored by international and bilateral agencies.

2.5 ROLE OF HOUSEHOLD SURVEYS IN THE COMPILATION OF THE MILLENNIUM DEVELOPMENT GOALS INDICATORS

Household surveys are an important source of socioeconomic data. Important indicators, including many MDG indicators needed to inform and monitor development policies, are often derived from such surveys. In developing countries, household surveys have become a dominant form of collecting data and supplementing other data collection programs. These surveys therefore have significance in any NSS for meeting specific data needs for informed policy making.

Because they provide deeper insights, household surveys are also important sources of information to complement the input and output data collected through administrative data systems. For example, while a well-organized education management information system in a country can provide reliable data for compiling enrollment rates or the ratio of girls to boys in primary, secondary, and tertiary education, it cannot provide deeper insights into the causes of poor enrollment and attendance, or falling ratio of girls to boys in primary education, and their relationship with other household characteristics, such as household income or consumption or educational status of the head of the household.

Household surveys have played a significant role in providing data for monitoring the progress of many MDGs in developing countries and can be the source of more than half of the MDG indicators. In fact, all the indicators under goal 1 can be reliably measured using data collected from household surveys. Table 2.5 summarizes the MDG indicators that can be sourced from commonly undertaken household surveys. This table reflects the immense utility of household surveys in providing data on key development indicators. It may be noted that in the context of an NSS, the importance of household surveys lies in their usefulness as a complement data source to administrative data.

Table 2.5: Millennium Development Goals Indicators That Can Be Produced from Household Surveys

Goal and Indicator	LSMS	DHS	MICS	CWIQ	HIES	LFS
Goal 1: Eradicate extreme poverty and hunger						
1.1 Proportion of population below $1 (PPP) per day	●	○	○	○	●	○
1.2 Poverty gap ratio	●	○	○	○	●	○
1.3 Share of poorest quintile in national consumption	●	○	○	○	●	○
1.4 Growth rate of GDP per person employed	●	○	○	○	◉	●
1.5 Employment-to-population ratio	●	◉	○	○	◉	◉
1.6 Proportion of employed people living below $1 (PPP) per day	●	○	○	○	◉	●
1.7 Proportion of own-account and contributing family workers in total employment	◉	○	○	○	◉	●
1.8 Prevalence of underweight children under-five years of age	●	●	●	○	◉	○
1.9 Proportion of population below minimum level of dietary energy consumption	●	○	○	○	◉	○
Goal 2: Achieve universal primary education						
2.1 Net enrollment ratio in primary education	●	●	●	●	○	◉
2.2 Proportion of pupils starting grade 1 who reach last grade of primary	●	●	●	●	○	◉
2.3 Literacy rate of 15–24 year-olds, women and men	●	◉	●	●	◉	◉
Goal 3: Promote gender equality and empower women						
3.1 Ratio of girls to boys in primary, secondary, and tertiary education	●	●	●	●	○	◉
3.2 Share of women in wage employment in the nonagricultural sector	●	◉	○	◉	◉	●
Goal 4: Reduce child mortality						
4.1 Under-5 mortality rate	◉	●	●	○	○	○
4.2 Infant mortality rate	◉	●	●	○	○	○
4.3 Proportion of 1 year-old children immunized against measles	●	●	●	●	○	○
Goal 5: Improve maternal health						
5.1 Maternal mortality ratio	○	●	●	○	○	○
5.2 Proportion of births attended by skilled health personnel	●	●	●	◉	○	○
5.3 Contraceptive prevalence rate	●	●	●	○	○	○
5.4 Adolescent birth rate	○	●	●	○	○	○
5.5 Antenatal care coverage (at least one visit and at least four visits)	○	●	●	○	○	○
5.6 Unmet need for family planning	○	●	●	○	○	○
Goal 6: Combat HIV/AIDS, malaria, and other diseases						
6.1 HIV prevalence among population aged 15–24 years	○	●	○	○	○	○
6.2 Condom use at last high-risk sex	○	●	●	○	○	○

Table 2.5 continuation

Goal and Indicator		LSMS	DHS	MICS	CWIQ	HIES	LFS
6.3	Proportion of population aged 15–24 years with comprehensive correct knowledge of HIV/AIDS	○	◉	◉	○	○	○
6.4	Ratio of school attendance of orphans to school attendance of non-orphans aged 10–14 years	○	◉	◉	○	○	○
6.7	Proportion of children under 5 sleeping under insecticide-treated bednets	○	◉	◉	○	○	○
6.8	Proportion of children under 5 with fever who are treated with appropriate anti-malarial drugs	○	◉	◉	○	○	○
Goal 7:	Ensure environmental sustainability						
7.8	Proportion of population using an improved drinking water source	◉	◉	◉	◉	◉	○
7.9	Proportion of population using an improved sanitation facility	◉	◉	◉	◉	◉	○
7.10	Proportion of urban population living in slums	◉	◉	◉	○	◉	○
Goal 8:	Develop a global partnership for development						
8.14	Telephone lines per 100 population	◉	◉	○	◉	◉	◉
8.15	Cellular subscribers per 100 population	◉	◉	○	◉	◉	◉
8.16	Internet users per 100 population	◉	◉	○	◉	◉	◉

Key:
◉ - Indicator can be measured with this survey
⊙ - Indicator can be measured with this survey but some changes to methodology may be required
○ - Indicator would not normally be estimated with this survey

CWIQ = core welfare indicators questionnaire, DHS = demographic and health survey, HIES = household income and expenditure survey, LFS = labor force survey, LSMS = living standard measurement survey, MICS = multiple indicator cluster survey.
Note: Information on HIES and LFS are also based on country practices in Mongolia and Sri Lanka.

Sources: International Development Association. 2004. Measuring Results: Improving National Statistics in IDA Countries. Discussion Paper for the Fourth IDA14 Replenishment Meeting. Athens, Greece. 13–14 December; Country reports of assessment study for improving administrative data sources for the monitoring of MDG Indicators for Mongolia, Nepal, Palau, Sri Lanka, and Viet Nam (ADB 2009a, 2009b, 2009c, 2009d, 2009e); United Nations. 2003. *Indicators for Monitoring the Millennium Development Goals: Definitions, Rationale, Concepts and Sources*. New York: United Nations; United Nations. Millennium Development Goals Indicators. The official United Nations site for the MDG Indicators. MDG metadata. http://mdgs.un.org/unsd/mdg/Metadata.aspx; CWIQ, DHS, LSMS, and MICS sample questionnaires.

2.6 DATA QUALITY CONSIDERATIONS

It is important to consider the quality of the data sources used to compile the MDG and other socioeconomic indicators. A particular data source should be used based on its fitness-for-use to produce the intended indicators. In Statistics Canada's Quality Assurance Framework (Statistics Canada 2002), the quality of statistical products has multiple dimensions—relevance, accuracy, timeliness, accessibility, interpretability, and coherence. The definitions as given by Statistics Canada are the following:

(i) **Relevance.** The relevance of statistical information reflects the degree to which it meets the real needs of clients. It is concerned with whether the available information sheds light on the issues of most importance to users. Assessing relevance is a subjective matter dependent upon the varying

needs of users. The agency's challenge is to weigh and balance the conflicting needs of current and potential users to produce a program that goes as far as possible in satisfying the most important needs within given resource constraints.

(ii) **Accuracy.** The accuracy of statistical information is the degree to which the information correctly describes the phenomena it was designed to measure. It is usually characterized in terms of error in statistical estimates and is traditionally decomposed into bias (systematic error) and variance (random error) components. It may also be described in terms of the major sources of error that potentially cause inaccuracy (e.g., coverage, sampling, nonresponse, response).

(iii) **Timeliness.** The timeliness of statistical information refers to the delay between the reference point (or the end of the reference period) to which the information pertains, and the date on which the information becomes available. It is typically involved in a trade-off against accuracy. The timeliness of information will influence its relevance.

(iv) **Accessibility.** The accessibility of statistical information refers to the ease with which it can be obtained from the agency. This includes the ease with which the existence of information can be ascertained, as well as the suitability of the form or medium through which the information can be accessed. The cost of the information may also be an aspect of accessibility for some users.

(v) **Interpretability.** The interpretability of statistical information reflects the availability of the supplementary information and metadata necessary for its interpretation and appropriate use. This information normally covers the underlying concepts, variables, and classifications used; the methodology for collecting and processing data; and indications of the accuracy of the statistical information.

(vi) **Coherence.** The coherence of statistical information reflects the degree to which it can be successfully brought together with other statistical information within a broad analytic framework and over time. The use of standard concepts, classifications, and target populations promotes coherence, as does the use of common methodology across surveys. Coherence does not necessarily imply full numerical consistency.

The data quality dimensions are relevant to the data collected by any of the methods, namely, census, sample survey, and administrative data. All producers of official statistics should consider these six quality dimensions in collecting and producing statistical outputs.

The quality assurance framework of Statistics Canada describes the characteristics and quality of the statistical outputs or the information products. The Australian

Bureau of Statistics Data Quality Framework (ABS DQF) 2009 (Australian Bureau of Statistics 2009), which is designed to evaluate the quality of statistical collections and products (e.g., survey data and statistical tables) including administrative data, has one additional dimension apart from the same six dimensions of Statistics Canada's quality assurance framework. This is the first dimension of ABS DQF and relates to the quality of institutional environment and the organizational factors, which may have significant influence on the production of credible and reliable data.

The International Monetary Fund's Tools on Data Quality Assurance

The General Data Dissemination System (GDDS) (IMF a) of the International Monetary Fund (IMF), provides a tool for the countries to improve the quality of their economic, financial, and sociodemographic statistics. It encourages countries to disseminate documentation on the sources and methods of data, their practices on quality assurance, policies on data dissemination, and improvement plans. The metadata thus prepared serves as a tool to track improvements in quality over time. The data dimension of the GDDS covers four macroeconomic sectors—real, fiscal, financial, and external; and four categories of sociodemographic data—population, health, education, and poverty.

The IMF's Data Quality Assessment Framework (DQAF) that arose from its data dissemination initiatives (IMF b) provides a more holistic approach to quality covering governance of statistical systems, core statistical processes, and observable features of the outputs. It is organized around a set of prerequisites of data quality (e.g., legal and institutional environment, resources for statistical programs, relevance of statistics collected, and other quality management concerns) and five dimensions of data quality: (i) assurances of integrity, (ii) methodological soundness, (iii) accuracy and reliability, (iv) serviceability, and (v) accessibility. The IMF has also developed a generic DQAF that includes the five dimensions of data quality and a set of prerequisites (IMF c).

Data Specific Quality Assurance Frameworks

The IMF's DQAF has been applied to develop seven dataset-specific DQA frameworks for (i) national accounts statistics, (ii) consumer price index, (iii) producer price index, (iv) government finance statistics, (v) monetary statistics, (vi) balance of payments statistics, and (vii) external debt statistics. In collaboration with the World Bank, a DQAF module on household income in a poverty context has also been developed. The World Bank in collaboration with the United Nations Educational, Scientific and Cultural Organization's Institute for Statistics has undertaken the application of the IMF's DQAF to develop *A Framework for Assessing the Quality of Education Statistics* (World Bank and the United Nations Educational, Scientific

and Cultural Organization). In the area of health statistics, The Health Metrics Network's *Framework and Standards for Country Health Information Systems* (Health Metrics Network 2008) identifies the key components and standards of a country's health information system. The quality assessment frameworks for education and health statistics follow a cascading structure that flows from five main dimensions of data quality—integrity, methodological soundness, accuracy and reliability, serviceability, and accessibility. In addition to these five dimensions of quality, the tools describe a set of prerequisites for the assessment of data quality. The frameworks emphasize engaging all stakeholders that will help in developing a shared vision of a more coherent, integrated, efficient, and useful system.

Using Generic Data Quality Assurance Frameworks for National Data Quality Assurance

While the IMF's DQAF guides its staff on the use of data in policy evaluation, preparing the data module of Reports on the Observance of Standards and Codes, and designing technical assistance, it also guides countries to prepare self-assessments on data quality. Thus, the DQAF generic framework can be adapted to a data-specific DQA framework and countries can use the existing frameworks in assessing the quality of their statistical products, processes, and practices through self-assessment, suitably modifying the existing generic frameworks to meet their national needs.

The United Nations Statistics Division has initiated a consultation process for developing a national quality assurance framework (United Nations Statistics Division). The issue was discussed at the 2010 session of the UN Statistical Commission on the basis of a report prepared by Statistics Canada. The report advocated that all NSOs should develop and use a national quality assurance framework, and proposed that a generic national quality assurance framework template with guidelines be prepared to help NSOs develop and/or strengthen their individual frameworks. This framework, once in place, will guide the national statistical agencies to apply the framework for assessing and improving the data quality of their information products.

KEY POINTS

→ All countries generally have a central statistics agency (NSO), either constituted independently as an autonomous institution or as an agency under a ministry in the government, responsible for collecting, compiling, and disseminating key statistics in the country.

→ Apart from the NSO, sectoral and line ministries or departments have statistical, planning, and/or monitoring agencies or units that collect, compile, and disseminate data on their respective sectors. These agencies produce official statistics in a country's statistical system.

→ The statistical activities within a country are often stipulated under a statistics legislation. The legislation assigns the roles and responsibilities to different stakeholders in the NSS, with the NSO often coordinating and setting national statistical standards.

→ Censuses, sample surveys, and administrative data are the three main sources of data for compiling socioeconomic indicators. Demand for socioeconomic indicators in evidence-based policy making has led to an increase in the number of population censuses and other censuses and sample surveys conducted in recent decades.

→ The types of censuses include population, housing, economic, and agriculture censuses. A census is a complete enumeration of the units in the population and provides data on the structure of the population under study and baseline data of its characteristics. Among the different types of censuses, the population census is the most widely undertaken since population count, its structure, and growth, are the most needed data for any policy and programming needs.

→ Population censuses are large-scale operations usually conducted once in 10 years and provide benchmark data on the structure and demographic particulars of the population. As these are usually conducted once in 10 years, their utility in terms of monitoring trend over time is limited. Censuses have several administrative and statistical benefits, including providing estimates for some MDG indicators, and for use as reference population for many indicators.

→ Household and establishment surveys are important sources of data for compiling many socioeconomic indicators in developing countries. In particular, household surveys, such as household, income, and expenditure surveys; labor force surveys; demographic and health surveys; and living standard measurement surveys have played a significant role in providing indicators for monitoring the MDG program in developing countries.

→ Household surveys have several distinct advantages over censuses but have their own limitations. These are most suitable for collecting detailed data on particular topics of interest, when it is not feasible to conduct a census, and when data are not available through administrative sources.

→ In addition to the censuses and sample surveys, administrative data sources of the sectoral and line ministries are a potentially rich and alternative source for compiling a number of socioeconomic indicators, including the MDGs.

→ The six dimensions of data quality, namely, relevance, accuracy, timeliness, accessibility, interpretability, and coherence provide the basis for decision on the fitness-for-use of data in producing the intended indicators.

APPENDIX 2.1

Fundamental Principles of Official Statistics

(1) Official statistics provide an indispensable element in the information system of a democratic society, serving the Government, the economy and the public with data about the economic, demographic, social and environmental situation. To this end, official statistics that meet the test of practical utility are to be compiled and made available on an impartial basis by official statistical agencies to honor citizens' entitlement to public information.

(2) To retain trust in official statistics, the statistical agencies need to decide according to strictly professional considerations, including scientific principles and professional ethics, on the methods and procedures for the collection, processing, storage and presentation of statistical data.

(3) To facilitate a correct interpretation of the data, the statistical agencies are to present information according to scientific standards on the sources, methods and procedures of the statistics.

(4) The statistical agencies are entitled to comment on erroneous interpretation and misuse of statistics.

(5) Data for statistical purposes may be drawn from all types of sources, be they statistical surveys or administrative records. Statistical agencies are to choose the source with regard to quality, timeliness, costs and the burden on respondents.

(6) Individual data collected by statistical agencies for statistical compilation, whether they refer to natural or legal persons, are to be strictly confidential and used exclusively for statistical purposes.

(7) The laws, regulations and measures under which the statistical systems operate are to be made public.

(8) Coordination among statistical agencies within countries is essential to achieve consistency and efficiency in the statistical system.

(9) The use by statistical agencies in each country of international concepts, classifications and methods promotes the consistency and efficiency of statistical systems at all official levels.

(10) Bilateral and multilateral cooperation in statistics contributes to the improvement of systems of official statistics in all countries.

Source: United Nations Statistics Division. http://unstats.un.org/unsd/dmss/gp/fundprinciples.aspax

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CHAPTER 3

SOURCES OF SOCIOECONOMIC STATISTICS: ADMINISTRATIVE DATA

This chapter describes the role of administrative data as a source of socioeconomic statistics. The advantages and limitations of administrative data for compiling socioeconomic indicators are discussed, along with their uses in monitoring the Millennium Development Goals (MDGs). The challenges in using administrative data for statistical purposes are also presented. The chapter concludes with a discussion on the usefulness of all types of data sources as complements in meeting the statistical needs of a country's statistical system.

3.1 WHAT ARE ADMINISTRATIVE DATA?

The Statistical Data and Metadata Exchange (SDMX 2009) defines administrative data and administrative source as:

> **Administrative data:** *The set of units and data derived from an administrative source.*

> **Administrative source:** *A data holding containing information collected and maintained for the purpose of implementing one or more administrative regulations.*

It further mentions a wider definition of administrative sources as used in the Eurostat Business Register Recommendations Manual (European Communities 2003): "… a data holding containing information which is not primarily collected for statistical purposes. The organizational unit responsible for maintaining one or more administrative sources is known as an administrative organization."

Canadian statistician Brackstone (1987) provides four features of administrative data:

   (i)   The agent that supplies the data to the statistical agency and the unit to which the data relate are different in contrast to most statistical surveys.

  (ii)   The data are originally collected for a definite non-statistical purpose that might affect the treatment of the source unit.

(iii)   The object is to achieve complete coverage of the target population.

(iv)   Control of the methods by which the administrative data are collected and processed rests with the administrative agency.

The term administrative data, also sometimes referred to as routine service-based data, covers a range of data generated by government administrative authorities in the process of implementing government administrative services and regulations. For example, it covers data and records generated by vital registration offices, education authorities, health service providers, immigration authorities, government budgetary authorities, business registration and/or licensing authorities, tax authorities, government customs agencies, vehicle licensing and registration offices, and other such service providers. These data can be produced and collected by the central, provincial, and even local government authorities.

Administrative data sources can thus be described as data produced from sources that are primarily established for government administrative or regulatory procedures, and will not be available in the absence of an administrative or regulatory function. This is in contrast to censuses and surveys, which are designed to collect data for compiling statistics and indicators for specific subjects.

A wide range of administrative sources are used for statistical purposes in different countries. The distinction between administrative and statistical sources has also blurred with the increasing demand for data to monitor and evaluate government programs and policies. In some countries, administrative data are collected by government ministries and departments to be specifically used for statistical purposes. Such arrangements are sometimes provided in the statistics legislation of a country. For example, the Law on Statistics in Mongolia distinguishes between "official statistics" and "administrative statistics" (Box 3.1). However, no clear-cut definitions of administrative and statistical sources seem to encompass the situations and circumstances of different countries.

Box 3.1: Official Statistics and Administrative Statistics in Mongolia

The administrative data reporting system is one of the important sources of statistical information in Mongolia. A number of socioeconomic indicators are compiled using administrative data collected by the line ministries as part of the programs and policies they implement.

According to Article 5 of the Law on Statistics of Mongolia, statistical information produced are of two types: "official" and "administrative." "Official statistical information" shall be produced by the National Statistical Commission (NSC), ministries, and other state organizations and governors of all levels. As per Article 3 of the law, "official statistical information" means statistical data and/or information on economy, population, society, and environment specified in Article 6 of this law, which are produced by methodologies and indicators approved by the National Statistical Commission of Mongolia. These are the data and information articulated in the country's Statistical Action Program and are to be collected for the NSC. "Administrative statistics" means data and information collected by means of methodologies and indicators adopted and approved by the NSC for the use of ministries, government agencies, other state institutions, and local governments.

Hence, the data reporting system of Mongolia covers not only statistics, which are collected by line ministries and other agencies, but also by state organizations and governors of local administrative units. The relevant ministries and agencies collect their own data and report the identified "official statistical information" to the NSC, while also collecting "administrative statistics" for their own purposes. In either case, the methods of collecting data and compiling indicators are approved by the NSC.

Sources: Asian Development Bank. 2009. *Country Report of Assessment Study for Improving Administrative Data Sources for the Monitoring of MDG Indicators, Mongolia*. Consultant's report. Manila (TA 6356-REG); Ministry of Justice and Home Affairs of Mongolia. Official translation of Law on Statistics of Mongolia. http://www.nso.mn

3.2 TYPES OF ADMINISTRATIVE RECORDS

Administrative registers, records, and other related documents contain a wide variety of data on demographic, social, economic, cultural, and environmental topics. The information is required primarily to complete some process, including the provision of goods and services by government authorities. The main advantages of this source of data are (i) they already exist and data are generated in the process of implementing a government administrative process; and (ii) the cost of collecting data is relatively small in relation to the costs that would be incurred in conducting separate censuses and surveys to collect similar information.

The government administrative authorities responsible for the administrative processes and record-keeping operations are also usually vested with the statutory and/or administrative authority to collect the requisite information. These authorities prescribe the forms, questionnaires, and registers to collect data and to create corresponding records of transactions with individuals or entities. In instances where such legislative support is provided for collecting data, the chances of wider coverage and completeness of records are usually good, provided the legislative provisions are enforced effectively.

Brackstone (1987) identifies the six broad categories of administrative records that generate administrative statistics:

(i) **Records maintained to regulate the flow of goods and people across borders.** Examples are records of imports, exports, immigration, and emigration. The coverage and content of the resulting administrative records and hence the statistics generated from them will depend on the legal and administrative regulations and their implementation.

(ii) **Records resulting from legal requirements to register particular events.** Examples are registration requirements for vital events of births, deaths, marriages, divorce, registration of business incorporation, vehicle registration, etc. Such legal arrangements exist in most countries. However, if the registration process is poorly enforced, as what usually happens in developing countries, it undermines the utility of the records for statistical purposes. Many entities eligible for registration may not register to avoid compliance with mandatory regulations.

(iii) **Records to administer benefits or obligations.** Examples are records on taxation, unemployment insurance, pension, health insurance, and family allowances. In developing countries, however, such social benefits are very limited and corresponding records may not be fit or sufficient to serve statistical needs.

(iv) **Records to administer public institutions.** Examples are records related to administration of schools and other educational institutions, health institutions, etc. These records are usually based on the institutions rather than on the individuals who interacted with the institutions. Records of education and health institutions are one of the most widely used data in developing countries as seen in the five case study countries of Mongolia, Nepal, Sri Lanka, Palau, and Viet Nam. However, they suffer from a variety of weaknesses for statistical uses.

(v) **Records arising from government regulation of industry.** Examples are records on transport, banking, insurance, and telecommunications.

(vi) **Records arising from the provision of utilities.** Examples are records related to electricity, fixed and cellular telephones, water services, and sewerage, where the billing records are useful for creating statistics.

Administrative records may also vary in terms of the processes by which they are assembled and in terms of their accessibility. Collecting data through an administrative system may or may not be under a legal statute. In terms of the specific provisions in enabling legislation, respondents are required to provide accurate and complete information within a stipulated time. Noncompliance can make the respondent liable to penalties. Accessibility pertains to legal and regulatory provisions governing access to and use of administrative records for secondary purposes, which includes, among others, their use for statistical purposes (Brackstone 1987).

Administrative data are often collected on an ongoing basis and are live data in that sense. These may also be collected annually, or daily, weekly, monthly, or quarterly, depending on the administrative needs and as stipulated under the law or administrative orders. This forms one of the biggest strengths of administrative data as it allows trend analysis with the availability of time series data.

3.3 ADVANTAGES AND LIMITATIONS OF ADMINISTRATIVE DATA

Administrative data have their advantages and limitations as sources for producing socioeconomic indicators. The main advantages and limitations are briefly discussed below.

Advantages

(i) **Simplicity, speed, and frequency of updating**
  • Simplicity results from the reduced need to design a census or survey.
  • Availability of information in registers and records makes extracting and aggregating data a simple process.
  • Frequent and quick compilation of statistics is possible so that these can be released earlier than through data collected from censuses and surveys.
  • Records maintained on a continuous basis could serve as a sampling frame for surveys and could be used to validate and check the results obtained from other inquiries.

(ii) **Lower costs**
- Compared with costs of censuses and surveys, administrative data costs are considerably less, as the data has already been collected as a by-product of an administrative activity.
- Costs involved are for extracting the data available in the administrative records and processing and aggregating them into meaningful information.

(iii) **Wider coverage, completeness, and disaggregations**
- Often, data are collected and records created under some statutory, regulatory, or administrative provisions. With these provisions in place, coverage and completeness of data are expected to be high.
- Data could be easily aggregated at different administrative and/or geographical levels, providing insights at the lowest levels of administration. Data could also be disaggregated by various other characteristics: rural–urban, age, sex, ethnicity, etc.

(iv) **Low-response burden**
- Respondents do not need to report the data for statistical purposes since the data are already collected for administrative purposes.

Limitations

(i) **Concepts, definitions, classifications, and methods not suited for statistical purposes**
- Since the primary purpose of collecting data is to fulfill an administrative regulation, the concepts, definitions, and classifications used in administrative laws and regulations may be unsuitable for statistical purposes.
- Changes in the definitions to suit administrative needs may affect data comparability.

(ii) **Incomplete coverage and poor reporting**
- Records of administrative units are often incomplete or inaccurate, and may not represent the population of interest.
- Data records could be subject to deliberate misreporting (overreporting or underreporting) due to financial incentives or disincentives.
- Staff responsible for data collection and reporting may not be adequately trained leading to poor data quality.

(iii) **Coverage biases**
- Data are limited to the population on whom the administrative records are generated and may not represent the population of interest.

- Data may have an inherent bias, such as those from health services or facilities, as they only represent the population that avail themselves of these services.
- The system may not cover private service providers, or these providers are less inclined to contribute—leaving out a significant portion of the population that uses their services.

(iv) **Less flexible**
- Data recording forms and registers are difficult to change given the large-scale changes to be implemented for the entire data reporting and recording system.
- Record-keeping formats may not be conducive to extract data and link records with ease particularly when the related information are kept in multiple registers.

These limitations of administrative data arise due to the very nature of the administrative record-keeping systems, as these are designed primarily to obtain information needed for administrative purposes and not for compiling or deriving statistics and indicators. Some of the limitations of administrative data systems for statistical uses can be avoided without extensive redesigning, and with minimal respondent burden and acceptable cost escalations. After identifying the information needs, a review of existing data collection forms and registers will indicate how the existing forms and records could be minimally redesigned to meet statistical needs without compromising administrative requirements.

3.4 USE OF ADMINISTRATIVE DATA FOR STATISTICAL PURPOSES

The Fundamental Principles of Official Statistics (United Nations Statistics Division 1994) adopted by the United Nations Statistics Commission in 1994 provide general criteria for functioning of a good system of official statistics. Principle 5 of the Fundamental Principles of Official Statistics provides guidance in the context of the use of administrative data vis-à-vis other sources of data.

> **Principle 5.** *Data for statistical purposes may be drawn from all types of sources, be they administrative or statistical records. Statistical agencies are to choose the sources with regard to quality, timeliness, costs and burden on the respondents.*

This principle implies that statistical systems must be cost-effective in their choice of sources and methods of collecting data. The overall choice should be guided by quality and timeliness of the data sources. The intention is to be cost-effective in collecting

data and to reduce overall respondent burden. Thus, if administrative records are timely, well-maintained, and can meet statistical requirements in terms of concepts, definitions, classifications, methods, coverage, and completeness, the need to conduct certain surveys and censuses could be avoided.

Statistical Uses of Administrative Data

Administrative data offer various potential statistical uses. Main statistical applications of administrative data are discussed below (Brackstone 1987).

(i) **Direct tabulation.** This implies using administrative records and data and aggregating quantitative variables for each unit into tables and cross-classifications by various attributes and by geographical groupings. Thus, statistical summaries of tables, such as number of deaths in a year, number of children enrolled in a particular grade during a school year, or number of health personnel, could be presented in tables with cross-classification by sex, age, region, etc.

(ii) **Indirect estimation.** In this case, the administrative records are one of the inputs in the estimation process. For example, in Canada (Brackstone 1987), individual tax returns for the same tax filer are linked from 1 year to the next to produce partial estimates of migration that can be weighted up with reference to census-based benchmarks. These estimates of migration then feed into Statistics Canada's population estimation program (which also use administrative data on births, deaths, and immigration). However, use of this type would require systems where data record links are possible, which are usually poorly developed in most developing countries.

(iii) **Survey frames and business registers.** One of the main strengths of administrative data sources is their comprehensiveness compared to most data sources. Consequently, these data sources are most appropriate as material for preparing, supplementing, or updating statistical registers and sampling frames for use in multistage sample surveys. For instance, a statistical registry of establishments in the manufacturing and nonmanufacturing sectors could be created using administrative registers. In India, the office of the Chief Inspector of Factories in every state maintains a register of manufacturing establishments registered as "factories" under the Factories Act, 1948 (International Labour Organization NATLEX). This list of registered establishments contains information on some basic characteristics of each establishment, such as location—rural or urban, use of power, economic activity, and the size of employment. This register provides

the basis for the creation of the sampling frame for the annual survey of registered manufacturing establishments known as the Annual Survey of Industries conducted by the Central Statistical Office. The information on key characteristics of the establishments allows appropriate stratification for selecting and allocating samples.

(iv) **Survey evaluation.** The potential use of administrative data in statistics is in checking, validating, or evaluating survey-derived data. Such evaluation can be done at the individual or aggregate level. Thus, "number of births attended by skilled health personnel" or "number of children immunized against measles" estimated from a household survey could be validated from similar data gathered through the routine reporting system, when these are considered of good quality and coverage.

A wide range of socioeconomic statistics and indicators can be generated by extracting data available in administrative records and registers. Box 3.2 lists some social and environment statistics that can be generated from administrative records maintained and created by government ministries and/or agencies responsible for the administration of their respective sector.

Box 3.2:   Social and Environmental Statistics Generated from Administrative Records

- Vital registration statistics—births, deaths, marriages, separations, and divorces
- Diseases and cause of death statistics from health facilities and vital registration records
- Migration statistics and international tourism statistics from immigration and emigration records
- Education statistics from school enrollment records
- Accident statistics from police and hospital records
- Crime statistics from police records and court records
- Post and telecommunication statistics from delivery and subscription records
- Unemployed persons from social security records
- Environment statistics from administrative records on flora and fauna and types of pollution and pollutants
- Energy statistics from administrative records of energy regulators

Source: Country reports of assessment study for improving administrative data sources for the monitoring of MDG indicators for Mongolia, Nepal, Palau, Sri Lanka, and Viet Nam (ADB 2009a, 2009b, 2009c, 2009d, 2009e).

3.5 ADMINISTRATIVE DATA AS SOURCES FOR COMPILING THE MILLENNIUM DEVELOPMENT GOALS INDICATORS

All the three main sources of data can be suitably used for compiling the MDG indicators. Household survey data are essential to measure and monitor some MDG indicators. Examples are the indicators identified for monitoring progress on MDG 1—Eradicate extreme poverty and hunger. Population census data measure certain characteristics and provide benchmark data for making population estimates to be used as denominators in many indicators.

Along with sample surveys and censuses, administrative data are also potential sources for a number of MDG indicators. Appendix 3.1 lists administrative records generated by administrative agencies that produce population, education, health, and environment statistics.

Some MDG indicators can be measured using both sample surveys and administrative sources. Examples of such MDG indicators are (i) ratio of girls to boys in primary, secondary, and tertiary education; (ii) under-5 mortality rate; and (iii) infant mortality rate. Strengthening administrative data-based monitoring mechanisms may help when compiling such indicators.

For some MDG indicators, administrative data may be a source for the numerator of the indicator, e.g., indicator 2.1—net enrollment ratio in primary education. The numerator "number of children in the official primary school age enrolled in primary education" can be compiled from the school enrollment data collected by education ministries. The denominator of the indicator "total population of children in the official primary school age" is estimated from population census data in conjunction with other administrative statistics on births, deaths, and migrations.

Table 3.1 identifies the MDG indicators and the corresponding data required from administrative sources for compiling these indicators. Many of these indicators can also be compiled from sample surveys. The quality of an administrative data source determines whether the source could be used to compile the indicators concerned and depends on the concepts and definitions used, coverage, quality, and timeliness of data reported and processed. The advantage of using administrative data for indicators that can be sourced from both administrative and survey data is that administrative data are available usually on an annual basis. It may also be possible to compile statistics for subnational levels and by various disaggregations using administrative data. In contrast, to have statistically reliable estimates for similar disaggregations from a sample survey would require very large sample

sizes, leading to huge data collection costs. However, it is important to examine the timeliness, quality, and coverage before using administrative data for statistical purposes.

3.6 MEETING CHALLENGES IN USING ADMINISTRATIVE DATA FOR STATISTICAL PURPOSES

Adoption of Statistical Standards and Classification Systems

The reliability of statistics from administrative records depends both on the completeness of the administrative records and the consistency of concepts, definitions, methods, and classifications used. Continuous improvements in recording, compiling, and analyzing such data are necessary. Wherever possible, it is advisable to use the standard definitions and concepts that are used in other data sources (sample surveys and censuses). Adoption of uniform standards, use of uniform data collection forms, and use of the same concepts, definitions, methods, classifications, and compilation procedures are essential to allow data comparison across different data sources and aggregation from local to national levels. In most countries, the coverage and scope of administrative sources is usually nationwide.

Table 3.1: Millennium Development Goals Indicators and Possible Use of Administrative Data

Goal and Indicator		Required Data
Goal 2: Achieve universal primary education		
2.1	Net enrollment ratio in primary education	Enrollment data from school registers and records collected by education authorities for numerator and projected population for the denominator.
2.2	Proportion of pupils starting grade 1 who reach last grade of primary	Data on enrollment, promotion, and repetition from school registers and records collected by education authorities and using cohort analysis.
Goal 3: Promote gender equality and empower women		
3.1	Ratio of girls to boys in primary, secondary, and tertiary education	Sex-disaggregated enrollment data collected by education authorities from primary, secondary, and tertiary educational institutes and corresponding sex-disaggregated student projections of reference population based on population census.
3.3	Proportion of seats held by women in national parliament	Data available from election commissions, national parliament and/or state legislatures.
Goal 4: Reduce child mortality		
4.1	Under-5 mortality rate	Number of deaths of children under 5 for numerator and number of live births for denominator from vital registration records.

Table 3.1 continuation

Goal and Indicator		Required Data
4.2	Infant mortality rate	Number of deaths of infants for numerator and number of live births for denominator from vital registration records.
4.3	Proportion of 1 year-old children immunized against measles	Routine reporting of immunization from health service providers and health facilities for numerator and reference population from the vital registration records or projections based on census data.
Goal 5: Improve maternal health		
5.1	Maternal mortality ratio	Number of maternal deaths from vital registration records with good medical certification of cause of death for the numerator and number of live births from vital registration records for the denominator.
5.2	Proportion of births attended by skilled health personnel	When high proportion of births occur in health facilities, records of service and/or health facilities for numerator and total number of live births during the same period from the vital registration records for denominator. Data for both numerator and denominator may come from vital registration records if such information is collected for numerator.
5.4	Adolescent birth rate	Number of live births to adolescent mothers for the numerator from the vital registration records and projected number of women in 15–19 age group from population census data for the denominator.
5.5	Antenatal care coverage (at least one visit and at least four visits)	When the coverage of health facilities is high, the records of antenatal care of mothers with live births maintained at health facility level for the numerator and total number of live births for denominator.
Goal 6: Combat HIV/AIDS, malaria, and other diseases		
6.5	Proportion of population with advanced HIV infection with access to antiretroviral drugs	Facility reporting systems or surveillance systems for the numerator—the number of people receiving antiretroviral therapy. The denominator is generated by estimating the number of people with advanced HIV infection requiring (in need of or eligible for) antiretroviral therapy.
6.6	Incidence and death rates associated with malaria	Administrative data are derived from the administration of health services and malaria eradication programs for the incidence; and vital registration records with good cause of death data and complete coverage for number of deaths.
6.9	Incidence, and death rates associated with tuberculosis	Administrative data are derived from the administration of health services and tuberculosis control programs or surveillance systems for the incidence; and vital registration records with good cause of death data and complete coverage for number of deaths.
6.10	Proportion of tuberculosis cases detected and cured under directly observed treatment short course	Administrative data are derived from the administration of health services of tuberculosis control programs or surveillance systems.

Table 3.1 continuation

Goal and Indicator		Required Data
Goal 7: Ensure environmental sustainability		
7.8	Proportion of population using an improved drinking water source [a]	Records of routine reports of facilities created from government authorities concerned to support programs and/or data reported by water utilities.
7.9	Proportion of population using an improved sanitation facility [a]	Records of facilities created from government authorities concerned to support programs.
Goal 8: Develop a global partnership for development		
8.14	Telephone lines per 100 population	Administrative data of the regulatory telecommunication authority or the ministry in charge of telecommunications for the numerator, and population estimates based on census data for the denominator.
8.15	Cellular subscribers per 100 population	Administrative data of the regulatory telecommunication authority or the ministry in charge of telecommunications for the numerator, and population estimates based on census data for the denominator.
8.16	Internet users per 100 population [b]	Administrative records on number of internet subscribers maintained by the regulatory telecommunication authority or the ministry in charge of telecommunications for the numerator, and population estimates based on census data for the denominator.

[a] Generally obtained from routine administrative reports that cover only facilities constructed from government-supported programs or from data reported by water and/or sanitation facilities. On account of non-coverage of nongovernment and other private facilities, administrative data are not used for international Millennium Development Goal (MDG) monitoring. In fact, administrative data are the least preferred source for these indicators.
[b] Pertains to internet subscribers only.
Sources: Compiled from United Nations. Millennium Development Goals Indicators. The official United Nations site for the MDG Indicators MDG metadata. http://mdgs.un.org/unsd/mdg/Metadata.aspx; United Nations. 2003. *Indicators for Monitoring the Millennium Development Goals: Definitions, Rationale, Concepts and Sources*. New York: United Nations; World Health Organization. 2010. *World Health Statistics, Indicator Compendium*. Interim version. Geneva: World Health Organization; United Nations Educational, Scientific and Cultural Organization (UNESCO). 2009. *Education Indicators Technical Guidelines.* Montreal: UNESCO Institute for Statistics.

The central agency responsible for the sector statistics should introduce uniform data collection instruments, standards, coding, and classification systems to be adopted throughout the country. This should be undertaken in consultation with the national statistics office (NSO) and other stakeholders to ensure use of uniform statistical standards across the system. Such arrangements should be institutionalized by making provisions in the statistics law. In the case of Mongolia, their Law on Statistics provides for the institutional arrangements that require approvals of the National Statistical Commission of Mongolia for data collected by the ministries and other government organizations with respect to their statistical activities. Article 12 of the law provides for the National Statistical Commission of Mongolia to monitor and approve indicators and methodologies for administrative ministries and also evaluate data coverage to avoid duplication

in data collection. Simultaneously, Article 19 of the law provides that ministries and other government agencies must adopt questionnaires, indicators, and methods of administrative statistical information approved by the National Statistical Commission to avoid duplication at the national level.

Coordination and Partnerships as Major Keys

In the context of meeting data needed to produce indicators for monitoring the socioeconomic situation, the NSO and other respective government agencies should collaborate to strengthen and enhance the use of administrative data sources for compiling needed statistics.

In attempting to meet existing or new demand for statistics, policies must be in place to first examine whether indicators could be extracted from an existing administrative source, or if an administrative source could provide data with minimal changes, costs, and resources. If such administrative sources could be used and data can meet the statistical requirements of timeliness, quality, and reliability, administrative data should be used instead of instituting a new survey.

Some of these issues can be resolved through coordination and partnerships between the NSO and the relevant line ministries. Such efforts were attempted in the course of implementing the pilot studies under the Asian Development Bank's regional technical assistance on Improving Administrative Data Sources for the Monitoring of the Millennium Development Goal Indicators (ADB 2006) in Mongolia, Palau, and Sri Lanka (Box 3.3).

Box 3.3:   Examples of Coordination and Partnerships

Mongolia. In Mongolia, three agencies, the National Statistical Office (NSO), Ministry of Health, and the General Authority for State Registration regularly collect data on births and deaths. The estimates from the three agencies however differ due to several reasons. Within the scope of the Asian Development Bank-sponsored study (ADB 2006), the three agencies participated in a joint review to resolve the conflicting statistics on births and deaths in the country and to harmonize data on permanent populations, vital statistics, and migration. Important lessons were learned and actions have been initiated by the agencies to resolve the issue. This includes the formation of an interagency joint working group under the chairpersonship of the senior vice chairman of the NSO.

Table 3.3 continuation

Palau. In Palau, the ministries of education, health, and finance (the National Statistics Office is part of the Ministry of Finance) jointly compiled education- and health-related MDG indicators using administrative data that they collect. This was done as part of developing the first MDG progress report for the country. The preparation of this report, with most indicators compiled using data from administrative sources, was a significant achievement in the MDG monitoring process of this small island nation. This would not have been possible without active coordination among the agencies.

Sri Lanka. To use the annual school census data collected by the Ministry of Education (MOE) in the annual compilation of MDG indicators 2.1, 2.2, 3.1 and a few other indicators, the MOE, Registrar General's Department, and the Department of Census and Statistics of Sri Lanka worked together under the Asian Development Bank-sponsored study. The MOE processed the enrollment data generated from the school census; the Registrar General's Department provided data on births, deaths, and migration; and the Department of Census and Statistics provided population estimates using population census data, vital statistics data from the Registrar General's Department, and results from a special survey of the North-East. Pilot estimates down to the district level, disaggregated by sex where relevant, were generated. The study helped identify data-related and methodological issues affecting the quality of estimates from school records and population estimates. Initial recommendations were drawn up, which would serve as the basis for resolving issues and improving education and population statistics. The pilot would not have succeeded without effective coordination among the three agencies.

Source: Pilot studies for Mongolia, Palau, and Sri Lanka (ADB 2009f, 2009h, 2009i), and ADB 2006.

NSOs and statistical units in ministries and other government agencies that collect administrative data need to coordinate regularly to ensure constant dialogue and resolve statistical issues, including that of nonconformity with standard statistical concepts, definitions, and classifications. Regular coordination will promote greater use of administrative data for statistical purposes. Institutional arrangements, such as standing technical committees on subject matters with representation from all relevant stakeholders, help establish coordination across agencies.

The National Statistical Indicator System of Viet Nam is an example of coordination and assignment of statistical activities across agencies. The regulation governing the implementation of the National Statistical Indicator System states that it "serves management agencies of the Party and State at different levels in evaluating, forecasting the situation, making strategies, policies, making socio-economic development plan for each period and checking implementation as well as meets economic information demands of other organizations and individuals" (General Statistics Office of Viet Nam) (Box 3.4).

Box 3.4: The National Statistical Indicator System of Viet Nam: An Example of Coordination and Assignment of Statistical Activities in the Statistical System

The National Statistical Indicator System (NSIS) of Viet Nam is a set of statistical indicators reflecting the country's major socioeconomic situations. The NSIS was promulgated together with Decision No. 305 /2005/QĐ-TTg on 24 November 2005 of the prime minister. The General Statistics Office (GSO) of Viet Nam implements the NSIS in coordination with other state organizations in Viet Nam. The director general of GSO submits to the prime minister any changes and supplements in the NSIS to make it suitable for the socioeconomic development needs.

The NSIS identified a set of more than 250 socioeconomic indicators categorized into 24 broad groups. It also identified the government ministry or agency responsible for collecting data, together with the required disaggregations and frequency of compilation for each of the identified indicators. While a number of indicators are under the responsibility of the GSO, a large number of indicators are assigned to administrative ministries that collect data and compile these indicators with disaggregation and frequency as specified in the NSIS. These agencies issue basic statistical reporting mechanisms and collect data for the assigned indicators. As described in the Statistics Law of Viet Nam, "The national statistical indicator system is the foundation for assignment and coordination in statistical activities and development of a national statistical survey scheme and regulations on aggregated and basic statistical reporting."

Under Article 18 of the Statistics Law, the prime minister issues regulations on basic statistical reports to collect data for indicators assigned to the GSO under the NSIS. The ministers, heads of ministerial-level agencies, chief judge of the Supreme People's Court, and director of the Supreme People's Prosecutorate issue regulations on basic statistical reports to collect data for indicators assigned to their respective agencies under the NSIS. The NSIS is the basis for a proposed data collection program of statistical surveys to be conducted by the GSO and other ministries. The GSO aggregates the long-term and annual national statistical survey schemes and submits these to the prime minister for decision.

Sources: Statistics Law. http://www.gso.gov.vn/default_en.aspx?tabid=502&catecode=2; NSIS. http://www.gso.gov.vn/default_en.aspx?tabid=510&idmid=6&ItemID=3994

Strong coordination through institutional and data-sharing arrangements between the NSO and line ministries, preferably stipulated in a statistics law, are needed to improve administrative data sources, and increase their use in compiling socioeconomic and MDG indicators.

3.7 COMPLEMENTARITIES AMONG DATA SOURCES

No single data source is generally capable of providing sufficient data to meet all policy planning needs or the needs for monitoring the MDGs and targets. In an NSS, data

produced through censuses, sample surveys, and administrative data systems by NSOs and line ministries should therefore be seen as complementary.

Other Methods of Collecting Data

Apart from data from population censuses, household surveys, and administrative sources, data from other methods of data collection are also used to supplement available information. These methods, known as rapid appraisal methods, and which include focus group discussions, key informant interviews, community interviews, direct observation, and mini surveys, are quick and low-cost methods to gather data systematically to meet information needs for specific questions and issues within a short period of time, which is not feasible from statistically designed sample surveys. The information collected through such methods are useful in better interpreting routinely collected quantitative data, resolving inconsistencies, and in deriving meaningful conclusions on the subject of inquiry. However, data collected through these methods have limited reliability and validity and should not be used to make generalizations about the whole population. Therefore, these may not be very effective in providing reliable quantitative estimates and are better suited for obtaining qualitative information rather than objective estimates of quantities.

Identifying Complementarities

Different types of data sources are often used in combination—like pieces of a jigsaw puzzle—which, when put together, provide a complete picture of a phenomenon, or help answer certain policy questions. In the absence of a good population register, for example, statistical agencies use data from recent or previous population censuses and civil registration systems to obtain estimates of the current population. This is however possible only when the civil registration system is sound enough to provide accurate estimates of birth, deaths, and migration in sufficient details. In the absence of a good civil registration system, data from sample registration systems or sample surveys like the demographic health surveys are used to make population projections based on the data of the recent or previous census.

Complementarity also exists when data is shared among the NSO, line ministries, and other government agencies, thus increasing the use of administrative data to compile socioeconomic and MDG indicators. The administrative data sources of the line ministries can usually provide the data required for the numerator of a socioeconomic indicator, such as net enrollment ratio. The estimates of the denominator could be, for example, age-specific population projections produced by the NSO. These arrangements are often among the most cost-effective ways of compiling the required indicators.

An official statistical system needs to clearly identify the complementarities between different sources of data and the means of compiling the required socioeconomic indicators. In the context of an NSS, institutional arrangements should exist to

    (i) identify the set of indicators and the frequency needed to monitor progress through a consultative process with all stakeholders (NSOs and line ministries and other data users);

   (ii) take stock of the data sources—censuses, sample surveys, and in particular administrative data available from line ministries to compile identified indicators;

  (iii) examine how and why administrative data are collected to understand their use in compiling the indicators, particularly with respect to definitions, classifications, and coverage;

  (iv) identify the procedures required to further process or adjust administrative data to make them suitable for statistical purposes;

   (v) identify other sources of data, especially from population censuses and sample surveys, that are required for complementing administrative data sources; and

  (vi) make the best use of administrative sources to provide regular indicators in the future and save resources required for conducting sample surveys, where possible.

Need for Cross-Validation Studies

Closely associated with recognizing complementarities is the need to set up a system of regular cross-validation of comparable data from censuses, surveys, and administrative sources. When estimates of the denominator and the numerator are drawn from different sources, they should be consistent in terms of definition, coverage, and reference period. Similarly, when the same indicator is derived using different data sources, cross-validating comparable estimates from different sources is the most effective method of examining inconsistencies.

In most cases, the NSOs or the line ministries carry out cross-validation studies only when the need arises. The instances of recognizing cross-validation as a part of the process of compiling indicators is rare, if not entirely absent. Undertaking regular cross-validation studies can serve the following two objectives: (i) examining inconsistencies, and thus the utility and validity of data currently available from different sources; and (ii) identifying shortcomings in procedures, definitions, or applications, for future improvements in the different data sources.

KEY POINTS

→ Administrative data sources can be described as sources that provide data and information that are not primarily designed or established for statistical purposes. These data sources were established for administrative or regulatory purposes by the government authorities concerned, in contrast to statistical data sources that are designed to collect data to generate socioeconomic statistics and indicators.

→ The advantage of administrative data over census and survey data is that administrative data involve lower respondent burden, collected more frequently and at a much lower cost, has the potential to be presented at various levels of disaggregation, and can be used to produce more timely statistics and indicators.

→ In terms of purpose, administrative data can be broadly categorized into (i) records maintained to regulate the flow of goods and people across borders, (ii) records resulting from legal requirements to register particular events, (iii) records needed to administer benefits or obligations, (iv) records needed to administer public institutions, (v) records arising from government regulation of industry, and (vi) records arising from the provision of utilities.

→ Potential statistical uses of administrative data include (i) aggregation of data from administrative records into tables and cross-classifications by various attributes and by geographical groupings; (ii) indirect estimation; (iii) as material for preparing, supplementing, or updating statistical registers and sampling frames for multistage sample surveys; and (iv) in checking, validating, or evaluating survey-derived data.

→ Administrative data could be used to compile a number of socioeconomic indicators, including the MDG indicators, if they meet the requirements of data quality in terms of concepts, definitions, classifications and methods of collection, and timeliness. While many socioeconomic indicators can be constructed from administrative records, use of statistics and indicators will depend on the completeness of coverage and quality of administrative records.

→ In most developing countries, administrative data remain underutilized for statistical purposes due to their inherent weaknesses, e.g., inconsistency with standard statistical concepts and classifications, poor systems and

processes, inaccuracy, and other data quality issues. Administrative data need to be seriously improved for them to be truly useful for statistical purposes.

➜ Regular coordination between NSOs and government authorities that produce administrative data are needed to ensure constant dialogues to resolve statistical issues, including that of nonconformity with standard statistical concepts, definitions, and classifications—thus promoting greater use of administrative data for statistical purposes.

➜ Censuses, surveys, and administrative data have their own advantages and limitations. Data produced through these sources should be viewed as complementary, designed to provide data to meet the needs for policy planning and evaluating government programs and policies.

APPENDIX 3.1

Key Statistics and/or Indicators from Administrative Records of Population, Education, Health, and Environment Authorities

Government Authority Responsible	Administrative Records and/or Data	Key Statistics and/or Indicators
Population and vital registration	• Records of birth, death, marriage, divorce, or migration, for issuing relevant certificates of registration of vital events	• Number of live births • Crude birth rate • Number of deaths • Crude death rate • Number of infant deaths • Infant mortality rate • Number of deaths of children under 5 years of age • Child mortality rate • Number of maternal deaths • Maternal mortality ratio • Mortality rates by cause of death • Number of births attended by skilled health personnel • Proportion of institutional births
Education	• Records maintained and reports submitted by schools and educational institutions to the education ministry • Records of education management and financing with the education ministries, departments, and their units	• Number of teachers • Proportion of trained teachers • Pupil to teacher ratio • Net intake rate • Transition rates • Gross enrollment ratios • Net enrollment ratios • Ratio of girls to boys in different levels of education • Age-specific enrollment ratios • Repetition rates • Dropout rates • School life expectancy • Survival rates by grade • Enrollment in secondary education by type of education • Percentage of private school enrollment • Public expenditure on education as percent of gross national product (GNP) • Public expenditure on education per capita GNP

Appendix 3.1 continuation

Government Authority Responsible	Administrative Records and/or Data	Key Statistics and/or Indicators
Health	• Records maintained and periodical reports submitted by units delivering health services in respect of preventive and curative health on persons availing themselves of the services • Records and reports of health services provided through specialized health care programs • Records of health management and financing with health ministries, departments, and their units	• Staff in health care per person • Public expenditure on health as percent of GNP • Public expenditure on health per capita GNP • Sources of finance—budgetary and external funding • Number of hospital beds per person • Morbidity rates from health facilities • Incidence, prevalence, and death rates due to specific rare and communicable diseases • Immunization rates • Number of births from health facilities • Weight of children at birth • Mortality rates (health facilities-based) • Number of deaths by disease from health facilities • Number of births attended by skilled health personnel
Environment and environmental protection	• Records of various government and intergovernment bodies; local authorities tasked with conserving, managing, developing, and enforcing the proper use of the country's environment and natural resources	• Deforestation rate • Production (quantity and value) of log, lumber, and other forest products • Area of forest • Area of protected and reforested forests • Number and total protected areas established • Number of endangered flora and fauna species • Area of marine sanctuaries • Area of protected seascape and/or marine sanctuaries • Number of water right permits granted • Consumption of ozone-depleting chlorofluorocarbons • Quantity and type of greenhouse gases • Quantity and type of recycled waste • Amount of rainfall • Atmospheric temperature levels • Relative humidity

Note: The above-mentioned indicators could be compiled disaggregated by geography, sex, age, level, size classes, rural-urban, etc. as appropriate, for the sector and the indicator. Some of the indicators listed would need gross domestic product and/or gross national product or reference population data.
Source: Country reports of assessment study for improving administrative data sources for the monitoring of MDG indicators for Mongolia, Nepal, Palau, Sri Lanka, and Viet Nam (ADB 2009a, 2009b, 2009c, 2009d, 2009e).

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CHAPTER 4

ADMINISTRATIVE DATA FOR EDUCATION STATISTICS

Data collected by education authorities from education establishments are a major source of relevant statistics and indicators for effective education planning, monitoring, and evaluation, including monitoring a country's achievement toward attaining education-related Millennium Development Goals (MDGs). This chapter examines the use of education data collected by education authorities in compiling education indicators and the issues that affect the quality of education statistics obtained from school records. Drawing on the experiences of the five case study countries of Mongolia, Nepal, Palau, Sri Lanka and Viet Nam, steps toward solutions to common problems are discussed to help authorities and statistical agencies strengthen the use of school records for statistical purposes. Focus is given to education-related MDG indicators through a discussion on the conceptual, methodological, and data limitations associated with the compilation of each indicator.

4.1 EDUCATION FOR ALL AND THE MILLENNIUM DEVELOPMENT GOALS

The World Conference on Education for All (EFA) was held in Jomtien, Thailand in 1990. The conference set the international agenda for access to EFA. Ten years later, The World Education Forum held in Dakar, Senegal in April 2000 reviewed the worldwide progress in basic education. This forum adopted a framework of action and defined six EFA Goals (Box 4.1) to be achieved by 2015. It appealed to all governments to strengthen national education action plans integrated with the policies and programs for development and the fight against poverty. This was followed by the adoption of the Millennium Declaration in September 2000. The declaration committed to ensure that by 2015: (i) children everywhere, boys and girls alike, will be able to complete a full course of primary schooling; and (ii) girls and boys will have equal access to all levels of education.

The goals and targets set under the MDG agenda are given in Table 4.1.

Box 4.1:   Education for All Goals

(1)   Expanding and improving comprehensive early childhood care and education, especially for the most vulnerable and disadvantaged children.

(2)   Ensuring that by 2015, all children, particularly girls, children in difficult circumstances, and those belonging to ethnic minorities, have access to a complete free and compulsory primary education of good quality.

(3)   Ensuring that the learning needs of all young people and adults are met through equitable access to appropriate learning and life skills programs.

(4)   Achieving a 50% improvement in levels of adult literacy by 2015, especially for women, and equitable access to basic and continuing education for all adults.

(5)   Eliminating gender disparities in primary and secondary education by 2005, and achieving gender equity in education by 2015, with a focus on ensuring girls' full and equal access to and achievement in basic education of good quality.

(6)   Improving all aspects of the quality of education, and ensuring excellence of all so that recognized and measurable learning outcomes are achieved by all, especially in literacy, numeracy, and essential life skills.

Source: United Nations Educational, Scientific and Cultural Organization (UNESCO). 2000. *The Dakar Framework for Action, Education for All: Meeting Our Collective Commitment.* Paris: UNESCO. http://unesdoc.unesco.org/images/0012/001211/121147e.pdf

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Table 4.1:   Goals and Targets Related to Education in the Millennium Development Goals Framework

Goals	Targets
Goal 2: Achieve universal primary education	**Target 3 (now Target 2A):** Ensure that by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling.
Goal 3: Promote gender equality and empower women	**Target 4 (now Target 3A):** Eliminate gender disparity in primary and secondary education, preferably by 2005, and in all levels of education no later than 2015.

Source: United Nations. Millennium Development Goals Indicators. The official United Nations site for MDG indicators. http://mdgs.un.org/unsd/mdg/Resources/Attach/Indicators/OfficialList2008.pdf

To meet international commitments, countries have integrated the MDG and EFA goals into their education policy and planning process, modified where appropriate to meet country priorities. For example, Nepal adopted the EFA goals in its national education planning, with an added goal to recognize the needs of indigenous people and linguistic minorities (Box 4.2).

The setting of goals and targets has given momentum to demands for more information to compile statistics and indicators needed to measure progress, evaluate existing plans, and make informed policy decisions.

Box 4.2: Nepal's Education for All Goals

Nepal made a firm commitment to achieve the goals of Education for All (EFA). The National Plan of Action outlined specific objectives, programs, targets, strategies, and financial provisions, and set the national targets of universal access to primary education, eradication of illiteracy, and elimination of the gender gap by 2015. An added goal besides the six EFA goals is "Ensuring the right of indigenous people and linguistic minorities to quality basic and primary education through their mother tongue." All the educational programs related to basic and primary education in both government and nongovernment sectors are directed toward the EFA goals. These are also in line with the Millennium Development Goal targets.

The Poverty Reduction Strategy Paper/Tenth Plan also emphasized the need for universalization of primary education with a net enrollment ratio of 90% in primary education, 70% literacy in the 6+ age group and 63% in the 15+ age group, and female literacy of 55% by 2007.

Source: United Nations Country Team of Nepal. 2005. *Nepal Millennium Development Progress Report.*
Kathmandu: National Planning Commission.

Information needs for education planning. Information needs for education planning purposes and policy making vary by administrative level. Table 4.2 presents some important information needs of actors at different levels in the education system. The information needs of other users will also vary depending on the type of users, such as parents, researchers, civic society organizations, international agencies, etc. Meeting the data needs of different users necessitates close coordination among data producers (statisticians), planners, policy makers, and other users at each level. Information needs will also depend on the degree of centralization or decentralization of planning and decision making process in any country.

Table 4.2: Information Needs according to Administrative Level

Level–Actor	Information Needs
Class – teacher:	
• To develop pedagogical strategies materials, and tests • To identify the learning difficulties and successes of pupils and the pedagogical responses • To control the assidulity and discipline of pupils	• National objectives and criteria • Detailed results by subject, by pupil • Updated records of attendance, communication with the director and parents

Table 4.2 continuation

Level–Actor	Information Needs
School – director:	
• To formulate the objectives and strategies of the education establishment • To monitor the admission and registration of students • To control results and the assiduity of pupils • To support and supervise teachers, etc.	• National objectives and comparative data of other education establishments • Updated files on students, personnel, buildings, and equipment • Class results compared to previous years' and other similar schools • Attitudes, motivation, recruitment, and needs for teacher training
District and/or region – manager at local level (less detailed data than for the daily tasks at the school level)	
• To monitor admission and registration of pupils in the schools of the region and/or district • To enable short-term projections of personnel needed in the region and/or district • To identify needs for resources in schools, etc.	• Pupil's admissions, registration by school (by gender and over several years) • Demographic data by age group, previous rates of admission flows • Actual resources, requests for equipment, materials, school furniture needs for teachers, and overtime hours
National – Planning Directorate (even more aggregated data focused on essentially quantitative aspects of education and development)	
• To prepare the monitoring and evaluation of the plan • To establish a diagnostic on the access to different levels of the education system • To evaluate internal efficiency, the regional disparities • To estimate the needs for teachers • To prepare the national budget for education	• School-age population, admission, schooling, transition (by sex, region, etc.) • Promotion, repetition, dropout • Projection of personnel, teacher supply • Budget, request of resources from regional offices and evaluation of the available resources

Source: Adapted from Carrizo, L., C. Sauvageot, and N. Bella. 2003. *Information tools for the preparation and monitoring of education plans. Education policies and strategies 5*, Paris: United Nations Educational, Scientific and Cultural Organization (UNESCO). p.38. Quoted from Fredriksen, B. J., 1983. *Statistics of education in developing countries: an introduction to their collection and analysis*. Paris: UNESCO. p. 12.

Information as a Tool for Building Accountability in the Education System

Accessibility of information to parents, civil society, and other stakeholders is also an essential requirement for maintaining accountability in the education system. A noteworthy development in this area is the growing interest in the use of what are known as "**education report cards**" or "**school report cards**" in some countries as measures of building accountability in school education (Cameron, Moses, and Gillies 2006; Sevilla and Winkler 2009).

The school report card is an instrument used to present to the stakeholders the status and performance of a school, or an administrative area, such as a block or a municipality, district, or state, on the basis of selected statistics and indicators. The contents or information in the card may be selected in consultation with the stakeholders.

As the school report card can provide information on various physical characteristics, financial information, and performance indicators of a school in quantitative terms, it is an important instrument in increasing transparency and building accountability in the school education system. It also provides a useful and easily understood tool for management at all levels, especially in schools. An indirect benefit of school report cards is improvement in the quality of school statistics compiled by school authorities and a check on the deliberate misreporting of statistics. Among the five case study countries, only Nepal has initiated a school report card system (Box 4.3). The "school profile" as it is called in Nepal, can be accessed for each school from the website of the Department of Education at http://www.doe.gov.np/.

Box 4.3: School Report Card – Nepal

In Nepal, the "School Profile" was introduced by the Department of Education (DOE) of the Government of Nepal as the country's version of the school report card. Annually, a snapshot report of every school is prepared based on information submitted to DOE by a school under the flash reporting system (system of collection of school statistics) established by the DOE.

Box Figure 4.3 presents the school profile for a school named Bal Bikas Ma V, code number 270010004, located in Alapot village development committee (VDC) of Kathmandu district for the Nepali year 2063–2064 (2007–2008). The school profile is divided into eight sections that present (i) general information on the school, (ii) type of school, (iii) student enrollment by grade, (iv) physical structures, (v) financial information, (vi) teacher information, (vii) student information by age, and (viii) indicators and comparative information. The last section presents three indicators: student–teacher ratio, promotion rate, and repetition rate with comparative average information on the same indicators at the VDC, district, and national levels.

The report card for a school can be accessed from the website of the DOE (http://www.doe.gov.np/) and is expected to serve as a tool for social audits, school improvement plans, and general local monitoring of the management of the school. It also serves as a two-way flow of data providing a feedback mechanism to the school with regard to its status in comparison to the average school in the VDC, district, and nation, and is thus useful in fostering the culture of use of data at the school level.

Box 4.3 continuation

Box Figure 4.3: School Report Card in Nepal

School Profile (2064)
School: Bal Bikas Ma V
Code: 270010004

GENERAL INFORMATION	
Development Region	Central
Eco-belt	Hill
Zone	Bagmati
District	Kathmandu
VDC	Aalapot
Address	Alapot Jaributte
Ward No.	4
Locality	Rural
Phone	
Email	

SCHOOL TYPE INFORMATION	ECD	Primary	L.Sec.	Sec.	H.Sec.
Community (Aided)		✔	✔		
Community Managed					
Community (Unaided)				✔	
Institutional (Private Trust)					
Institutional (Public Trust)					
Institutional (Enlisted with Company)					
Madrassa					
Gumba					
Ashram					

GRADEWISE STUDENT INFORMATION

Particulars	ECD	1	2	3	4	5	6	7	8	9	10	11	12	Total
Total Enrollment		16	15	24	30	25	35	34	32	35	40			286
Boys Enrollment		6	7	11	9	10	14	16	15	14	21			123
Girls Enrollment		10	8	13	21	15	21	18	17	21	19			163
Dalit Enrollment		7	8	7	9	4	7	3	7	7	7			66
Janjati Enrollment		5	2	11	16	12	16	6	17	10	10			105
Disabled Enrollment				1						1	1			3
Repeaters														0
New Enrollment		0												0
Transferred - In							11	4	2	6				23
Textbooks (full set)		16	15	24	30	25								110
Sections														
Teaching Methods		1	1	1	1	1	1=Subject Teaching, 2=Grade Teaching, 3=Multi-Grade Teaching							

PHYSICAL AND OTHER INFORMATIONS

No. of Buildings	2	Water	Tap	Urinal	
No. of Rooms	16	Health Facilities	N/A	Urinal for Girls	
No. of Computers		Compound	No	Urinal for Teachers	
Inadequate Rooms	4	Electricity	Yes	SIP	No
Rooms to Rehabilitate		Library		Social Audit	No
Usable Desks/Benches	114	Playground		Financial Audit	No
Required Desk/Benches	20	Store		School Calendar	Yes
Non Teaching Staffs	2	Toilet	Yes	PTA	Yes
External Monitoring	0	Toilet for Girls		SMC	Yes
Staff Room		Toilet for Teachers		SMC Meetings	6

FINANCIAL INFORMATION

Income		Expenditure	
Government Support	1476175	Salary	1476175
Scholarship Grant	25728	Scholarship	2572
Block Grant	50000	Materials	20000
Other Government Support		School Reconstruction	15000
Others	501200	Student Benefits	
Total	2053103	Teacher Benefits	
		School Improvement	105000
		Others	
		Total	1618747

TEACHER INFORMATION

Levels	Approved Position	No. of Working Teachers								Total Teachers		Permanent (govt)		Temporary (govt)		Rahat Quota (govt)		Private Sources		Fully Trained		Partially Trained		Untrained	
		Total		Dalit		Janjati		Disabled																	
		F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M
Primary	6	5								5		1	4	0	1					1	3	4			
L.Sec.	7	6		1		1	0			6		1	6	0	0	0	1			0	1	5		1	1
Sec.	2	2								2		0	1	0	1					0	2	2			
H.Sec.																									

AGEWISE STUDENT INFORMATION

Status	Class 1									Class 2									Class 1-5								
	Total			Dalit			Janjati			Total			Dalit			Janjati			Total			Dalit			Janjati		
	F	M	T	F	M	T	F	M	T	F	M	T	F	M	T	F	M	T	F	M	T	F	M	T	F	M	T
Total																											
Under Age																											
Correct Age																											
Over Age																											

INDICATORS AND COMPARATIVE INFORMATION

Levels	Student Teacher Ratio (All)				Promotion Rate (in %)				Repetition Rate (in %)			
	Pri.	L.Sec.	Sec.	H.Sec.	Pri.	L.Sec.	Sec.	H.Sec.	Pri.	L.Sec.	Sec.	H.Sec.
School	18	14	38	-	100	100	88	-	0	0	0	
VDC	15	13	14	-	96	100	88	-	0	0	0	
District	24	31	19	-	93	94	91	59	4	3	3	
National	37.8	51.7	32.5	-	70	83.8	85.3	-	17.2	8.8	8.4	

(c) District Education Office, KATHMANDU
Source: Flash 2063-2064

Sources: Asian Development Bank. 2009. *Country Report of Assessment Study for Improving Administrative Data Sources for the Monitoring of MDG Indicators, Nepal*. Consultant's report. Manila (TA 6356-REG);Ministry of education and sports. Nepal. 2009. Paper presented at the Regional Technical Assistance 6356 Workshop. Bangkok. 26–27 November; Department of Education, Government of Nepal website. http://202.70.77.75/flash/schoolreport/reportpre.php; http://202.70.77.75/flash/schoolreport/reportshow.php?d=27&v=001&s=270010004&t=&yr=2064

4.2 SOURCES OF EDUCATION STATISTICS

Education management information systems. To meet the data needs of education planning, monitoring, and evaluation, education authorities of countries, including those in the five case study countries, have put in place information systems often referred to as the education management information systems (EMIS), to collect data for compiling statistics and indicators that will be useful for monitoring national plans, policies, and programs. "The EMIS is a sub-system of an education system whose aim is to collect, store, process, analyze, and disseminate information. Its purpose is one of providing the basis (operating system in charge of carrying out daily activities) and the summit (decision making system, the organ in-charge of defining objectives and strategic choices) of an organization with information and knowledge, for informed decision making" (Carizo, Sauvageot, and Bella 2003, p. 15).

Information relating to education particularly on enrollment in educational institutions and educational attainment of the population are some of the key statistics that are collected and used in EMIS. Education statistics that can feed an EMIS are usually derived from the following sources: (i) censuses of population and housing, (ii) household sample surveys, and (iii) administrative sources.

The first two methods of data collection are usually in the domain of the national statistics offices (NSOs), while the third is managed by the administrative ministries and agencies regulating the education sector, and can be referred to as the administrative data sources for compiling education statistics and indicators.

Censuses. Of these methods, population censuses are conducted infrequently, usually once in 10 years. Census data serve as baseline data covering the entire population. It can cover a limited range of topics, such as school enrollment, school attendance, highest educational attainment, and literacy.

Household surveys. Sample surveys of households are sources of education statistics that can cover topics and items more comprehensively. Household surveys can provide data on current attendance and educational attainment of household members. It can be used to understand more comprehensively, for example, the reasons for dropouts and for not attending school, household expenditure on education, interrelationship between poverty and education, educational attainment and employment, and qualitative aspects of education. However, sample survey estimates are usually available at the national level. Reliable subnational estimates with disaggregated categories—rural–urban, age, sex, ethnic, and other minorities require very large sample sizes.

Administrative sources. Information on pupils, teachers, education facilities, financing, and others are collected by education authorities from education establishments in the process of administering the education system. In contrast to sample surveys, administrative data provide the possibility for compiling indicators at the subnational levels disaggregated by age and sex every year. For these reasons, administrative data collected by education authorities serve as the principal source of statistics on education and of EMIS.

Statistics from the three different sources of education data may not be comparable because of differences in methodologies. They are however complementary and provide a means to cross-check quality and to reinforce the need to adopt uniform definitions and standards in their compilation.

4.3 ADMINISTRATIVE DATA AS SOURCES FOR EDUCATION STATISTICS AND INDICATORS

Organization of Administrative Data Collection in Education

The collection and compilation of education-related information from school establishments in a country usually rest with the ministry that administers and regulates the public education system. In each of the five case study countries, clearly identified divisions or units in the respective ministries of education collect, compile, and disseminate education statistics and indicators. However, the organizational structure, available human and financial resources, and data communication systems vary from one country to another.

The management structure and organizational responsibilities for the administration of school education are usually distributed hierarchically starting from the school establishment level to the next higher level of school administration—to districts, zones, provinces, and central level. It depends on the structure of the government and the degree of decentralization and devolution of the central authority.

A large part of school statistics is obtained from the schools themselves, making them the primary unit of information on a number of variables. Schools fill up a questionnaire at least once a year, usually at the beginning of every school year. The statistics or planning, monitoring, and evaluation units in the central education ministry decide on the format of data collection and recording instruments, such as questionnaires, forms, and registers. The topics to be canvassed and the degree of details vary according to the needs of the country. It is a good practice to develop

the data collection instruments in consultation with data users and suppliers at the central, regional, district, and school levels. This process will help meet the data needs of various users with the available resources for data collection.

Country Example

In the five case study countries, the ministries and/or departments of education also collect and compile education statistics from data collected in the process of school administration. Education authorities have established systems for regularly collecting administrative data and management information by canvassing forms and questionnaires from the school system on a census basis. As an illustration, the prevailing education management structure in Sri Lanka, which came into effect since the establishment of the provincial council system with a decentralized management organization structure, comprises five interlinked layers: (i) the Ministry of Education as the central ministry, (ii) the provincial ministries and/or Department of Education, (iii) the zonal education offices (ZEO), (iv) the divisional education offices (DEO), and (v) schools.

Box 4.4 describes the process of collecting, verifying, processing, and compiling data and bringing out the results of the annual school census in Sri Lanka. Responsibilities are assigned at each level of the organizational structure—schools, divisions, zones, provinces, and the statistics branch of the central Ministry of Education, which is in charge of the school census. The structure provides for the management of the annual school censuses by trained statisticians of the Department of Census and Statistics in the Ministry of Education, with the additional advantage of organizing education statistics under the professional guidance of the NSO on technical matters.

Box 4.4:   Collecting Education Statistics for the Annual School Census of Sri Lanka

The Ministry of Education collects, compiles, and disseminates education statistics in Sri Lanka for the annual school census. Technical staff recruited by the Department of Census and Statistics (DCS) and outposted to the Ministry of Education manage the statistics branch of the ministry. A senior statistician heads the statistics branch. Only the clerical and other related staff are appointed by the ministry. The DCS provides overall technical guidance and logistical assistance to the technical staff in the statistics branch of the ministry.

The statistics branch prepares the census schedules after coordinating with branches of the ministry and provincial education departments. The census schedules are prepared in both Sinhala and Tamil mediums. The officers of the statistics branch

Box 4.4 continuation

train the provincial coordinators (planning directors at the provinces), zonal planning directors, and divisional education directors in implementing the school census. These training classes are conducted at the provincial level.

Divisional education directors train the school principals, who submit their school's data, in filling out the census schedules. The training provides the opportunity for school principals to clarify any issues they face in filling out the census schedules. Zonal planning directors supervise these training classes and provide guidance to the division directors in the conduct of the training.

In each school, a teacher, guided and supervised by the school principal, fills out census forms. A 1-week deadline is given for filling out the forms and for preparing the school summary. The school principal checks the filled-out forms and submits the completed forms to the divisional education directors in the second week of the census. Divisional education directors check the school summaries and after correcting any errors in the school data, prepare the division summary. The division summary and the school summaries are then sent to the statistics branch of the ministry, which prepares the preliminary report of the annual school census. The completed annual school census schedules are also submitted by the divisions to the respective zonal planning directors, who supervise the computerization of census schedules and checking of data errors for their respective zones.

The officers of the statistics branch of the ministry provide training in data editing, coding, and computerizing the school census data and in checking and correcting data errors to relevant staff in the zonal offices. The data-entry and error-checking programs are prepared by the statistics branch and provided at the training classes to zonal offices. The zonal data-entry operators computerize school census schedules after coding and checking for any errors. In some zones, these operations are affected due to lack of permanent data entry staff. The zonal planning directors further check the data, correct any errors, prepare the zonal level reports, and submit the zonal data files in magnetic form to the statistics branch of the ministry. The zonal planning directors also provide the data files to their respective provincial planning directors who oversee the implementation of the school census activities for the zones falling under their jurisdiction.

Officers of the statistics branch in the ministry again check the data files received from the zonal offices to clean them further for any data inaccuracies and data quality issues in the school-level data. Clarifications for any incomplete data, errors, and inconsistencies are obtained from the zonal and/or provincial offices. The cleaned zonal data files are then merged to prepare a consolidated data file for the whole country (all islands), which is then used to prepare education statistics and related indicators and reports for dissemination to the users.

Sri Lanka's organization of education statistics system is an example where the national statistics office (the DCS) and the education ministry work closely in producing education statistics with the outposting of professional statisticians of DCS to the statistics branch of the ministry. This practice, which is not commonly found in other countries, has the obvious advantage of the statistical work being managed by professional statisticians—who manage and oversee entire census activities starting

Box 4.4 continuation

with pre-census preparations, schedules, design and preparation of guidelines for data collection, conducting training, data collection, data processing, establishing quality control procedures at different stages of data collection and processing, and bringing out the final results. Despite these arrangements, the statistics branch faces data quality and accuracy issues in the school level data. Feedback by the statistics branch on the data submitted by the schools, along with instructions and guidelines to improve data quality and accuracy at the time of annual training program of school principals may be useful in further improving the quality and completeness of school statistics.

Source: Asian Development Bank. 2009. *Pilot Study – Compilation of a Series of Education-Related MDG Indicators Using Administrative Data from the School Census in Sri Lanka.* Consultant's report. Manila (TA 6356-REG).

Essential Data from School Establishments

Education or school establishments are the primary units of information for education authorities who prescribe standardized questionnaires for data collection. Data from school establishments are the raw material for constructing many education indicators, necessitating good record management from schools to ensure timely and good quality data. Box 4.5 provides a list of essential data that should be collected from each school establishment. The list is not exhaustive and other data items may be needed for different purposes by different users.

Apart from school-level data, reliable estimates of population by age and sex over the years are essential for compiling many indicators. The NSOs are usually responsible for providing population data. Some indicators require data on public authorities' and private sector's education expenditures (by levels of education) along with national accounts estimates of macroeconomic indicators, such as gross domestic product and gross national product.

Box 4.5:   Essential Data to Be Collected from Educational Establishments

Data on pupils
- Distribution by grade, gender, and age
- Distribution of repeaters by gender and grade
- For the first grade: distribution of repeaters by gender and age
- Number of pupils attending double-shift classes by grade

Box 4.5 continuation

Data on teachers and other categories of personnel
- Distribution of teachers by level of qualification and certification, by grade, and by gender
- Distribution of teachers by age and by gender
- Number of teachers working double shifts
- Number of teachers in multigrade classes
- Number of non-teaching personnel by category, age, and gender

Data on educational establishments
- Number of classrooms
- Facilities available in schools

Essential data to collect at the national level on education expenditures
- Education budget in the overall state budget (budget voted and budget disbursed) broken down by level
- Expenditures at the local level, of private organizations by level
- Gross domestic product and gross national product

Essential data to collect at the national level on population
- Distribution by age and by gender of the population by region, each year for at least the past 10 years, with projections for at least the next 10 years
- Locating migrations: entry and exit from each region and their impact on the school-age population.

Source: Adapted from Carrizo, L., C. Sauvageot, and N. Bella. 2003. *Information tools for the preparation and monitoring of education plans. Education policies and strategies 5*. Paris: UNESCO.

Education Indicators

Several indicators have been prescribed to monitor the inputs, outputs, and outcomes of the education systems and for guidance of national authorities. Education indicators can be broadly grouped into (i) literacy and outcomes, (ii) access and participation, (iii) indicators of efficiency, and (iv) education resources and inputs.

Table 4.3 lists some key education indicators under these groupings. Most of the indicators under categories (ii), (iii), and (iv) could be compiled from data collected by education authorities annually from schools and education establishments. These data are supplemented with additional administrative information on government budget expenditures and estimates of GDP and GNP, along with needed reference population data for the denominator in some indicators.

Table 4.3:   Key Education Indicators

1. Literacy and outcomes
Adult literacy rate
Literacy rate of 15–24-year olds / Youth literacy rate[a]
Ratio of literate females to literate males (Gender parity index of literacy rate)
2. Access and participation
Apparent and net intake rate (AIR and NIR)
Gross enrollment ratio (GER)
Net enrollment ratio (NER) and adjusted net enrollment ratio (ANER)[a]
Age-specific enrollment ratio (ASER)
School life expectancy (SLE)
Ratio of girls to boys in primary and secondary education[a]
Percentage of private enrollment
3. Indicators of efficiency
Transition rates (TR)
Coefficient of efficiency (CE)
Primary school entrants reaching last grade of primary education[a]
Survival rates by grade (SR)
Repetition rates (RR)
4. Education resources and inputs
Pupil-teacher ratio (PTR)
Percentage of female teachers
Public expenditure on education as percentage of gross national income
Public expenditure on education as percentage of total government expenditure
Public current expenditure per pupil (student) as percent of gross national income per capita
Public current expenditure on education as percentage of total public expenditure on education
Personnel compensation as percentage of public current expenditure on education

ᵃ   MDG indicator.
Sources: United Nations Educational, Scientific and Cultural Organization (UNESCO) Institute for Statistics. 2009. *Education. Indicators Technical Guidelines*. Montreal: UNESCO; Asian Development Bank Economics and Research Department. 2004. *Development Indicators Reference Manual, Concepts and Definitions*. Manila: Asian Development Bank.

The UNESCO Institute for Statistics has formulated standard concepts, definitions, and classifications for compiling indicators and statistics. It has also developed technical guidelines to guide official statisticians and staff working in the statistics units of education ministries and the NSOs. These have been supplemented by technical publications from other international agencies. Some of these publications and releases are listed below and readers interested in the technical details can access these publications from the websites of the publishing agencies. Some of these have been extensively referred to and used in preparing some of the sections of this chapter.

  (i) Galodé, Gilles. 1998. *Statistical information system on expenditure in education: Administration Manual*. Paris: Institute for Education Economics Research in cooperation with the Division of Statistics of UNESCO.

 (ii) Galodé, Gilles. 1998. *Statistical information system on expenditure in education: Technical Manual*. Paris: Institute for Education Economics Research in cooperation with the Division of Statistics of UNESCO.

(iii) United Nations. Millennium Development Goals Indicators. The official United Nations site for MDG Indicators. http://unstats.un.org/unsd/mdg/ Metadata.aspx?IndicatorId=0&SeriesId=711. Metadata developed for the MDG indicators for monitoring of education-related MDG indicators. This site provides detailed methods of compiling the indicators and the data sources used, and their limitations in compiling international datasets.

(iv) Organisation for Economic Co-operation and Development. 2004. *Handbook for Internationally Comparative Education Statistics: Concepts, Standards, Definitions and Classifications*. http://www.oecdbookshop.org/oecd/display. asp?sf1=identifiers&st1=962004031P1

 (v) United Nations. 2003. *Indicators for Monitoring the Millennium Development Goals: Definitions, Rationale, Concepts and Sources* (ST/ESA/ STAT/ SER .F/95) New York: United Nations. http://unstats.un.org/unsd/mdg/Host. aspx?Content=Indicators/Handbook.htm

(vi) United Nations Educational, Scientific and Cultural Organization (UNESCO). 2009. *Education Indicators – Technical Guidelines*. http://www.uis.unesco. org/ev.php?ID=5202_201&ID2=DO_TOPIC

(vii) UNESCO. 2006. *International Standard Classification of Education 1997*. UNESCO-UIS. http://www.uis.unesco.org/TEMPLATE/pdf/isced/ISCED_ A.pdf

(viii) UNESCO. 2004. *Guide to the Analysis and Use of Household Survey Data and Census Education Data*. UN, UEPA/UAPS/UIS/USAID/UNICEF/DHS. http:// www.uis.unesco.org/template/pdf/educgeneral/HHSGuideEN.pdf

(ix) UNESCO. 1997. *Gender-Sensitive Education Statistics and Indicators: A practical guide.* http://unesdoc.unesco.org/images/0010/001091/ 109177eo.pdf

4.4 EDUCATION-RELATED MILLENNIUM DEVELOPMENT GOALS INDICATORS AND USE OF ADMINISTRATIVE DATA

To monitor progress on education, the MDG framework provides for the targets and indicators for goals 2 and 3 (Table 4.4). These goals relate to monitoring achievements toward universal primary education and removing gender disparity in education.

Table 4.4: Education-Related Millennium Development Goals, Targets and Indicators

Goal 2: Achieve universal primary education	
Target 2.A: Ensure that, by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling	2.1 Net enrollment ratio in primary education 2.2 Proportion of pupils starting grade 1 who reach last grade of primary 2.3 Literacy rate of 15–24 year-olds, women and men
Goal 3: Promote gender equality and empower women	
Target 3.A: Eliminate gender disparity in primary and secondary education, preferably by 2005, and in all levels of education no later than 2015	3.1 Ratio of girls to boys in primary, secondary, and tertiary education

Source: United Nations Official List of MDG Indicators. http://mdgs.un.org/unsd/mdg/Host.aspx?Content=Indicators/OfficialList.htm

Except for indicator 2.3—literacy rate of men and women aged 15–24—the indicators listed in Table 4.4 can be compiled using school enrollment data collected by education authorities through their annual school census programs and through relevant population estimates usually produced by NSOs. In addition to these indicators, the national education authorities and authorities at subnational levels also need other school education-related indicators to meet specific planning and policy needs. To a large extent, administrative data collected by education authorities are one of the major sources to fulfill data needs. The definitions, data required, and the data limitations (as observed in the five case study countries) in using administrative data for compiling the MDG indicators are further discussed in Boxes 4.6–4.8.

Box 4.6:   Millennium Development Goal Indicator 2.1: Net Enrollment Ratio in Primary Education

Definition. The number of children of official primary school age (as defined by the national education system) who are enrolled in primary education as a percentage of the total children of the official school age population.

$$\text{NER for Primary} = \frac{\text{Enrollment of the official primary school age}}{\text{Population of official primary school age}} \times 100$$

An alternative indicator is the total (or adjusted) net enrollment rate (NER) for primary education, which also includes children of primary school age enrolled in secondary education in the numerator.

The adjusted net enrollment ratio (ANER) indicator shows the extent of participation in primary and secondary education of children corresponding to the official age group for primary education in a country. The adjusted NER is used to monitor progress toward the goal of achieving universal primary education, identified in both the Millennium Development Goals and Education for All initiatives.

A high primary adjusted NER implies a high degree of coverage for the official primary school-age population. NER can have a maximum theoretical value of 100%.

Desired disaggregations. By sex, geographical location (region, rural–urban) and by level of education.

Data required and source. Number of children in the primary school age enrolled in primary and secondary levels from the school registers or school census collected by education authorities. Population estimates by single years of age for school-age population are usually obtained from the national statistics office.

Data limitations. While administrative data are useful sources for this indicator, the following data limitations have been observed from the five case study countries:
- Incomplete coverage of all children of relevant age groups from all types of schools and education institutions that provide organized educational programs, including public and private. Private schools are often not covered or only partially covered leading to underestimation of enrollments.
- Possible misreporting (overreporting) of enrollments if budget allocation is linked to performance on student enrollment, leading to overestimation.
- Unreliable or incomplete data on age of students from schools, leading to inaccurate enrollment data for the numerator.
- Obtaining reliable estimates of subnational level population in the relevant age groups with necessary disaggregates by sex, rural–urban, etc. for the construction of the subnational indicators is a major limitation in some countries.
- Inconsistencies in numerator and denominator, with NER or ANER exceeding its theoretical value of 100% as the data for numerator and denominator come from different sources and may refer to different reference points in time.

Source: UNESCO 2009; United Nations 2003; United Nations. Millennium Development Goals Indicators. The official United Nations site for MDG Indicators. http://mdgs.un.org/unsd/mdg/Metadata.aspx; country reports of assessment study for improving administrative data sources for the monitoring of MDG indicators for Mongolia, Nepal, Palau, Sri Lanka, and Viet Nam (ADB 2009a, 2009b, 2009c, 2009d, 2009e).

**Box 4.7: Millennium Development Goal Indicator 2.2:
Proportion of Pupils Starting Grade 1 Who Reach Last Grade of Primary**

Definition. Also known as the survival rate to last grade of primary, this indicator is the percentage of a cohort of pupils enrolled in grade 1 of the primary level of education in a given school year who are expected to reach the last grade of primary school, regardless of repetition.

It is obtained by dividing the total number of pupils belonging to a school cohort who reach each successive grade of the specified level of education by the number of pupils in the school cohort (in this case the students originally enrolled in grade 1 of primary education) and multiplying the result by 100. The standard method prescribed for calculating the indicator is known as the "reconstructed cohort method."[a]

It is an indicator of internal efficiency of the education system and helps monitor the universal primary education objective of Education For All and the Millennium Development Goals. Rates approaching 100% indicate a high level of retention and low incidence of dropout.

Desired disaggregations. By sex, geographical location (region, rural–urban) and by type of institution (private or public).

Data required and source. The reconstructed cohort model requires data on the number of students enrolled by grade in the reference year (year t), number of students enrolled and repeated by grade in succeeding year (i.e., year t+1) and number of successful completers (graduates) in the reference year. Data collected by the ministries of education based on school registers and questionnaires sent to the school in the school census provide the data for the numerator and the denominator.

Data limitations. The method of estimating the indicator using cohort analysis is based on the following assumptions:
- The observed flow rates will remain unchanged throughout the cohort life.
- There will be no additional new entrants in any of the subsequent years during the life time of cohort.
- The number of times any given pupil will be allowed to repeat must be well-defined.

It further depends on the three flow rates—promotion, repetition, and dropout rates. These are affected by the following:
- Overreporting of enrollment and/or repeaters (particularly in grade 1)—which can be deliberate when there is a financial incentive, for example if the number of teachers paid by the government is related to the number of pupils enrolled.
- Incorrect distinction between new entrants and repeaters results in underreporting of repeaters and an overestimation of dropouts, other things remaining equal.
- Variations in coverage of data in successive years will result in inaccurate estimates of flow rates. For example, if data available for year t are of complete coverage but for year t+1 are based on incomplete coverage, this will imply that the number of promotees and repeaters in t+1 will be underestimated and the number of dropouts will be overestimated.

Box 4.7 continuation

These data errors can lead to biases in the indicators of internal efficiency. "Since the dropout rate is determined as a residual, it often serves as a test for some of these errors: particularly, a negative dropout rate is a sign of errors in the raw data, i.e., reported enrollment and repeaters."[a]

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[a] United Nations Educational, Scientific and Cultural Organization (UNESCO). *Use of Cohort Analysis Models for Assessing Educational Internal Efficiency*. http://www.uis.unesco.org/i_pages/indspec/eff-box.html

Sources: UNESCO 2009; United Nations 2003; United Nations. Millennium Development Goals Indicators. The official United Nations site for MDG Indicators. http://mdgs.un.org/unsd/mdg/Metadata.aspx; country reports of assessment study for improving administrative data sources for the monitoring of MDG indicators for Mongolia, Nepal, Palau, Sri Lanka, and Viet Nam (ADB 2009a, 2009b, 2009c, 2009d, 2009e).

Box 4.8:   Millennium Development Goal Indicator 3.1:
Ratio of Girls to Boys in Primary, Secondary, and Tertiary Education

Definition. This is the ratio of the number of female students enrolled at primary, secondary, and tertiary levels of education to the number of male students in each level. To standardize the effects of the population structure of the appropriate age groups, the gender parity index (GPI) of the gross enrolment ratio (GER) for each level of education is used.

$$GPI = \frac{GER \text{ for level of education for girls}}{GER \text{ for level of education for boys}}$$

where GER for a level of education is:

$$GER = \frac{Total \text{ enrolment in the level irrespective of age}}{Population \text{ of official age-group for the level}} \times 100$$

The GPI serves as an indicator of equality of educational opportunity to girls and boys in terms of school enrollments.

Desired disaggregations. By level of education, type of institution (private or public) and geographical location (region, rural–urban).

Data required and source. The enrollment of females and males regardless of age at each level of education. When correcting for population structure, the estimated population of females and males in the official age for primary, secondary, and tertiary levels of education is needed to calculate the GER for females and males separately. The data sources used are principally school enrollment data compiled by education authorities through school censuses and surveys and population estimates produced usually by the national statistics office using population census data.

Box 4.8 continuation

Data limitations. Data limitations are similar to those for indicator 2.1—net enrollment ratio. In particular, inaccurate sex-disaggregated population estimates especially at subnational levels may not be very reliable. In the absence of reliable population estimates, indicators based on simple female-to-male ratio may give a biased picture.

Source: UNESCO 2009; United Nations 2003; United Nations. Millennium Development Goals Indicators. The official United Nations site for MDG Indicators. http://mdgs.un.org/unsd/mdg/Metadata. aspx; country reports of assessment study for improving administrative data sources for the monitoring of MDG indicators for Mongolia, Nepal, Palau, Sri Lanka, and Viet Nam (ADB 2009a, 2009b, 2009c, 2009d, 2009e).

The discussion in Boxes 4.6 to 4.8 is limited to the three MDG indicators for which annual enrollment and other administrative data collected by educational authorities in the process of school administration are extremely useful sources. With the availability of reliable reference population data and with necessary disaggregations, the indicators can also be compiled at subnational levels to meet the policy and planning needs at local levels. The data limitations observed above are also applicable to other related indicators.

When administrative data are not available, or are not reliable due to incomplete coverage or are of poor quality, or when the required population data are not available, population census and household survey data based on self-reported attendance as against enrollment reported by school authorities are alternative sources.

However, many other indicators are needed in education planning and monitoring and a number of these can be sourced from administrative data systems. Readers may refer to the standard technical manuals and guidelines from the UNESCO Institute for Statistics and other UN agencies listed in section 4.3.

4.5 IMPROVING ADMINISTRATIVE DATA: OBSERVATIONS AND LESSONS FROM COUNTRY STUDIES IN USING EDUCATION DATA FOR STATISTICAL INDICATORS

Education authorities in the five case study countries have established systems of capturing enrollment and other data through questionnaires canvassed to education establishments. In the context of using the education data collected from educational establishments in these countries, several issues that affect the quality of data have been observed. These have bearing on the quality of the indicators compiled using the collected data. These issues should be addressed to strengthen the

administrative-data-based educational statistics. Users should also be made aware of these deficiencies and limitations through dissemination of metadata so that they can interpret the results carefully. Some of the important issues are discussed below.

Incomplete Coverage

School statistics are normally based on 100% coverage of schools in the school census. Coverage will be incomplete if schools covered in the school census fail to respond. Apart from failure to respond, inaccessibility and poor communication due to logistical constraints for schools in remote and difficult areas may also lead to incomplete coverage. Another problem is the low response to the school questionnaire from private schools—whose share in primary and secondary education has been increasing. Incomplete coverage should be managed as it affects the accuracy of estimates and comparability across time.

How can coverage be improved? To improve coverage and response from education establishments, the central data collection team should monitor the coverage of data collection. This means that education authorities at all levels who manage the data collection operations should ensure that (i) all types of existing and eligible schools (public and private) are included in the data collection program, and (ii) filling in of questionnaires by the schools is closely monitored. This requires good communication with the school principals at the beginning of each data collection process through workshops and trainings.

If a school fails to respond, the education authority closest to the school establishment should follow up until coverage is completed and the last questionnaire is received. If the school still fails to respond, the next higher level authority should follow up. A schedule of follow-up for data with specified timelines for reminders should be prepared and implemented. Authorities should preferably send personalized reminder letters to the school principal for better impact.

Some schools still may not be able to respond to the questionnaires. The extent of schools missing from the coverage must be accounted for at the end of the data collection process to estimate for the incomplete coverage and to align the information closer to reality. Suggestions for estimating for non-responding schools when aggregating the data are:

(i) Estimating the current year's data using past years' trend of the non-responding schools, e.g., assume the same average annual growth rate. These estimates for non-responding schools are then used to generate overall aggregates.

(ii) Using previous year's data if there is no evidence of any major changes due to known reasons.

(iii) Using the trend of the responding schools to estimate the growth of the non-responding schools, if it can be assumed that both schools have similar growth patterns.

Areas in special situations that cause the omission of a large number of schools, such as areas with law and order problems or those with issues of inaccessibility or complete omission of private schools, will have to be dealt with separately. A possible solution could be to inflate the available figures using an inflation factor that is based on a related dataset. For example, data from other surveys (or special surveys), such as the labor force surveys could be used as the basis to scale up the incomplete student enrollment numbers.

Authorities should also follow up with the non-responding schools even after the deadline for compiling current year statistics. Data submitted after the cut-off dates should be used later in updating the current year's data. The updating of the data for a particular year is usually carried out at the same time that data for the following year are compiled. Finally, documentation should be provided in the metadata on the extent of undercoverage of schools in the school census and the methods used to estimate for the missing data.

Incomplete coverage or noncoverage of private schools. School education in developing countries has always been dominated by government-funded schools. In recent years however, private sector education, including schools run by nongovernment organizations have expanded. Complete coverage of education statistics requires that private schools be included in the reporting. However, experience from the case study countries suggests that reporting by private schools is incomplete and partial. Some suggestions to improve coverage from private schools are:

(i) Engage the management of private schools as stakeholders and partners in the country's education development and encourage them to submit education statistics.

(ii) Build trust with the school management to assure them that the data collected from the schools will be used only for statistical purposes.

(iii) Mitigate the schools' burden through less data demands, and limit requested data to the key characteristics of students, teachers, and physical facilities. More information, such as financial data can be requested once trust has been built.

(iv) Tailor the data collection questionnaires to simultaneously meet the data needed for school planning to encourage the use and reporting of the data.

(v) Introduce administrative and/or legal provisions that make it mandatory for the schools to submit the needed data to education authorities in prescribed questionnaires. This process should be initiated with an open dialogue with the management and/or owners of private schools to enlist their support.

Poor Records and Other Data Quality Issues

Other data quality issues that were reported relate to the following: (i) poor maintenance of school level records, (ii) incomplete filling of questionnaires, and (iii) misreporting of data in school censuses. This may happen as the school principals may not see this exercise as useful, but as an extra reporting burden. Other reasons are lack of guidelines and instruction materials for filling up the questionnaires and lack of training and awareness about the utility of this data. In Nepal, for example, "Flash" questionnaires were introduced to report education statistics by the schools to feed into the EMIS in 2004. These questionnaires in Nepali had too many tables per page. The pages were further constrained with detailed guidelines for answering questions within the forms, which could have been given to head teachers in a separate booklet. As a result, the questionnaires lacked the neatness that is needed for reporting with clarity (ADB 2009b).

Ways to improve these issues include the following:
  (i) Standardize record-keeping at school levels and ensure compatibility between the school record system and data collection forms for easy retrieval of information from school records into the school questionnaires.
 (ii) Design user-friendly data collection forms for better reporting and to reduce the errors of data recoding in the transfer of information from school records and registers to the prescribed forms.
(iii) Review existing data collection forms. Too many forms that seek overlapping information burden the school management. Forms to be filled at the school level should be rationalized to reduce the reporting burden. Data collectors and education staff engaged in the process should be involved to improve the design of the school questionnaires.
(iv) Prepare guidelines and instruction manuals that explain the concepts and definitions of data items included in the forms to ensure uniform understanding and reporting by the primary compilers of data.
 (v) Include basic data consistency checks that should be satisfied by different data variables in the school questionnaire to ensure internal consistency and quality of data submitted. For example, checking for ranges, invalid data values, subtotals that add to the total, and cross-checking with the past year data will control quality at the primary data collection level. This will minimize the problems of cleaning the data at the data processing stage.
(vi) Introduce quality control systems by verifying data in the filled-in questionnaires at the first level of education authority, which is also the one closest to the school. This authority can clarify errors and discrepancies.
(vii) Inspect the maintenance of school records and verify the information submitted by the school (by education authorities during school inspections).

(viii) Conduct training and orientation programs at the beginning of every school year for all staff engaged in collecting and compiling data, and provide training on data entry and data processing to relevant staff.

(ix) Make data available to users to promote evidence-based education planning at all levels including the local communities and authorities. This serves as an important instrument not only for planning, but also for improving the quality of data. Nepal provides a good example of the use of EMIS data in planning (Box 4.9).

(x) Provide feedback to schools, for example, by way of school report cards. This will increase awareness on the utility of schools' contribution to the education planning and monitoring process.

Misreporting of data. Since state-financed school systems are directly supervised by educational authorities, linking school performance indicators and budgeting has helped improve the response to school questionnaires. However, this has also led to the tendency to overstate school performance to inflate completion rates, which dilutes the quality of education standards. This practice has been reported in Mongolia, Nepal, and Viet Nam, where budgetary allocations are also linked in some way to the identified indicators of school performance, such as enrollment and completion rates.

The tendency to misreport is dangerous and may give a distorted picture of the education system. A management information system plagued by systematic misreporting by overstating achievements may lead to wrong policy decisions and illusions of success. Checking this tendency should therefore be part of the quality control strategy. This could be undertaken through

(i) Internal data audits, where the higher authorities should be assigned a fixed percentage of random verification of data reported by schools based on personal visits.

(ii) External data audits that include social audits for the schools to introduce transparency in school reporting.

(iii) Independent and/or joint data audits by "data audit teams" comprising the NSO and education ministry officials, which inter alia also judge data quality issues with regard to application of standard concepts, definitions, and methods. Coordinated efforts between the NSO and the education authorities will go a long way in improving data quality and also result in improved statistical capacity of the staff in education ministries.

Box 4.9:   Use of Education Management Information Systems Data for Evidence-Based Planning in Nepal

Promoting the culture of data use and linking data to planning and decision making at the school and local levels have an important bearing on data activities and improving the quality of data. Nepal provides a good example of integrating the use of education management information systems (EMIS) data in its education planning and monitoring and evaluation process. It demonstrates the important role played by EMIS in supporting planning at the national, district, village, and school levels. With the emphasis on decentralized planning in Nepal, the local management of schools has increasingly been transferred to the local school management committees. The role of government has gradually shifted from a direct implementer to that of a facilitator by (i) providing block grant based on the school improvement plan and village, municipal, and district education plans; and (ii) monitoring the results of quality and access to education.

The initiation of the school improvement plan and the village, municipal, and district education plans has made a positive impact on data activity at the local levels. The need to prepare and implement these plans encourages all agencies in the data collection, compiling, and reporting chain not only to report data to higher authorities but also to use them for their own planning purposes. The School Sector Reform (SSR) Plan 2009–2015 of the Government of Nepal identifies 15 key SSR indicators with base year values of 2009 and target values to be achieved by 2015. It clearly identifies the role of the EMIS in monitoring the SSR and in institutionalizing evidence-based planning. Funds are also allocated to the districts, village development committees, and schools based on performance criteria that are measured through indicators, such as net enrollment rates, repetition rates, completion rates, and learning outcomes.

The SSR plan makes schools responsible for monitoring and reporting on developments through the institutionalized EMIS, i.e., preparation and submission of the school-level EMIS report. It also provides for social audits in the schools, contributing to enhanced accountability and transparency in financial management. The school improvement plan has proved to be an effective planning tool to guide a process for resourcing and reinforcing strategic interventions in the dynamic and evolving contexts of Nepal's education sector.

The inculcation of the culture of evidence-based planning at all levels will promote the use of data in the planning but will also lead to better coverage and improved data quality in the process.

Source: Ministry of Education, Government of Nepal. 2009. *School Sector Improvement Plan (2009–2015)*. Kathmandu: Ministry of Education. http://moe.gov.np/new/

Use of Non-Standard Definitions and Methods

The use of nonstandard definitions and methods of compiling indicators also affect data quality and comparability across countries. In some cases, non-standard methods for compiling MDG indicators have been used. In most countries, MDG indicator 2.2—proportion of pupils starting grade 1 who reach last grade of primary—is not compiled using the recommended reconstructed cohort method. Indicator 3.1—ratio of girls to boys in primary, secondary, and tertiary education— is sometimes compiled without correcting for population structure. The reasons are lack of consistent data coverage in successive years, lack of accurate data on flow rates (repetition and promotion rates), and lack of reliable estimates of single-year age and sex-disaggregated population data particularly at the subnational levels. Usually, population estimates are available for the standard 5-year age groups, whereas single year and specific age group data are needed to produce some key education indicators. In some countries, different institutions may produce different population estimates and projections for their needs. Use of the reconstructed cohort method also requires technical assistance in countries with low skills development.

These improvements to adopt standards could be implemented by reviewing associated problems and through capacity building using recommended methods, or by taking actions to improve the availability of data needed to construct the indicators. Better coordination with NSOs could play an important role in building the capacity of the staff in education ministries and also in providing age- and sex-disaggregated population estimates for the denominators.

At the institutional level, an interdepartmental technical committee representing the NSO, relevant agencies, and users should be constituted. The committee will be the forum to discuss technical issues with regard to adopting uniform standards across the country in line with internationally recommended standards and for taking decisions on improving data quality and their implementation issues.

Inconsistencies in Estimates

In some cases, indicators produced are found to be inconsistent over time and have problems related to technical aspects. These include estimates beyond their theoretically acceptable values, or sudden jumps or drops in data values from 1 year to the next, creating doubts on the quality and reliability of data. In Palau, gross enrollment and net enrollment ratios have shown such variations (Box 4.10). Another example can be seen in Tables 4.5A and 4.5B, which present trends in net enrollment ratio in primary education in Sri Lanka and some select districts based on a pilot study (ADB 2009f). At the national level, the ratio has exceeded its theoretical maximum value of 100% in earlier years, but in the later years, the ratio has fallen sharply. The ratio also exceeds 100% for a number of districts.

Box 4.10:   Data Fluctuations in Education Indicators – Palau

The *Millennium Development Goals: Initial Status Report*, the first national Millennium Development Goal (MDG) report of Palau under the MDG 2—achieve universal primary education—has observed the following with regard to possible data issues: "At the primary level, gross enrollment rates have been historically high, (averaging 112% for school years 1995–1996 through 2004–2005). These rates dropped sharply for school year 2005–2006 and subsequent years. While the reasons for this decline require further investigation, errors in data collection are possible as are distortions in data due to movement of children between schools, both within Palau and between Palau and neighboring jurisdictions. At the secondary level, gross enrollment rates average 92% with no trends in evidence."

Box Table 4.10: Gross and Net Enrollment Rates, Primary and Secondary

Year	Gross Enrollment Rate		Net Enrollment Rate	
	Primary	Secondary	Primary	Secondary
1995–1996	113	86	N.A.	N.A.
1996–1997	109	89	N.A.	N.A.
1997–1998	113	95	N.A.	N.A.
1998–1999	115	96	N.A.	N.A.
1999–2000	113	93	N.A	N.A
2000–2001	115	94	N.A.	N.A.
2001–2002	114	91	N.A.	N.A.
2002–2003	113	94	N.A.	N.A.
2003–2004	109	86	96	51
2004–2005	104	90	93	62
2005–2006	100	94	85	66
2006–2007	93	94	N.A.	N.A.
2007–2008	88	98	N.A.	N.A.

N.A. = not available.

"Net enrollment rates, which are more sensitive indicators of school participation levels, have been compiled for only three recent years. For 2 of these 3 years, net enrollment data confirm near universal primary participation but for the third year, (school year 2005–2006), rates show the same precipitous decline as evident in the gross enrollment statistics."

Source: Government of Palau. 2008. *The Millennium Development Goals: Initial Status Report, Republic of Palau*. Fiji: Government of Palau and UNDP. p.16.

While the data for the numerator of the indicator is based on school statistics, the denominator is based on projections using 2001 population census data, births, and deaths statistics from the Registrar General's Department, data on international migration compiled by the immigration authorities, and special enumeration conducted in 2007 in the Eastern province and the Jaffna district in Northern province.

The values for the districts can exceed 100% if a large number of students who reside in one district attend school in a neighboring district that offers better educational facilities. But the value of the ratio exceeding 100% at the national level and then its decline in later years may also be due to incomplete coverage of the increasing number of private and international schools in Sri Lanka. This can also be due to inaccurate population estimates for the denominators or a combination of all of the above, which require further investigation.

Table 4.5A: Net Enrollment Ratio in Primary Education in Sri Lanka and Selected Provinces 1998–2000 (%)

Province and/or District	1998			1999			2000		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
All Island	100.57	101.81	101.18	95.79	101.17	98.36	94.69	100.17	97.31
Western	99.60	100.22	99.90	94.54	100.37	97.31	94.48	100.32	97.26
Colombo	91.13	90.56	90.85	86.88	88.34	87.58	86.85	88.37	87.58
Gampaha	108.46	110.11	109.26	101.63	116.13	108.31	101.87	116.76	108.73
Kalutara	102.17	103.29	102.72	98.10	100.50	99.27	97.51	99.28	98.37
Central	106.02	104.41	105.23	98.82	100.38	99.58	96.43	98.73	97.55
Kandy	96.83	95.38	96.11	90.30	91.33	90.80	88.12	90.46	89.26
Matale	100.15	99.04	99.60	93.82	97.15	95.43	92.90	94.83	93.83
Nuwara Eliya	130.97	128.77	129.88	121.52	122.82	122.15	117.40	119.94	118.63

Source: Asian Development Bank. 2009. *Pilot Study – Compilation of a Series of Education-Related MDG Indicators Using Administrative Data from the School Census in Sri Lanka*. Consultant's report. Manila (TA 6356-REG).

Table 4.5B: Trends in Net Enrollment Rate at Primary Level in Sri Lanka 1998–2007 (%)

Year	Total	Boys	Girls
1998	101.18	100.57	101.81
1999	98.36	95.79	101.17
2000	97.31	94.69	100.17
2001	100.03	99.71	100.36
2002	98.04	98.05	98.03
2003	95.19	95.10	95.29
2004	92.92	92.08	93.80
2005	90.70	90.55	90.85
2006	89.77	89.74	89.80
2007	89.87	90.11	89.63

Source: Asian Development Bank. 2009. *Pilot Study – Compilation of a Series of Education-Related MDG Indicators Using Administrative Data from the School Census in Sri Lanka*. Consultant's report. Manila (TA 6356-REG).

The cited examples highlight data quality issues in education statistics compiled using administrative data. This issue is further elaborated in the next section.

Non-Availability of Complementary Reference Population Data

All indicators need reliable data for the variables in the numerator and the denominator. If the data for the numerator and the denominator both come from the same data source, such as population census, sample survey, or administrative records, these can be estimated without inconsistency. However, if the numerator and the denominator come from different sources, inconsistency between the two is likely to arise. Gross and net enrollment ratios estimated using administrative education statistics are examples of such indicators, where the numerator is based on administrative education data but the denominator comes from population projections based on census and vital statistics records.

In respect of education indicators, sex disaggregated population estimates by single-year age are usually needed for many indicators. Compiling these indicators at the national level is less problematic. However, compiling indicators disaggregated by sex, and further at subnational levels, may become challenging due to lack of timely and reliable data on births, deaths, and internal and external migration arising from weak registration systems in developing countries.

Mongolia uses education administrative data for compiling MDG indicator 2.1 at the national and provincial levels, but the indicator is not available by sex despite the Ministry of Education, culture and science regularly collecting the data by sex for the number of children enrolled in primary schools. The problem lies in non-availability of reliable estimates of the population of children belonging to a particular age by sex for the denominator (ADB 2009a).

A similar situation prevails in Sri Lanka, where the absence of estimates of reference population has prevented the use of annual education census data in compiling a time series of MDG indicators, such as net enrollment ratio in primary education and ratio of girls to boys in primary, secondary, and tertiary education (Box 4.11). In Viet Nam, the General Statistics Office provides annual population estimates by age and sex at the national and provincial levels based on population census and annual sample survey on population change and family planning. These population estimates from the General Statistics Office are available only for five age groups at 10-year intervals, which do not meet the needs of education ministry whose minimum requirements are age data for 5-year age groups for relevant levels of education.

Box 4.11:   Study on Using School Census Data for Compiling Education Indicators in Sri Lanka

In Sri Lanka, annual school census data collected by the statistics branch of the Ministry of Education have not been used in compiling some of the indicators, such as the Millennium Development Goal (MDG) indicator 2.1—net enrollment ratio. This is due to the absence of complete coverage of schools in the school census on one hand and non-availability of timely and reliable age-specific and sex-disaggregated annual official estimates of reference population at the subnational levels on the other. In the absence of the population estimates for denominators from official sources, despite the availability of annual school census, the estimates derived from some socioeconomic surveys have been used as a substitute for constructing the estimates of MDG indicator 2.1.

Recently, the Registrar General's Department (RGD) and the Department of Census and Statistics (DCS) prepared a set of subnational population estimates of provinces and districts into which the country is divided, to construct some of the education indicators in a pilot study on education statistics that was undertaken with technical assistance provided by the Asian Development Bank under a regional technical assistance on Improving Administrative Data Sources for Monitoring of MDG Indicators.[a] The statistics branch of the Ministry of Education, the RGD, and the DCS participated in the project. The indicators included the MDG indicators 2.1, 2.2, and 3.1. The enumerated population from the Population Census 2001, births, and deaths statistics compiled by the RGD, data on international migration compiled by the immigration authorities, and special enumeration conducted in 2007 in the Eastern province and the Jaffna district in Northern province were used in preparing subnational population estimates.

The study produced estimates of the above indicators at the national, provincial, and district levels. However, the study also revealed a number of issues in the estimates of both the numerators and denominators in preparing the indicators. The numerators were affected by incomplete data from the private schools, *pirivenas* (monastic schools), and absence of coverage of international schools in school statistics. The population estimates for the denominators at district levels were affected due to the lack of data on internal migration. While the school census statistics on students is based on the location of the school attended irrespective of the usual residence of the student, the population estimates at the district level are based on place of usual residence and affects the estimates when students attend schools located outside their district of usual residence. This results in net enrollment ratios exceeding 100% for some districts.

At the national level, a decline in both net and gross enrollment rates was observed from 2001 to 2007. The net enrollment ratio, which was estimated at 100.0% for 2000, was estimated at 89.9% for 2007 (Table 4.6B) The Department of Census and Statistics conducted a special MDG Indicator Survey (MDGIS) in 2006–2007, which estimated the net enrollment ratio at 97.5% for 2007. However, in the MDGIS some districts in the northeastern parts of the country were not covered, whereas the school census geographically covers the whole country. The falling net enrollment ratio over the years using the school census data and the difference between the two estimates for 2007 could be partly attributed to the incomplete data on the *pirivenas*, private

Box 4.11 continuation

schools, and absence of coverage of international schools in the school census. It may also be noted that the contribution of private schools and international schools in primary education has been growing in recent years. Based on some assessments, the private schools' contribution to the net enrollment was assessed at about 2.5%, international schools about 3%, and the *pirivenas* about 1%, which together accounts for nearly 6.5% of the observed difference in the two estimates.

This study suggests the need to resolve data-related issues from private schools and *pirivenas* and for initiating a system of collection of basic student data on school education from international schools, given their increasing role in the education system in Sri Lanka. For generating annual population estimates by sex at the district levels, continued coordination between the DCS and RGD should be established. The capacity development for improvements in the methods and procedures for projecting the district-level age-specific sex-disaggregated population for reference age cohorts is desirable to meet the data needs for producing reliable annual estimates of education indicators from the school census data at subnational levels.

[a] Asian Development Bank. 2006. *Regional Technical Assistance on Improving Administrative Data Sources for the Monitoring of the Millennium Development Goal Indicators.* Manila: Asian Development Bank.

Source: Asian Development Bank. 2009. *Pilot Study – Compilation of a Series of Education-Related MDG Indicators Using Administrative Data from the School Census in Sri Lanka.* Consultant's report. Manila (TA 6356-REG).

The administrative data needed to supplement the population census data for estimating the annual population at national and subnational levels by age and sex are the births and deaths registrations, and internal and external migrations. These registration-based statistics are weak in most developing countries. Because it is more efficient to construct these indicators annually using administrative data including indicators at subnational levels and with necessary disaggegations, the NSOs, vital registration office, and other agencies that collect any population-related data should coordinate and pool all available population data. Capacity needs to be built to prepare population projections on an ongoing basis using advanced demographic techniques and models.

Use of Information and Communications Technology in Collecting, Compiling, and Disseminating Education Data

The use of information and communications technology (ICT) infrastructure is an important component in supporting the data collection systems and in improving the data quality and timeliness of statistical products. In the five case study countries, experience on ICT use has a common pattern, with manual data collection and compilation at the local levels and with the use of ICT infrastructure usually at the district or provincial levels. In Mongolia, the computerization begins at the *aimag* (province), in Nepal at the district, in Sri Lanka at the zonal level, and in Viet Nam

at the ministry, with plans to implement ICT at the provincial levels. In Palau, use of ICT begins at the school levels with standardized data collection forms to be filled by school principals and to be sent by e-mail to the Ministry of Education.

The five case study countries use simple databases or spreadsheets, transfer data via e-mail or other electronic media, and have not yet moved to advanced web-based data entry and storage. Thus, data at the local level is compiled manually, with computerization taking place at the district or provincial level, and sent to the central office for consolidation at the national level.

ICT has definite benefits in improving the data quality, timeliness, and dissemination, but it must be realized that ICT alone cannot solve all the problems. The choice of ICT infrastructure should be realistic and should be easily implemented in the current circumstances and also be flexible for future modifications and changes. The decision should be largely driven by the requirements of data and needs of users.

The choice of hardware and software should be influenced by availability of skills and resources to ensure long-term sustainability and future improvements (Powell 2006). Capacity building for using the adopted ICT infrastructure should be an important component in the implementation strategy, and the decision to adopt an ICT infrastructure for collecting education statistics should be carefully planned. Small-scale pilot studies could be undertaken to test the efficacy of the selected infrastructure and to draw lessons before adopting the same infrastructure at the national level. In this regard, the example on Nigeria quoted in an *Infodev* study by Powell (2006, p. 21) will guide the developing countries that are about to reform their ICT infrastructure.

> "...instead of introducing a wide-scale national reform of the whole ICT system, a small scale pilot was implemented at the state of Kano. This helped identify problems and ensure they were ironed out prior to going national. However, before implementing the pilot, a needs analysis was undertaken to identify the most appropriate architecture for the EMIS, resulting in the decision to develop a web-enabled system to support the collection, collation, and reporting of school level data. Advantages of a web-enabled system are ease of access, low maintenance cost, and the fact that one good computer and a server is required. Understandably, it is easier to maintain such a system and virus protection is only needed for one computer."

In the five case study countries, education authorities have consistently made efforts to improve the coverage and quality of school enrollment statistics. The experience of the five countries highlights the complexities involved in using administrative data sources for establishing reliable EMIS using administrative data collected by the education authorities. While increased emphasis is needed on computerizing the processes in collecting and compiling the data to address quality and timeliness issues, computerization alone cannot resolve all the issues. Adequate steps are needed to improve data quality and coverage and to address data gaps. Staff capacity issues, such as regular training, development of manuals, guidelines, and instructions to collect data, and putting in place quality control mechanisms, are needed. Promoting the culture of use of data for evidence-based planning and policy making as well as for building accountability in the education system will also contribute immensely to improvements in data coverage and data quality.

KEY POINTS

→ The adoption of goals and targets by national governments and international agencies under international initiatives, such as the EFA and the MDGs has led to the need for objective data in monitoring the progress toward the attainment of the goals and targets.

→ Government ministries that administer and regulate the education system in a country usually collect and compile education-related information from education establishments.

→ Education statistics come from three major sources namely censuses of population and housing, household socioeconomic surveys conducted by NSOs, and school-based censuses and surveys conducted by education authorities. Due to differences in methodologies, estimates from these sources are seldom comparable but they provide a good mechanism to cross-check and cross-validate data.

→ To facilitate international comparability of education statistics compiled by national authorities, the United Nations Educational, Scientific and Cultural Organization, the lead international agency on education, developed concepts and definitions, calculation methods, and classification systems.

→ Administrative data collected from the school establishments and other administrative sources are a major source for generating a number of education indicators with the necessary frequency and breakdown by age, sex, geographic area, and other relevant disaggregations. As such, administrative data serve as the principal source of statistics for monitoring education-related MDG targets and for the maintenance of EMIS of countries.

→ MDG indicators 2.1—net enrollment ratio (Adjusted), 2.3—proportion of pupils starting grade 1 who reach the last grade of primary, and 3.1—ratio of girls to boys in primary and secondary—can be compiled regularly from the school statistics collected annually by education authorities from schools.

→ Quality issues in compiling indicators from school administrative records have restricted their use for statistical purposes. Some of the most common issues include (i) incomplete coverage due to nonresponse or noncoverage of private schools, (ii) poor records and lack of quality control mechanisms, (iii) misreporting of data, and (iv) nonconformity with statistical standards.

→ Use of data for evidence-based educational planning and policy making is an important step in improving data availability, relevance, quality, and timeliness. Use of instruments, such as school report cards and school improvement plans are important instruments in improving and using education statistics.

→ Timely and reliable estimates of the reference population at the subnational levels disaggregated by age and sex are needed as denominator for many indicators. Lack of reliable data on reference population by age and sex due to absence of good registration systems on births, deaths, and migration in developing countries restricts the utility of administrative data in producing reliable indicators at subnational levels and by desired disaggregates. These can however be met by systematic coordination between the NSO and other agencies that are responsible for the registration systems.

→ Use of ICT in collecting, compiling, and disseminating education statistics should be guided by the requirements of the data and the user. The hardware and software choice should also depend on the skills and resources available and with a view of sustainability of the system. Capacity building using the adopted ICT infrastructure should be an important component of any ICT implementation strategy.

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CHAPTER 5

ADMINISTRATIVE DATA FOR HEALTH STATISTICS

Adequate, timely, and reliable health statistics are needed to monitor the attainment of health goals and targets and for accurate measurement of the health of the population. Administrative data collected by health ministries and/or authorities through routine reporting by the health facilities and institutions offer much potential for tracking health resources, inputs, outputs, and outcomes, and for generating disaggregated indicators relevant for health planning and policy formulation. However, deficiencies and weaknesses plague administrative data systems in developing countries, resulting in low data quality. This chapter examines the use of administrative data collected routinely from health facilities and institutions in the health information system of a country. It discusses the issues affecting the quality of administrative-based health statistics, with the view to strengthening their use for managing the health system and monitoring health goals and targets including the Millennium Development Goals (MDG). Experiences of the five case study countries of Mongolia, Nepal, Palau, Sri Lanka, and Viet Nam in their compilation of MDG and other health-related indicators serve as the basis for drawing up suggested recommendations.

5.1 HEALTH FOR ALL AND THE MILLENNIUM DEVELOPMENT GOALS

Health for All is "*The attainment by all the people of the world of a level of health that will permit them to lead a socially and economically productive life*" (WHO 1998).

Internationally, targets have been set for achieving "Health for All", which has served as an important focal point for the health strategy of the World Health Organization (WHO) and of many countries. In May 1998, WHO adopted at the 51st World Health Assembly a resolution in support of the new global Health for All policy—*Health-for-All in the twenty-first Century*. This policy succeeded the earlier Health for All by the Year 2000 strategy launched in the World Health Assembly in 1977 and adopted at Alma-Ata Conference in 1978. The new policy, with its 10 targets, aims at a shared vision for all countries and to motivate all member states to take country-specific actions and set priorities for resource allocation. Box 5.1 provides the 10 targets in the renewed WHO's Health for All policy.

Box 5.1:   Global Health Targets

A. Health Outcomes
- By 2005, **health equity indices** will be used within and between countries as a basis for promoting and monitoring equity in health. Initially, equity will be assessed on the basis of a measure of child growth.

- By 2020, the targets agreed at world conferences for **maternal mortality rates** (<100/100000 live births), **under 5** years or **child mortality rates** (<45/1000 live births), and **life expectancy** (>70 years) will be met.

- By 2020, the **worldwide burden of disease will be reduced substantially**. This will be achieved by implementing sound disease control programmes aimed at reversing the current trends of increasing incidence and disability caused by tuberculosis, HIV/AIDS, malaria, diseases related to tobacco, and violence or trauma.

- Measles will be eradicated by 2020. Lymphatic filariasis will be eliminated by the year 2020. The transmission of Chagas' disease will be interrupted by 2010. Leprosy will be eliminated by 2010, and trachoma will be eliminated by 2020. In addition, vitamin A and iodine deficiencies will be eliminated before 2020.

B. Intersectoral Action on Determinants of Health
- By 2020, all countries, through intersectoral action, will have made major progress in making available safe **drinking water**, adequate **sanitation**, and **food and shelter** in sufficient quantity and quality, and in managing risks to health from major environmental determinants, including chemical, biological, and physical agents.

- By 2020, all countries will have introduced, and be actively managing and monitoring, strategies that **strengthen health enhancing lifestyles** and **weaken health damaging ones** through a combination of regulatory, economic, educational, organisational, and community based programmes.

C. Health Policies and Systems
- By 2005, all member states will have operational mechanisms for developing, implementing, and monitoring policies that are **consistent with this Health for All policy**.

- By 2010, all people will have **access** throughout their lives to **comprehensive, essential, quality health care, supported by essential public health functions**.

- By 2010, appropriate global and national health information, **surveillance, and alert systems** will be established.

- By 2010, **research policies** and institutional mechanisms will be operational at global, regional, and country levels.

Source: van Herten, L., and H. van de Water. 1999. New global health for all targets. *BMJ* 319 (7211): 700–703.

The Millennium Declaration that was adopted in September 2000 included goals and targets that were aimed at eradicating hunger, improving maternal and child health, and combating HIV/AIDS and other diseases. The health-related goals and targets in the MDG framework, as they stand after a revision in January 2008, are given in Table 5.1.

Table 5.1:   Goals and Targets Related to Health in the Millennium Development Goals Framework

Goals	Targets
Goal 1: Eradicate extreme poverty and hunger	Target 1.C: Halve, between 1990 and 2015, the proportion of people who suffer from hunger
Goal 4: Reduce child mortality	Target 4.A: Reduce by two-thirds, between 1990 and 2015, the under-5 mortality rate
Goal 5: Improve maternal health	Target 5.A: Reduce by three quarters, between 1990 and 2015, the maternal mortality ratio Target 5.B: Achieve, by 2015, universal access to reproductive health
Goal 6: Combat HIV/AIDS, malaria, and other diseases	Target 6.A: Have halted by 2015 and begun to reverse the spread of HIV/AIDS Target 6.B: Achieve, by 2010, universal access to treatment for HIV/AIDS for all those who need it Target 6.C: Have halted by 2015 and begun to reverse the incidence of malaria and other major diseases
Goal 7: Ensure environmental sustainability	Target 7.C: Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation

Source: United Nations. 2008. *Official list of MDG Indicators, Effective 15th January 2008,* Millennium Development Goals Indicators. The official United Nations site for MDG Indicators. New York: United Nations. http://mdgs.un.org/unsd/mdg/Resources/Attach/Indicators/OfficialList2008.pdf

The adoption of international goals and targets led countries to integrate these targets into their national health policies and planning to improve the health conditions of specific target groups and the general population of developing countries. As an example, Box 5.2 provides the goals adopted in Viet Nam's socioeconomic development plan 2006–2010 (Ministry of Planning and Investment 2006) for improving maternal and child health and in combating HIV/AIDS and other diseases. The targets have been defined based on the country's priorities and plans for 2006–2010.

Information needs of health planning. Health planners and decision makers need different kinds of information (WHO 2010, p. 44), including

(i)   health determinants (socioeconomic, environmental, behavioral, genetic factors) and the contextual environments within which the health system operates;

(ii) inputs to the health system and related processes, including policy and organization, health infrastructure, facilities and equipment, costs, human and financial resources, and health information systems;

(iii) the performance or outputs of the health system, such as availability, accessibility, quality and use of health information and services, responsiveness of the system to user needs, and financial risk protection;

(iv) health outcomes (mortality, morbidity, disease outbreaks, health status, disability, well-being);

(v) health inequities in terms of determinants, coverage of use of services, and health outcomes; and

(vi) key stratifiers, such as sex, socioeconomic status, ethnic group, and geographic location.

Box 5.2:   Viet Nam's Health Goals in The Five-Year Socio-economic Development Plan 2006–2010

- Reduce the birth rate to achieve a natural average substitution rate no later than 2007 for the whole country and in remote, isolated, and poor areas no later than 2010.
- Reduce the infant mortality rate to 16/1,000 by 2010.
- Reduce the under-5 mortality rate to 25/1,000 by 2010.
- Reduce the under-5 malnutrition rate to 20% by 2010.
- Reduce the underweight birth rate (under 2.5 kg) to 5% by 2010.
- Reduce the maternal mortality rate to 60 per 100,000 live births by 2010 with special attention to remote and advantageous areas.
- Improve postnatal health of mothers.
- Slow the speed of HIV/AIDS to a prevalence rate of less than 0.3% of population by 2010.
- Continue eradicating polio and minimize the incidence of cholera and related deaths, typhoid, petechial fever, malaria, and bubonic plague.

Source: Ministry of Planning and Investment. 2008. *Viet Nam Continues to Achieve the Millennium Development Goals*. Ha Noi: Ministry of Planning and Investment.

Decision makers and the public need information to identify existing problems, set priorities, develop and evaluate policies and plans, guide research and development, set standards and guidelines, monitor progress, and be informed. They must have ready access to accurate information on the health hazards associated with development and the environment (Von Schirnding 2002).

Information needs also vary at the different levels of the health system. These will vary for patients, local community, and district, regional, and national levels. Accordingly, data collection and reporting tools should vary from one level of the health system to the next. Information needs and reporting tools for different levels must be identified so that only relevant information for each level are collected and the system is not overburdened (Figure 5.1) (Health Metrics Network 2008).

Figure 5.1: Information Needs and Tools at Different Levels of Data Collection

Level of data collection	Quantity of data	Information needs	Information tools
Global/Regional	Less	Summary indicators for global reporting e.g., MDGs, UNGASS	Global/Regional summary reports
National		Summary indicators for national needs, e.g., strategic planning and resource allocation	National summary reports
District		Indicators for district and national reporting and planning	District summary reports
Facility		Facility management, audit, planning, drug procurement	Facility registers, logbooks
Patient		Patient care	Patient charts
Household and community	More	Understanding population burden of disease and risks; Monitoring and evaluation of CBOs	Household surveys, census, civil registration, and demographic surveillance

CBO = community-based organization, MDG = Millennium Development Goal, UNGASS = UN General Assembly Special Session on HIV/AIDS.
Source: Health Metrics Network. 2008. *Framework and standards for country health information systems*. Geneva: World Health Organization. p. 11.

The above information needs, coupled with the international initiatives, goals, and targets, such as the MDGs, identify a number of monitoring indicators related to health, morbidity, and mortality. This has led to a growing attention to and focus on establishing sound information systems to provide timely and reliable data for monitoring at the international, regional, national, and subnational levels.

5.2 SOURCES OF HEALTH STATISTICS

The health information system. To meet the data needs of health planners and to monitor the goals and targets set in the policies and plans, health authorities in countries establish health information systems (HIS). WHO (2004) defines an HIS as:

> *A system that integrates data collection, processing, reporting, and use of the information necessary for improving health service effectiveness and efficiency through better management at all levels of health services.*

It further defines a health management information system (HMIS) as:

> *An information system specially designed to assist in the management and planning of health programmes, as opposed to delivery of care.*

HMIS in general refers to the information system based on the health facility recording and reporting system designed to aid health management.

The health information system provides the underpinnings for decision making and has four key functions: (i) data generation, (ii) compilation, (iii) analysis and synthesis, and (iv) communication and use. The health information system collects data from health and other relevant sectors, analyzes the data and ensures their overall quality, relevance and timeliness, and converts the data into information for health-related decision making (WHO 2010, p. 44).

An HIS has several data sources. These data are generated usually in two ways: (i) directly from the population (**population-based data source**), and/or (ii) from the health service records of health facilities and institutions (**health service based** or **institution-based data sources**) (Health Metrics Network 2008). Various data sources within these two broad sources are shown in Figure 5.2.

Population-based data are collected through the (i) censuses, (ii) household surveys, and (iii) civil registration systems.

Institution-based data include data collected at the institutions level relating to (i) individual health records, (ii) health service records, and (iii) health resource records.

Figure 5.2:   Health Information Data Sources
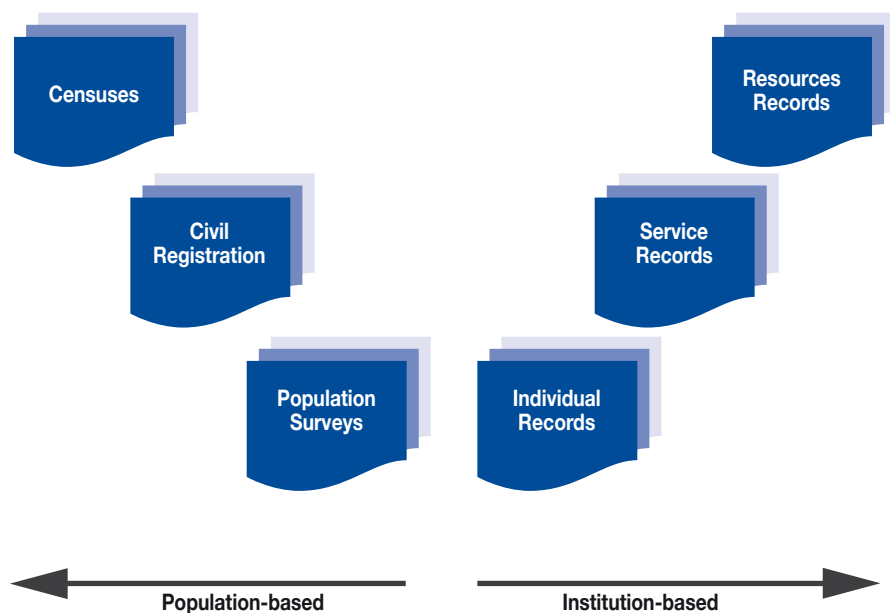
Source: Health Metrics Network. 2008. *Framework and Standards for Country Health Information Systems*. Geneva: World Health Organization. p. 22.

The above data sources can be classified into three classical sources of data, namely, (i) censuses; (ii) household surveys; and (iii) administrative data, comprising civil registration system and institution-based sources.

The civil registration system and institution-based data sources (individual records, service records, and resources records) can be grouped into a broad category of **administrative data sources.** These data are generated as a by-product of either the administrative activity of registration of vital events, such as births, deaths, marriages, and divorce, or generated routinely from administrative recording and reporting by health institutions in the health system. When data are gathered routinely and systematically from health facilities based on standardized records and formats prescribed by the health authorities, these provide good resources for compiling health statistics.

The administrative data sources are a major source for health information, especially those on health systems resources and service provisions, while population censuses and household surveys serve as supplementary sources for some topics, including to generate baseline data as well as data to validate those produced by

administrative sources. The Health Metrics Network[1] has contributed significantly to the understanding of various sources of data and their interrelations in an HIS. For detailed discussion on the conceptual framework of the HIS and the sources of data, the readers may refer to *Framework and Standards for Country Health Information Systems*, Second Edition, Health Metrics Network, WHO (June 2008). A brief discussion on the different data sources for health information drawn from this publication is given in the following paragraphs.

Censuses

The national statistics offices (NSOs) usually conduct population and housing censuses. Population censuses can cover a limited number of topics on health. The information on population structure by age, sex, and other characteristics obtained from the census are essential for health planning at the local and national levels. In countries where the civil registration systems are weak, population census is a possible means of collecting data on fertility and mortality. The updated *Principles and Recommendations for Population and Housing Censuses Rev. 2* (UN 2008) identifies population census as a possible source of data for a number of MDG indicators including maternal mortality ratio.

Household Surveys

Household surveys are the only source of data for constructing many statistical indicators, including MDG indicators in the developing countries. A large majority of health-related MDG indicators are currently generated through household surveys, such as the demographic and health survey, multiple indicators cluster survey, and reproductive health survey. These surveys, apart from providing the data for some MDG indicators, are also a source for compiling a host of information on child and maternal health and nutrition, out-of-pocket expenses on health, health status satisfaction, and evaluation. However, surveys have their limitations in providing reliable estimates of indicators at subnational levels due to inadequacy of sample size. In developing countries, the absence of good quality civil registration systems has increased reliance on these surveys to meet short-term data needs. Experience in developing countries suggests that these surveys have usually been undertaken with technical and financial assistance from development partners in collaboration with the NSO and/or the Ministry of Health.

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[1] The Health Metrics Network (HMN) was launched in 2005 as a global health partnership to help countries and other partners improve global health by strengthening the systems that generate health-related information for evidence-based decision making.

With households being the ultimate receivers of health services, household surveys can provide information for a better understanding of the more complex issues of interrelations of health and poverty, health shocks, use of public and private health services, household expenditure on health services, and the quality of health services in the public and private sectors. Such analysis is not feasible in a census or in an administrative data collection system. However, sample survey estimates are usually available only at the national level because producing estimates at subnational levels further disaggregated by rural–urban, age, sex, ethnicity, and other population characteristics requires large sample sizes.

Administrative Data

Civil registration. Civil registration systems, usually established as a registry for vital events, such as births, deaths, marriages, and divorces, are important sources of vital statistics. The responsibility for collecting, compiling, and disseminating vital statistics from the civil registration systems may be shared among the NSO, the ministry of home affairs or local government, and the Ministry of Health, and practices vary from country to country.

The greatest advantage of the civil registration system is that it enables routine collection and compilation of vital statistics for monitoring health outcomes by different disaggregations—geographic, rural–urban, age, and sex—on an ongoing basis. Thus, it provides insights into the health issues of small areas. Complete and timely civil registration systems are considered the gold standard for reliable vital statistics, especially those on infant, child, and maternal mortality and for causes of deaths. Given their significance in developing mortality statistics and in compiling few critical MDG indicators for MDG monitoring, civil registration systems are discussed separately under the chapter on civil registration systems and vital statistics.

Institution-based.[2] These include health records of individuals, records of service delivery, and health resource records generated routinely at health facilities and institutions. These are also referred to as routine health information and are the main focus of this chapter. These records are generated as a result of administrative and operational activities of the health system largely at the health facility level. They include documents and case records of individual patients based on in-patient and out-patient consultations, treatment and discharge; notification and documentation of individual cases of disease and other health events captured by surveillance systems and vertical disease programs; and data on the provision of clinical services or health status at the time of clinical encounters, which are generated routinely during the

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[2]   In this chapter, this means health authorities' routine collection of data from health facilities and institutions, to manage and monitor a country's health system.

recording and reporting of services delivered. Among the more important data from these institution-based records are morbidity and mortality among the people availing of services; the services delivered; drugs and commodities provided; and human and financial resources.

Institution-based records include the service records not only of health service providers but also the records of events with important health consequences produced in other sectors, such as police, veterinary services, environmental health authorities, insurance companies, and occupational health agencies. The type of events covered will include unintentional injuries, homicides, suicides, road traffic accidents, environmental and meteorological incidents, and alerts on food and product safety.

Resource and administrative records include data on the density and distribution of health facilities, human resources for health, budgets and expenditures, drugs and other core commodities, and key services. Resource records help identify geographical areas that are deficient in terms of availability of inputs and resources for strategic planning purposes and to help in the equitable distribution of health services and inputs.

Government budget and expenditure documents are another important administrative source of information on financing of health expenditures. The methodology for compiling health accounts has been developed to track the flow of the financial resources used in the health sector. For policy development and strategic planning, financial data is compiled using the methodology for national health accounts[3] (Health Metrics Network 2008, p. 35).

The coverage of institution-based administrative data should include all health facilities of the public and private sector institutions and of the community and civil society organizations.

Timely and reliable information on health issues is essential to enable actions on public health delivery systems. Evidence from the five case study countries however suggests that the HIS in most countries is weak because of lack of sufficient resources. Available data also remain unused because either users do not get hold of

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[3] National health accounts is a tool for the systematic, comprehensive, and consistent monitoring of resource flows in a national health system. It provides a framework with standard definitions, boundaries, classifications, and a set of interrelated tables for standard reporting of expenditures on health and its financing. National health accounts are designed to capture the resource flows for the main functions of health-care financing, namely: resource mobilization and allocation; pooling and insurance; purchasing and providing of care; and the distribution of expenditures by disease, socioeconomic characteristics, and geopolitical areas (Health Metrics Network 2008, p.60).

the data, or lack the capacity to interpret statistics and indicators for planning and formulating policies. This situation has led to the limited use of these information systems to effectively monitor health goals and progress.

5.3 ADMINISTRATIVE DATA AS SOURCES FOR HEALTH STATISTICS AND INDICATORS

Organization of Administrative Data Collection in the Health Sector

Multiple data sources produce health statistics that can be used to compile health-related indicators. Each of these data sources have their advantages and limitations and cannot meet all the information needs of a country. Often, a combination of sources may lead to better information, while in others, possible duplications may be avoided. Multiple data sources may also provide a measure of cross-checking the quality of the data and can be used as a measure for improving overall data quality.

In most developing countries of the Asia and the Pacific region, the ministry that administers and regulates the health care and delivery system also collects a large amount of data routinely reported by the health facilities. The discussion on administrative data sources for health statistics in this chapter largely covers institution-based health data. Civil registration systems that are another major administrative source are discussed in the next chapter.

Health facilities, usually spread throughout the country, constitute the basic units of information collected from individual, service, and resource records at the health facility and institution levels. These data, collected as a by-product of health administration and management, offer much potential for tracking health resources, inputs, outputs, and health outcomes, and is a major constituent of the HIS managed by health ministries. For uniformity in the collection of data and its meaningful analysis, the health ministry prescribes standardized registers and records to be maintained at the health facility, and formats for reporting the data periodically to authorities at higher levels. The reporting period depends on the type of information and its required monitoring frequency.

Each of the five case study countries had established an HIS according to the structure of the health delivery system in their respective countries. Ministries of health have one or more divisions and/or units that collect and compile data for health statistics.

Health Indicators

A number of indicators are widely used to measure the inputs to health systems, outputs, or performance; to identify trends in disease and mortality; and to monitor and evaluate the health system. The indicators of health can be broadly grouped into (i) health status (mortality and morbidity), (ii) health service coverage, (iii) health risk factors, and (iv) health system resources.

Table 5.2 lists some key health indicators under these groupings. Many of these indicators can be compiled using either population-based (vital registrations) or institution-based (administrative) data sources discussed above. Along with needed reference population data for denominators and data on gross domestic product and gross national product, etc., the administrative data sources provide a valuable and cost-effective data source that can be used to regularly compile selected indicators.

Table 5.2:   Key Indicators of Health

1. Health Status
Mortality 　　Neonatal mortality rate (per 1,000 live births) 　　Infant mortality rate (per 1,000 live births)[a] 　　Under-5/child mortality rate (probability of dying by age 5 per 1,000 live births)[a] 　　Adult mortality rate (probability of dying between 15 to 60 years per 1,000 population) 　　Age-standardized mortality rates by cause (per 100,000 population) 　　Maternal mortality ratio (per 100,000 live births)[a] 　　Crude death rate (CDR) 　　Life expectancy at birth (years) 　　Healthy life expectancy (HALE) at birth (years) 　　Deaths due to HIV/AIDS (per 100,000 population) 　　Deaths due to tuberculosis (per 100,000 population)[a] 　　Death due to malaria (per 100,000 population)[a] *Morbidity* 　　Adult HIV prevalence rate[a] 　　Prevalence of anemia (children under 5; pregnant women) 　　Incidence of malaria [a] 　　Incidence of tuberculosis [a]
2. Health Service Coverage
Immunization against infectious childhood diseases 　　Children immunized against measles [a] 　　Children under 5 with diarrhea receiving oral rehydration therapy (ORT) 　　Antenatal care coverage [a] 　　Newborns protected against tetanus 　　DOTS detection rate [a] 　　Contraceptive prevalence rate [a] 　　Percent/proportion of births attended by skilled health personnel [a]

Table 5.2 continuation

3. Risk Factors
Low birth-weight newborns (percentage) Prevalence of child malnutrition Prevalence of underweight children [a] Prevalence of stunted children/Children under 5 stunted (%) Prevalence of wasted children Percent of population below minimum level of dietary energy consumption [a] Percent/proportion of population with access to improved water source [a] Percent/proportion of population with access to improved sanitation facilities [a] Prevalence of current tobacco use among adults aged ≥ 15 years (percentage)
4. Health Systems Resources
Human resources Density of community health workers (per 10,000 population) Density of medical doctors (per 10,000 population) Density of nursing and midwifery personnel (per 10,000 population) *National health accounts* External resources for health as a percentage of total expenditure on health General government expenditure on health as a percentage of total expenditure on health *Facilities* Percent of population with access to primary health care facilities Hospital bed–population ratio

DOTS = directly observed treatment short-course.
[a] MDG indicator.
Source: Indicators selected from WHO Statistical Information System (WHOSIS). 2008. Indicator definitions and metadata. http://www.who.int/whosis/indicators/compendium/2008/en/#mort; World Health Organization. 2010. *World Health Statistics Indicator Compendium*. Interim version. http://www.who.int/whosis/indicators/WHS10_IndicatorCompendium_20100513. pdf; Asian Development Bank. 2004. *Development Indicators Reference Manual, Concepts and Definitions.* Manila: Asian Development Bank.

International agencies, such as WHO, have established technical standards for collecting and compiling internationally comparable statistics and indicators. The definitions, computation methods, data sources, and the limitations of these data sources and indicators are documented by United Nations agencies for the guidance of data producers and users. Some of the relevant publications are listed below and readers interested in the technical details can access these publications from the websites of the publishing agencies. Some of these have been extensively referred to and used in preparing some of the sections of this chapter.

(i)   WHO Statistical Information System (WHOSIS), World Health Organization. 2008. Indicator definitions and metadata. http://www.who.int/whosis/ indicators/compendium/2008/en/#mort

(ii) World Health Organization. 2010. *World Health Statistics, Indicator Compendium.* Interim version. http://www.who.int/whosis/indicators/ WHS10_IndicatorCompendium_20100513.pdf

(iii)   United Nations. 2003. *Indicators for Monitoring the Millennium Development Goals: Definitions, Rationale, Concepts and Sources*. New York: United Nations.   http://unstats.un.org/unsd/mdg/Host.aspx?Content=Indicators/Handbook.htm

(iv)   United Nations. Millennium Development Goals Indicators. The official United Nations site for MDG Indicators. http://unstats.un.org/unsd/mdg/Metadata.aspx?IndicatorId=0&SeriesId=711 Metadata developed for the MDG indicators for monitoring of education-related MDG indicators. This site provides detailed methods of compiling the indicators and the data sources used, and their limitations in compiling international datasets.

5.4   HEALTH-RELATED MILLENNIUM DEVELOPMENT GOALS INDICATORS AND USE OF ADMINISTRATIVE DATA

To monitor health-related goals and targets, the MDG program included the indicators shown in Table 5.3. These goals and targets relate to monitoring the progress toward improving nutrition, reducing child mortality, improving maternal health, combating HIV/AIDS, tuberculosis, and other diseases, and other indicators related to health and environmental sustainability. One-third of the indicators included in the MDG framework relate to monitoring the progress made in improving the health conditions of the population. As many as half of these indicators can be compiled on an ongoing basis using data generated from the civil registration systems and from the institution-based data sources from routine reports of the health facilities.

Table 5.3:   Health and Health-Related Millennium Development Goals, Targets and Indicators

Goal 1: Eradicate extreme poverty and hunger	
Target 1.C: Halve, between 1990 and 2015, the proportion of people who suffer from hunger	1.8 Prevalence of underweight children under 5 years of age 1.9 Proportion of population below minimum level of dietary energy consumption
Goal 4: Reduce child mortality	
Target 4.A: Reduce by two-thirds, between 1990 and 2015, the under-5 mortality rate	4.1 Under-5 mortality rate 4.2 Infant mortality rate 4.3 Proportion of 1 year-old children immunized against measles
Goal 5: Improve maternal health	
Target 5.A: Reduce by three quarters, between 1990 and 2015, the maternal mortality ratio	5.1 Maternal mortality ratio 5.2 Proportion of births attended by skilled health personnel

Table 5.3 continuation

Target 5.B: Achieve, by 2015, universal access to reproductive health	5.3	Contraceptive prevalence rate
	5.4	Adolescent birth rate
	5.5	Antenatal care coverage (at least one visit and at least four visits)
	5.6	Unmet need for family planning
Goal 6: Combat HIV/AIDS, malaria and other diseases		
Target 6.A: Have halted by 2015 and begun to reverse the spread of HIV/AIDS	6.1	HIV prevalence among population aged 15–24 years
	6.2	Condom use at last high-risk sex
	6.3	Proportion of population aged 15–24 years with comprehensive correct knowledge of HIV/AIDS
	6.4	Ratio of school attendance of orphans to school attendance of non-orphans aged 10–14 years
Target 6.B: Achieve, by 2010, universal access to treatment for HIV/AIDS for those who need it	6.5	Proportion of population with advanced HIV infection with access to antiretroviral drugs
Target 6.C: Have halted by 2015 and begun to reverse the incidence of malaria and other major diseases	6.6	Incidence and death rates associated with malaria
	6.7	Proportion of children under 5 sleeping under insecticide-treated bednets
	6.8	Proportion of children under 5 with fever who are treated with appropriate anti-malarial drugs
	6.9	Incidence, prevalence, and death rates associated with tuberculosis
	6.10	Proportion of tuberculosis cases detected and cured under directly observed treatment short course
Goal 7: Ensure environmental sustainability		
Target 7.C: Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation	7.8	Proportion of population using an improved drinking water source
	7.9	Proportion of population using an improved sanitation facility

Source: United Nations. Millennium Development Goals Indicators. The official United Nations site for MDG Indicators. http://mdgs.un.org/unsd/mdg/Resources/Attach/Indicators/OfficialList2008.pdf

The national and international monitoring of MDGs has given rise to challenges related to the timely availability of quality data needed to compile the prescribed MDG indicators. Further, issues of health equity within a country necessitates that these indicators be available at the subnational levels, disaggregated by rural–urban, sex, ethnicity, and by the disadvantaged sections of society. As a result, administrative data collected by the health authorities through facility reporting systems (and civil registration systems) are a rich source of many of these indicators.

Administrative sources of vital registration records and the facility reporting system of routine health service information and administrative data systems of the national health authorities are viable sources for compiling MDG indicators (or parts of the indicator) 4.1, 4.2, 4.3, 5.1, 5.2, 5.4, 5.5, 6.6, 6.9, and 6.10. Some of the MDG indicators that can be compiled using administrative data sources are briefly reviewed and

discussed below. The MDG indicators of infant, child, and maternal mortality, namely MDG indicators 4.1, 4.2, and 5.1, respectively, and MDG indicator 5.4 on adolescent birth rate are discussed in chapter 6. This is because a fully functional and complete civil registration system with good recording of causes of death is considered the most appropriate source for compiling these indicators.

The definitions, data needs, and the data limitations in compiling the MDG indicators using administrative data systems are briefly discussed in Boxes 5.3 to 5.7. Practices followed in the five case study countries and relevant issues in their compilation are also presented. Alternative data sources, such as sample surveys used in compiling these indicators, where applicable, have also been briefly mentioned. Readers interested in greater details can refer to the publications of the international organizations cited earlier in this chapter.

Box 5.3:   Millennium Development Goal Indicator 4.3: Proportion of 1 Year-Old Children Immunized against Measles

Definition. This is the percentage of children under 1 year of age who have received at least one dose of measles-containing vaccine in a given year. For certain countries, the immunization is recommended from the ages of 12 to 15 months.

$$\text{Proportion of 1-year olds immunized against measles} = \frac{\text{Number of doses administered}}{\text{Number of children in target group}} \times 100$$

This indicator provides a measure of the coverage and the quality of child health care system in the country. Immunization is considered an essential component for reducing under-5 mortality.

Desired disaggregations. Sex and geographical location (region, rural–urban)

Data required and source. Administrative records of service and/or facility reporting systems, on total number of vaccinations given to the target age children by service providers (e.g., district health centers, vaccination teams, physicians) for the numerator. For the denominator, population estimates for the reference age-group based on census projections is used. The data coverage should include reports of vaccinations performed by all service providers including public and private hospitals, health centers, and physicians for completeness of coverage for the numerator.

Alternative data sources for this indicator are household surveys that canvass information on children's vaccination history (coverage surveys), such as the Expanded Programme on Immunization 30-cluster survey, the multiple indicator cluster survey, and the demographic and health survey that canvass and collect data on the vaccination history of children to estimate vaccinations given.

Box 5.3 continuation

Administrative data from immunization records of health authorities have been used as a source for compiling this indicator in Mongolia, Palau, and Viet Nam, while the demographic and health surveys have been the preferred data sources in Nepal and Sri Lanka for national Millennium Development Goals monitoring.

Data limitations. Administrative reporting of vaccination coverage may not cover all the health facilities. In particular, those from the private sector may fail to report, leading to an underestimation of the numerator and the vaccination coverage. Use of administrative data needs reliable estimates for the reference population. Biased estimates of the indicator can be the result of inaccurate denominator values. Population projections from population census may overestimate the denominator leading to a low bias of coverage, while an underestimation will inflate the estimate of coverage. Values may exceed 100%, which is more of an error in the ascertainment of the numerator or the denominator or inclusion of children outside the target age group in the numerator. This problem is more complex when the indicator coverage is compiled for the subnational levels—provinces and districts.

When these estimates are based on household surveys, they will have the usual disadvantages of a sample survey. Coverage levels greater than 100% could arise due to recall bias when the proportion of vaccinations based on maternal recall is high.

Source: WHO 2010; United Nations 2003; United Nations. Millennium Development Goals Indicators. The official United Nations site for MDG Indicators. http://mdgs.un.org/unsd/mdg/Metadata.aspx; country reports of assessment study for improving administrative data sources for the monitoring of MDG indicators for Mongolia, Nepal, Palau, Sri Lanka, and Viet Nam (ADB 2009a, 2009b, 2009c, 2009d, 2009e).

Box 5.4:   Millennium Development Goal Indicator 5.2: Proportion of Births Attended by Skilled Health Personnel

Definition. This is the percentage of deliveries attended by personnel trained in providing life-saving obstetric care, including giving the necessary supervision, care, and advice to women during pregnancy, labor, and the post-partum period; in conducting deliveries on their own; and in caring for newborns. Traditional birth attendants, even if they receive a short training course, are not included.

$$\text{Proportion of births attended by health personnel} = \frac{\text{Number of women aged 15–49 with live birth attended by skilled health personnel}}{\text{Total number of women aged 15–49 with a live birth in the same period}} \times 100$$

This indicator measures the access of women to skilled health care during pregnancy and at delivery to ensure detection and management of complications.

Desired disaggregations. Geographical location (region, rural–urban)

Box 5.4 continuation

Data required and source. Household surveys are the preferred sources of data for this indicator. However, facility reporting systems are the other possible sources of data, which is used in many countries. When based on administrative data from the service and/or health facility, the numerator is derived from reports of the relevant health facilities. The denominator is based on the total number of live births in the same period from reports of the same health facilities, or is derived from the civil registration records on the number of live births during the same period.

If appropriate questions are provided in the birth registration forms under the civil registration system capturing the type of medical attendance availed by the mother at the time of child birth, the data for the numerator as well as the denominator can be derived from the civil registration system. Alternatively, estimates are derived from household surveys, such as the multiple indicator cluster survey and demographic and health survey, conducted usually every 3 to 5 years.

For national Millennium Development Goals monitoring purposes, the indicator is compiled from administrative data sources in Mongolia, Palau, and Viet Nam, while in Nepal and Sri Lanka, the indicator has been estimated from the demographic and health survey for the survey years.

Data limitations. The health facility data have the same limitations as discussed for indicator 4.3. The administrative data reporting system from health facilities may overestimate the proportion of births attended by skilled professional because the denominator might not capture all women who deliver outside of health facilities, or because the denominator is based on incomplete registration of live births. It is preferred that service and/or facility administrative statistics be used where very high proportions of births take place in health facilities, and that reporting includes at least 90% coverage. When the denominator is based on vital registration, it is desirable that at least 90% of births are registered.

When based on household surveys, the value of the indicator may be inflated because of the inclusion of providers that are not considered skilled, such as community health workers, under the term skilled health personnel.

Source: WHO 2010; United Nations 2003; United Nations. Millennium Development Goals Indicators. The official United Nations site for MDG Indicators. http://mdgs.un.org/unsd/mdg/Metadata.aspx; country reports of assessment study for improving administrative data sources for the monitoring of MDG indicators for Mongolia, Nepal, Palau, Sri Lanka, and Viet Nam (ADB 2009a, 2009b, 2009c, 2009d, 2009e).

**Box 5.5: Millennium Development Goal Indicator 6.6:
Incidence and Death Rates Associated with Malaria**

Definition. The number of **reported cases** of malaria is the sum of confirmed cases of malaria (confirmed by slide examination or rapid diagnostic test) and probable (unconfirmed) cases of malaria (cases that were not tested but treated as malaria).

Reported cases of malaria = confirmed cases + probable (unconfirmed) cases

Incidence rate refers to the number of reported new cases of malaria in a given time period, expressed per 100,000 people.

$$\text{Incidence rate} = \frac{\text{Number of reported new cases of malaria in a given time period}}{\text{Population in that given period}} \times 100{,}000$$

Death rate refers to the number of deaths caused by malaria per 100,000 people.

$$\text{Death rate} = \frac{\text{Number of deaths caused by malaria in a particular period}}{\text{Population in that particular period}} \times 100{,}000$$

Desired disaggregations. Sex and geographical location (region, rural–urban)

Data required and source. Data collection on the incidence of malaria is usually through surveillance systems. National malaria control programs often collect data on the number of suspected cases—those tested and those confirmed. Probable or unconfirmed cases are calculated by subtracting the number tested from the number suspected. The data for deaths may come from civil registration systems or from routine reporting from health facilities. The population data is based on projections from the census population.

Multiple indicator cluster surveys collect information on the prevalence of fever in the last 2 weeks for children under 5 years.

For national Millennium Development Goals reporting in Nepal, Sri Lanka, and Viet Nam, the indicator has been sourced from administrative reporting under malaria eradication programs. The indicator is not relevant for Mongolia and Palau.

Data limitations. Data reported by health facilities may not cover all the cases in the population. Reporting may be incomplete and some may report only laboratory-confirmed cases. In settings where cases are identified through clinical signs and symptoms alone, there can be overdiagnosis of malaria. Countries face difficulties in enhancing disease surveillance and face challenges in accurately identifying, diagnosing, and reporting infectious diseases due to the remoteness of communities, lack of transport and communication infrastructure, and shortage of skilled health care workers and laboratory facilities, affecting the accuracy of estimates. The number of deaths, if coming from the civil registration sources, might be underestimated due to incomplete coverage of civil registration and due to misclassification of the cause of death.

Source: WHO 2010; United Nations 2003; United Nations. Millennium Development Goals Indicators. The official United Nations site for MDG Indicators. http://mdgs.un.org/unsd/mdg/Metadata.aspx; country reports of assessment study for improving administrative data sources for the monitoring of MDG indicators for Mongolia, Nepal, Palau, Sri Lanka, and Viet Nam (ADB 2009a, 2009b, 2009c, 2009d, 2009e).

Box 5.6:   Millennium Development Goal Indicator 6.9: Incidence, Prevalence, and Death Rates Associated with Tuberculosis

Definition. Incidence rate is the estimated number of new tuberculosis (TB) cases arising in a year per 100,000 population. All forms of TB are included, as are cases in people with HIV.

$$\text{Incidence rate} = \frac{\text{Estimated number of new TB cases in a period}}{\text{Population in that given time}} \times 100{,}000$$

Prevalence rate is the number of cases of TB (all forms) in a population at a given point in time (sometimes referred to as point prevalence). It reflects the number of cases per 100,000 population. Estimates include cases of TB in people with HIV.

$$\text{Prevalence rate} = \frac{\text{Number of cases of TB in a population at a given time}}{\text{Population in that given time}} \times 100{,}000$$

Death rate is the estimated number of deaths due to TB in a given time period expressed as per 100,000 population per year. Deaths from all forms of TB are included. Deaths from TB in people with HIV are included.

$$\text{Death rate} = \frac{\text{Number of deaths due to TB in a given time period}}{\text{Population in that given period}} \times 100{,}000$$

Desired disaggregations. Sex and geographical location (region, rural–urban)

Data required and source. For the estimation of incidence rate, administrative data derived from routine reports of surveillance systems of health services and/or facilities on cases notified is needed. Direct estimates of prevalence rate are not available and are estimated from incidence using variety of techniques. For compiling death rates, the number of deaths due to TB from civil registration systems with complete coverage and a good recording system of the cause of death is preferred. Few countries have complete civil registration systems and the death rates are also computed from incidence. In the absence of complete data on tuberculosis deaths from civil registration, health facility reporting is used in some countries. Data for the population estimate in the denominator come directly or indirectly from population censuses.

Data can also be obtained from household surveys, such as the multiple indicator cluster survey or the demographic and health survey, although they usually refer only to children under 5 and do not provide death rates.

For national Millennium Development Goals reporting, this indicator is compiled in the five case study countries using the administrative data of the Ministry of Health reported routinely under TB prevention programs.

Data limitations. TB mortality can be measured directly only where there is a good civil registration system with complete coverage of vital events and accurate coding of cause of death. The number of patients dying while on TB treatment (as reported in routine follow-up of cohorts of TB patients) is not an indication of true TB mortality, as it includes deaths from causes other than TB, excludes deaths from TB among people not on treatment, and excludes deaths among people that are treated for TB but who are not registered in a routine TB surveillance system.

Source: WHO 2010; United Nations 2003; United Nations. Millennium Development Goals Indicators. The official United Nations site for MDG Indicators. http://mdgs.un.org/unsd/mdg/Metadata.aspx; country reports of assessment study for improving administrative data sources for the monitoring of MDG indicators for Mongolia, Nepal, Palau, Sri Lanka, and Viet Nam (ADB 2009a, 2009b, 2009c, 2009d, 2009e).

**Box 5.7:   Millennium Development Goal Indicator 6.10:
Proportion of Tuberculosis Cases Detected and Cured under Directly
Observed Treatment Short-Course**

Definition. Tuberculosis (TB) **detection rate** is the percentage of estimated new infectious TB cases detected under the internationally recommended TB control strategy directly observed treatment short-course (DOTS). Case detection, as used here, means that TB is diagnosed in a patient and is reported within the national surveillance system, and then to the World Health Organization. **Cure rate** is the percentage of new, registered smear-positive (infectious) cases that were cured or in which a full course of DOTS was completed. At the end of the treatment, each patient is assigned one of the following six mutually exclusive treatment outcomes: cured, completed, died, failed, defaulted, and transferred out with outcome unknown.

$$\text{DOTS detection rate} = \frac{\text{Number of new smear-positive cases detected in DOTS programs and notified to WHO}}{\text{Estimated number of new smear-positive cases for the same year}} \times 100$$

$$\text{Treatment success rate} = \frac{\text{Number of new smear-positive TB cases registered under DOTS in a given year that successfully completed treatment whether with ("cured") or without ("treatment completed") bacteriologic evidence of success}}{\text{Estimated number of incident smear-positive cases for the same year}} \times 100$$

Desired disaggregations. Sex and geographical location (region, rural–urban)

Data required and source. Data on both the detection and the treatment success are reported under country level World Health Organization DOTS programs by health authorities who monitor and report cases detected, treatment progress, and program performance.

In all the five case study countries, data are sourced from the routine reports of the DOTS program being run in the respective countries.

Data limitations. The detection rates depend on the extent of routine surveillance at the country level and the completeness of reporting by the surveillance facilities. The estimates of TB incidence will improve as the TB surveillance improves. The treatment success rates will be affected if the coverage in the reporting system is incomplete, and if the outcomes of the treatment are not recorded and reported adequately for all patients at the health facility level.

Source: WHO 2010; United Nations 2003; United Nations. Millennium Development Goals Indicators. The official United Nations site for MDG Indicators. http://mdgs.un.org/unsd/mdg/Metadata.aspx; country reports of assessment study for improving administrative data sources for the monitoring of MDG indicators for Mongolia, Nepal, Palau, Sri Lanka, and Viet Nam (ADB 2009a, 2009b, 2009c, 2009d, 2009e).

The discussion in Boxes 5.3 to 5.7 is limited to MDG indicators that can be compiled using data collected through the administrative data system of routine reporting from health facilities to the health ministries. The MDG indicators for which civil registration systems are the most preferred sources are discussed separately in chapter 6.

5.5 DATA QUALITY ISSUES: OBSERVATIONS AND LESSONS FROM COUNTRY STUDIES IN USING ADMINISTRATIVE DATA FROM THE HEALTH SECTOR

The health ministries in the five case study countries have established systems of capturing routine health information through reporting systems by prescribing registers, forms, and reporting tools. Data collection begins at the health facility level and information flow is usually from community to health facility, from health facility to district level, from district to regional level, and from regional to central or national level. The HIS in these countries have been evolving and improving over time. Some countries have reviewed their systems to make them more responsive in providing timely and qualitative information for health policy, planning, and decision making at the local and national levels. Several issues affect the quality of the data recorded and reported through the routine reporting of the administrative data collected from the health facilities. These issues have a bearing on the quality of the information and indicators compiled. Some of the important issues are discussed below.

Data Quality Issues

Incomplete coverage

Completeness of health information is compromised due to (i) exclusion of population and communities from the health facility coverage, particularly in the remote and geographically inaccessible or difficult areas; (ii) exclusion of all eligible health facilities, especially the private sector facilities from reporting; and (iii) failure to submit periodic reports on time by the health facilities to the authorities.

While the health facilities and services are primarily provided by the government in all the five case study countries, private sector services are expanding. Except for Mongolia where health reporting regulations include reporting from the private health sector facilities, coverage and reporting by the private sector in the other case study countries is deficient.

Country–specific traditional forms of curative and preventive health systems, such as *ayurveda, unani, siddha*, and *homeopathy,* are also used by a significant proportion of the population and may not be covered in the routine HIS. Thus in interpreting data from health facilities, it is important to note that the exclusion of disease incidence in the population that uses traditional systems of medicine causes an underestimation of the incidence of diseases and remedial measures actually used by the community.

Inefficiency of manual data collection and compilation processes

As seen in the five case study countries, data collection from the health facilities at the local level is usually based on manual recording and reporting by the health staff at the primary level. The staff collect and record data, and prepare reports in addition to their primary responsibilities of providing health service. Computerization has been established usually at the central and regional and/or provincial levels only.

Manual processing leads to errors in data recording and inconsistency apart from delays in data compilation and transmission to the next higher level. Often, too many recording and reporting instruments are prescribed especially at the grass roots levels, overburdening the data collectors.

The data flow from the lower level to the higher authorities is also through traditional means in the absence of computerization and internet connectivity. The dependence on paper and manual form of data collection is likely to continue in most developing countries and computerization at all levels can be implemented in stages, depending on the availability of resources.

Poor quality of reporting and lack of quality control

Incomplete filling out of prescribed forms and medical practitioners' illegible and incomplete reporting of symptoms, diseases, and cause of death, are some of the reasons behind inconsistent and fluctuating data. Quality control mechanisms at the primary data collection levels are also absent, resulting in data errors that are carried forward to the next level.

Service-based health statistics are also prone to misreporting to show higher achievements of targets on disease control, immunizations, child mortality, and maternal mortality.

Lack of adequately trained human resources

Staff assigned to collect, compile, report, and analyze data at the primary and higher levels do not have the requisite statistical background and are usually not well-trained to do these tasks. Absence of regular training programs, instructions, and guidelines for collecting, reporting, compiling, and analyzing data also contribute to the poor quality of statistics.

Specialized skilled staff that could process, encode, and classify data at the district, regional and/or provincial levels and below are usually in short supply, as evidenced from the five case study countries. While well-trained staff are needed at all levels, staff specializing in statistics, biostatistics, statistical packages, and information technology are needed at the central level.

Addressing Data Quality Issues

Much of the data quality issues can be addressed by (i) actively undertaking continuous improvements in the data collection and compilation processes; (ii) reviewing and rationalizing the data collection and reporting tools; (iii) introducing quality control processes; (iv) instituting regular training of staff engaged in collecting, compiling, and analyzing data; and (v) introducing feedback mechanisms at different levels of the data collection system. Some suggestions on these lines are below.

(i) Improve data coverage by ensuring that all eligible health facilities are included in the coverage, and ensuring receipt of filled-in data collection forms from all the health facilities by due date. Follow-up action by the first level of administrative authority should be taken if reports are not received by the due date.

(ii) Consider the option of introducing administrative and/or legal provisions that make it mandatory for private sector health facilities to submit the needed data to health authorities in prescribed forms. This process should be initiated with an open dialogue with the management and/or owners of private health facilities to enlist their support and keep the burden of information at the minimum. Full confidentiality of data collected must be ensured by incorporating adequate provisions in the regulations.

(iii) Prepare guidelines, instructions, and technical manuals explaining the concepts and definitions of data items included (including ICD-10

classification)[4] in the data collection records and registers. This will help achieve uniform understanding of all the data items and consistency in reporting and compiling at all levels. Introduce at least an annual training and orientation program for staff.

(iv)   Motivate health staff who collect and compile data at the health facilities to prioritize and pay attention to collecting data and reporting tasks, emphasizing the role of data in local and national level health planning.

(v)   Aim at an error-free data collection at the primary level. Prepare data quality and consistency checklists for the primary data compilers so that majority of the errors that result from manual compilation of data are checked and addressed at the primary data compilation stage.

(vi)   Assign an administrative authority at the first level to rigorously check the quality of the data submitted by the health facility under its administrative jurisdiction. Promptly refer back errors and inconsistencies to the facility concerned for clarification and correction.

(vii)   Establish regular feedback mechanisms from the higher level to the lower level on the data submitted. For example, in Nepal, data are verified in follow-up meetings in regions by tallying the data of HMIS at the center and the data submitted by the Regional Health Directorate, and making corrections whenever necessary (Box 5.8).

Box 5.8:   Quality Check Systems in the Health Management Information System of Nepal

In Nepal, where a centralized health information system was established in 1993/94 by the Ministry of Health at the center, the following efforts are made to check the quality of data submitted on a monthly basis by the districts to the health management information system (HMIS) section. These steps are useful in checking data quality, providing feedback to the district level and below, and in improving the accuracy and consistency of data collected.

1.   Data received at HMIS section from the districts are reviewed manually for errors before further processing.

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4   ICD or the International Statistical Classification of Diseases and Related Health Problems is a classification maintained by WHO for coding diseases, signs, symptoms, and other factors causing morbidity and mortality; used worldwide for morbidity and mortality statistics, and designed to promote international comparability, collection, processing, classification, and presentation of statistics. The tenth revision of the classification is its latest revision and can be accessed at http://www.who.int/classifications/icd/en/

Box 5.8 continuation

2. Erroneous and/or inconsistent data and coding errors are noted and referred back for correction.
3. The HMIS section conducts follow-up meetings with the statistical assistants and medical recorders at the respective regions for verification. The HMIS section generates the data verification sheet (raw data for all months of the running fiscal year before verification), which are provided to the staff concerned during follow-up meetings for verification. The staff verify and tally the data from the center with their reports and inconsistencies are corrected.
4. Raw data are generated every month for each program by district. The raw data sheet is sent to the respective program division and/or center, Ministry of Health and Population, and National Planning Commission, as well as external development partners for comments.
5. Supervision and monitoring is carried out on a regular basis from the center to district, and from the district to the primary health centers, health posts, and sub-health posts.

Source: Asian Development Bank. 2009. *Country Report of Assessment Study for Improving Administrative Data Sources for the Monitoring of MDG Indicators, Nepal.* Consultant's report. Manila (TA 6356-REG); Ministry of Health and Population, Nepal. 2007. Administrative Data System of Ministry of Health and Population in Nepal. Paper presented at the Asian Development Bank regional workshop for Improving Administrative Data Sources for Monitoring of the Millennium Development Goal Indicators. Bangkok. 9–11 July.

(viii) Conduct internal data audits and monitoring, where higher authorities perform random checks of data reported by health facilities via personal visits. Include inspection of health facility records maintenance in the routine inspections of health authorities.

(ix) Conduct independent and/or joint data audits by data audit teams comprising the NSO and health ministry officials, which also judge data quality issues with regard to application of standard concepts, definitions, and methods. Coordinated efforts between the NSO and the health authorities will go a long way in improving data quality and promoting statistical coordination.

(x) Paper forms are likely to continue to play a major role in recording health service information on individuals in developing countries for many years. Data collection forms and reporting tools should be reviewed to reduce reporting burden and to ensure that only relevant information are collected.

(xi) Improve design of forms to make them user-friendly to facilitate ease in reporting and in extracting data correctly.

(xii) After studying hardware and software needs, computerize data collection and reporting in stages, as resources become available. Staff should be trained for a successful and effective computerized HIS.

(xiii) Make data available to users to promote evidence-based health management and planning at all levels. This serves as an important instrument for planning and leads to improved quality of data. A good HIS should present and disseminate data in appropriate formats to its users.

(xiv) Administrative data-based estimates can be cross-checked with survey-based data when available. While the two sources of data may not be directly comparable, the differences between the two could be the starting point for finding the reasons for the discrepancies. If survey data are considered more reliable and accurate in statistical terms, this should be used to investigate the reasons for large discrepancies, if any, and to take steps to improve the quality of administrative data.

Table 5.4 provides estimates of infant mortality rate (IMR) obtained from administrative sources of the Ministry of Health and those obtained from the reproductive health survey in Mongolia. Although both sources show a declining trend in IMR, the survey-based estimates of IMR are much higher than those obtained from the routine health statistics. The reasons for low estimates from administrative sources could be misclassifications of stillbirths and neonatal deaths, and/or incomplete coverage and reporting from the health facilities.

Table 5.4:   Estimates of Infant Mortality Rate from Administrative Data and Reproductive Health Survey, Mongolia

Data Source	1998	2003	2005
Reproductive health survey	69.3	29.5	…
Administrative data of the Ministry of Health	35.3	23.0	20.7

... = data not available.
Source: Asian Development Bank. 2009. *Country Report of Assessment Study for Improving Administrative Data Sources for the Monitoring of MDG Indicators, Mongolia*. Consultant's report. Manila (TA 6356-REG).

Other Issues in Improving Health Information Systems

Integrated health information systems. Experience from the five case study countries is similar to that in many developing countries, where the HIS is quite fragmented between different health programs within the Ministry of Health and its various directorates or divisions that deal with various vertical programs. For example, in the small island country of Palau, the Ministry of Health, comprising the Bureau of Hospital and Clinical Services and the Bureau of Public Health Services,

operates a number of computer databases, each related to a different health program handled independently by different divisions of the ministry. There is a lack of interface among the various divisional databases, consequently creating duplication. For example, a common set of data is collected by each program or division, which requires additional efforts and resources to reconcile data. Such vertical programs need to be integrated to avoid duplication in data collected, reduced burden of reporting at the health facility level of data collection, and to enhance the efficiency of the information system. Boxes 5.9 and 5.10 provide information on initiatives undertaken in Nepal, Mongolia, and Pakistan to improve the functional efficiency of the different components of their HIS. These cases provide useful lessons. Countries may learn from these examples to help integrate and improve their HIS with the involvement of all stakeholders including their respective NSOs, and the private sector.

Box 5.9:   Health Information Systems Initiatives Undertaken in Nepal and Mongolia

Nepal: Integrating the health management information system. In Nepal, a significant number of vertical health projects and programs of the Ministry of Health and Population used different data recording and reporting practices to collect data for their own subsector purposes. There were more than 100 recording and reporting forms in operation. This caused a high reporting burden on the data collectors at the grassroot levels. All these reporting and recording practices were not integrated and the use of collected information was also limited.

In 1993–1994, Nepal's Ministry of Health implemented a new health management information system (HMIS). A review of the reporting tools was undertaken and these were sharply reduced from about 100 to nearly one-third by integrating various data requirements of different programs. An integrated HMIS was established in the Department of Health Services (DOHS) in 1993–1994. The HMIS is supplemented by other supporting information systems in other areas of the health and population sector. These information systems are the human resources development information system, population management information system, logistic management information system, and financial management information system. These were developed to facilitate the decision-making process in human resources, population, logistics, and financial management of health programs and are maintained by different divisions in the ministry.

The integrated HMIS has 37 recording and reporting tools. To meet the new demands of data, some of the tools were modified recently. Some tools were added to meet the data gaps and address the social inclusion aspects (sex, caste, ethnicity, etc.). These data helped generate information and indicators related to sex and marginalized groups of society, to highlight and address issues of social inclusion and equity in health.

Box 5.9 continuation

Mongolia: Developing a health management information system strategy.
Mongolia developed a comprehensive HMIS Development Strategy (2006–2010)
by undertaking an extensive assessment of its health information system. The
mission of Mongolia's HMIS is to contribute to the improvement of health outcomes
and client satisfaction by supporting knowledge-based decision making at all levels
of the health sector capitalizing upon appropriate information technology. The new
strategy identified main activity areas to (i) improve the structure, organization, and
management of HMIS; (ii) foster evidence-based decision making; (iii) develop
human resources for HMIS; (iv) improve the quality and content of health data and
information; and (v) enhance the use of information technology infrastructure by
automating data registration, collection, transfer, analysis, and reporting at all levels
of the health sector.

The new strategy was prepared after detailed consultations with all stakeholders
including the private medical sector. The data collection and reporting tools were
reviewed and revised after consultations, to collect only relevant data and to
reduce the burden of data collection and compilation at the primary level. The new
measures for administrative data collection in health will also address the gender
gaps in the earlier system and many indicators, including MDG indicators, such as
under-5 mortality rate; infant mortality rate; incidence, prevalence, and death rates
associated with tuberculosis; and proportion of 1 year-old children immunized against
measles. This was achieved after carefully assessing the existing health information
system and revising data collection tools and data processing systems to capture
missing information.

The system is being implemented in a coordinated manner through a working group
comprising key stakeholders: the Ministry of Health, Health Department, statisticians
of specialized health centers, National Statistical Committee, Association of Mongolian
private hospitals, local hospitals, and the World Health Organization.

Sources: Asian Development Bank (ADB). 2009. *Country Report of Assessment Study for Improving
Administrative Data Sources for the Monitoring of MDG Indicators, Nepal*. Consultant's report. Manila
(TA 6356-REG); Ministry of Health and Population, 2007. Administrative Data System of Ministry of Health
and Population in Nepal. Paper presented at the ADB regional workshop for Improving Administrative
Data Sources for Monitoring of the Millennium Development Goal Indicators. Bangkok. 9–11 July; ADB.
2009. *Country Report of Assessment Study for Improving Administrative Data Sources for the Monitoring
of MDG Indicators, Mongolia*. Consultant's report. Manila (TA 6356-REG); Ministry of Health, Mongolia.
2009. Comments on Country Report of Assessment Study. Paper presented at the ADB regional workshop
for Improving Administrative Data Sources for Monitoring of the Millennium Development Goal Indicators.
Bangkok. 28–30 October; Ministry of Health, Mongolia; ADB, and World Health Organization. 2005. *Health
Management Information System Development Strategy (2006–2010)*. Ulaanbaatar: Ministry of Health.

Tools for Improving the Health Information Systems

Health Metrics Network tools. The Health Metrics Network (HMN) has significantly
contributed to the process of developing concepts and principles for the framework
and standards for a country's HIS. HMN developed a tool, *Assessing the National Health
Information System – An Assessment Tool Version 4.00* for the effective assessment of
existing national HIS—both to establish a baseline and to monitor progress. To assist

countries in this key activity, HMN has developed the assessment tool[5] that describes in detail how to undertake a first baseline assessment. It explains the objectives of an HIS assessment, the key players involved, and how to facilitate the assessment. The tool examines the integral components of an HIS and provides the information on how to determine key areas of focus.

The HMN has developed another tool, *Guidance for the Health Information Systems Strategic Planning Process, Version 6* – March 2009, which is designed to help countries apply and implement the concepts and principles presented in the *Health Metrics Network Framework and Standards for Country Health Information Systems* (Health Metrics Network 2008). These tools have been developed to help countries and other partners improve global health by strengthening the systems that generate health-related information for evidence-based decision making.

Performance of Routine Information System Management – Tools for assessing, monitoring and evaluating routine health information systems performance. These tools[6] have been developed by MEASURE Evaluation and John Snow, Inc. It is a program funded by the United States Agency for International Development for assessing the performance of routine health information systems[7] (RHIS). The Performance of Routine Information System Management (PRISM) framework consists of tools to assess RHIS performance, identify technical, behavioral, and organizational factors that affect RHIS, aid in designing priority interventions to improve performance, and improve quality and use of routine health data. These have been applied in the People's Republic of China, Cote d'Ivoire, Haiti, Honduras, Mexico, Pakistan, Paraguay, South Africa, and Uganda for assessment and evaluation and will be useful for developing countries that would like to assess the performance of their routine reporting system in health sector.

The beta version of the PRISM toolkit includes the following questionnaires, data collection methods, and processes for assessing RHIS performance, processes, and determinants:[8]

    (i)   Performance diagnostic tool – As the primary component in the PRISM toolkit, this tool determines the overall level of RHIS performance to identify strengths and weaknesses; the other three succeeding tools identify

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[5]   This and other HMN tools may be downloaded from http://www.who.int/healthmetrics/tools/en/

[6]   The PRISM tools can be downloaded at http://www.cpc.unc.edu/measure/tools/monitoring-evaluation-systems/prism

[7]   As mentioned in PRISM documents, RHIS and HMIS are considered synonyms, both referring to any regular data collection (with an interval of less than 1 year) in health facilities and their extension in communities.

[8]   MEASURE Evaluation. http://www.cpc.unc.edu/measure/tools/monitoring-evaluation-systems/prism

the underlying technical, organizational, and behavioral reasons for those strengths and weaknesses.

(ii) Overview and facility and/or office checklist – This tool examines technical determinants, such as the structure and design of existing information systems in the health sector, information flows, and interaction between different information systems. It allows users to understand the availability and status of RHIS resources and procedures used at health facilities.

(iii) Management assessment tool – This tool is designed to take rapid stock of the RHIS management practices and aid in developing recommendations for better management.

(vi) Organizational and behavioral assessment tool – This tool identifies behavioral and organizational factors that affect RHIS performance, including data demand, motivation, confidence level, task competence, and problem-solving skills.

The lone case study from an Asian country on the application of the PRISM tools, as quoted in the case studies available in the MEASURE website (www.cpc.unc.edu/measure), is presented in Box 5.10. The PRISM framework and its tools were used to reform Pakistan's RHIS and in designing and pilot testing a new district HIS as well as an evaluation of the pilot test to assess feasibility for scale-up.

Box 5.10: Pakistan Health Management Information System: Reforming from a Centralized System to a District-Based System

Rationale for Using Performance of Routine Information System Management Tools. The Government of Pakistan wanted to change the pre-existing centralized health management information system (HMIS) to a district-based one to improve accountability and performance and to expand HMIS to secondary hospitals and the private sector. The Government of Japan provided funding and technical assistance. The project was implemented by Scientific System Consultants, a Japanese firm, and JSI (the HMIS team). They applied the Performance of Routine Information System Management (PRISM) framework and its tools as part of the study to reform Pakistan's routine health information system (RHIS). The reform process included a baseline assessment, design and pilot testing of the new district health information system (DHIS), and an evaluation of the pilot test to assess feasibility for scale-up.

Data collection. In 2004, the HMIS team conducted a baseline situation analysis using PRISM tools. A total of 135 people in 16 districts from four provinces were surveyed. Key informant interviews were conducted to collect information on management practices and triangulate quantitative data. The PRISM tools were used to identify strengths and weaknesses in the existing HMIS. Through a process of consensus-

Box 5.10 continuation

building with stakeholders at all levels and based on the findings of the assessment study, a reform package was developed and pilot-tested in four districts. The new DHIS extended the HMIS to secondary hospitals and the number of data items in the monthly report decreased from 446 to 131.

Analysis of findings. The pilot DHIS was evaluated after 6 months, based on the criteria of user-friendliness, satisfaction, time consumption, expansion to secondary hospitals and improvement in data quality and information use. Twelve facilities per pilot district were surveyed and 190 people from facility, district, and provincial offices were interviewed. The baseline assessment showed that HMIS data accuracy (41%) and information use (10%) were limited (Fig. 5.10.2). One of the contributing factors was low HMIS task competence (Fig. 5.10.1). Less than 42% of the respondents were able to calculate, plot, explain, and find a trend in a bar chart and use those findings for decision making. There was no mechanism for checking data accuracy.

Box Figure 5.10.1: Observed Performance Facility and District Level (N=132)
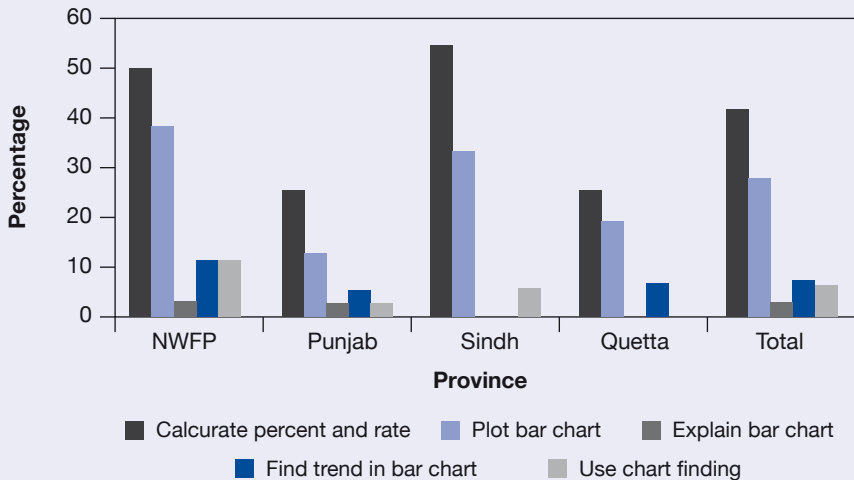
Evaluation of the districts in the pilot test showed that the new DHIS implementation was well-received. Ninety percent of respondents were satisfied with the DHIS design, its tools, and the training they received; HMIS performance improved (Fig. 5.10.2). The level of data accuracy before intervention was 40%, which improved to 75% after intervention. Similarly, use of information levels improved from 10% before intervention to 55% after intervention. This could be due to the availability of meeting registers, which facilitated recording of the discussions and decisions during the monthly meeting of the facility staff and district officials; 30% of facilities surveyed applied the new data accuracy checklist for self-assessing their data quality at the facility level. This was a big achievement for initiating a new behavior.

Box 5.10 continuation

Box Figure 5.10.2: Improvements in Data Accuracy and Use of Information before and after Test in Pakistan, 2006
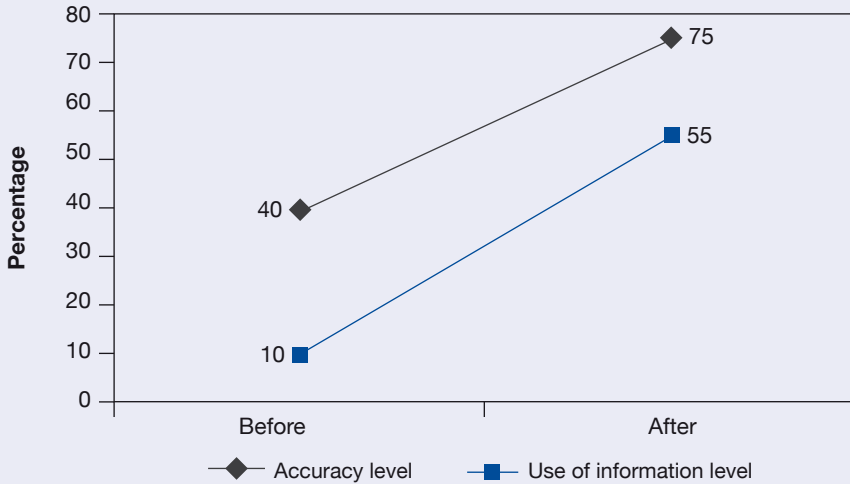
The results of the pilot test evaluation were presented in meetings at federal, provincial, and pilot districts for their comments and approval. Between 2004 and 2006, more than 1,000 government officials and stakeholders including members from the United States Agency for International Development, World Health Organization, Department for International Development of the United Kingdom, United Nations Population Fund, and other national and international organizations participated in meetings about the HMIS reform process and consensus building.

Promotion of information use: The HMIS reform activity was intended to improve HMIS performance, improving accuracy and use of information for decision-making at the district level and below. Examples of the use of baseline and evaluation findings include:

• The development of the DHIS pilot test package included revised data collection forms for primary care facilities and new forms for hospitals as well as tools for continuous improvement of DHIS performance.
• An HMIS training manual was developed for the revised data collection registers and forms.
• A separate training manual was developed on assessing data quality and use of information for continuous improvement of health system performance.
• The HMIS team developed and pilot-tested a district software application for data entry, analysis, and report generation.
• During the pilot test, the facilities and the districts conducted monthly performance reviews using DHIS information and recorded decisions on a new DHIS register.
• A National Action Plan for scaling-up the DHIS, approved by the Government of Pakistan in February 2007, was disseminated in a meeting attended by federal and provincial officials and international donors.

Source: Aqil, Anwer. *PRISM Case Studies: Strengthening and Evaluating RHIS*. North Carolina: MEASURE Evaluation. http://www.cpc.unc.edu/measure/publications/pdf/sr-08–43.pdf. p. 6–7.

The health information produced by national health authorities as a by-product of health administration and regulation are good examples of administrative data sources that can be used for compiling statistics and indicators to manage and monitor health sector goals and targets.

The ultimate purpose of any HIS is to promote evidence-based policy making. Accurate and reliable data and their timely dissemination to the users are essential requirements in inculcating a culture of use of information in developing good policies. The following examples of organizational and behavioral interventions (Health Metrics Network 2008, p. 64) for improving the use of information in decision making and planning are presented and should be imbibed by organizations:

(i) mechanisms linking data/information to actual resource allocation (budgets and expenditure);

(ii) indicator-driven, short- (1 year) and medium-term (3–5 years) planning;

(iii) organizational routines where managers are held accountable for performance;

(iv) the use of results-based indicators at all levels of the health system;

(v) a program addressing behavioral constraints to the use of data, e.g., through incentives, such as awards for best service delivery performance, best or most improved district, or best HIS products or use;

(vi) a supportive organizational environment that places a premium on the availability and use of well-packaged and well-communicated information and evidence for decision making;

(vii) ensuring that data are relevant to strategic decision making and to planning;

(viii) engaging all key constituencies in determining which information to collect to ensure broad ownership and involvement;

(ix) making maximum efforts to ensure confidence in the reliability and validity of information;

(x) avoiding offering too much information with excessive details, and making sure that important aggregations are provided;

(xi) providing essential disaggregations, such as health status by major measures of equity;

(xii) customizing data presentation to the needs of specific target audiences; and

(xiii) ensuring the timeliness of data.

KEY POINTS

→ The adoption of goals and targets by national governments and international agencies under international initiatives, such as Health for All and the MDGs led to the need for objective data in monitoring progress toward the attainment of the goals and targets.

→ Data from the HIS are usually generated in two ways: (i) directly from the population, and (ii) from the health service records of health operations of health institutions.

→ Population-based sources generate data on individuals and cover all three major methods of data collection namely censuses, sample surveys, and administrative records. On the other hand, institution-based health information or health-services-based information are generated routinely from the administration, recording, and reporting in the health care delivery system, and can be further classified into three types: individual records, service records, and resource records.

→ The collection and compilation of health-related information from health facilities reporting systems or the routine reporting systems is usually undertaken by the health ministries in a country.

→ Administrative data offers much potential for generating information and indicators at disaggregations of special interest to health policy makers, such as rural–urban, sex, age groups, and subnational levels.

→ A number of MDG indicators and other indicators can be compiled every year with desired disaggregations using data collected by the health ministries in the routine reporting by the health facilities. Despite this, these are presently sourced in many countries from household surveys as deficiencies and weaknesses continue to plague administrative data systems in developing countries.

→ As part of their contribution toward improving and enhancing the usefulness of health statistics, international agencies, such as WHO, have established technical standards for collecting and compiling internationally comparable statistics and indicators and have provided standard definitions and computation procedures, and also identified the data sources needed for compiling these indicators.

→ While surveys can provide more comprehensive information concerning the health of the population and in understanding more complex issues, they can be very costly especially in generating reliable statistics at finer disaggregations. For this reason, the improvement of the quality of administrative-based health statistics has become a primary concern in the statistical community as data quality issues have direct bearing on their reliability for compiling MDG and other indicators for monitoring health goals and targets.

→ The HIS in most developing countries remain fragmented and weak due to underinvestment in data collection, processing, and analysis—resulting in reporting burdens and duplications and overlaps in data collection.

→ The most common issues affecting the quality of data from administrative data systems are (i) incomplete coverage (remote areas, private health sector facilities, omission of population not availing of services from health facilities); (ii) under counting; (iii) manual and centralized processing, which impact on the timeliness and quality of data; (iv) lack of skilled staff to undertake data processing, coding, and classifications; and (v) lack of data quality control mechanisms.

→ Quality issues in administrative-based health statistics can be addressed by taking appropriate measures to improve data quality on a continuing basis and building staff capacity through regular training and development of guidelines and instruction materials.

→ Tools developed by international development partners, such as the Health Metrics Network and the MEASURE Evaluation for assessment of the HIS are useful instruments for developing countries in improving their HIS.

→ Lack of data dissemination and inadequate capacity of users to interpret these statistics and indicators for effective planning and policy formulation have prevented the full use of routinely available information.

→ As the ultimate purpose of any HIS is to promote evidence-based policy making, accurate and reliable data and their timely dissemination are essential requirements in inculcating a culture of use of information in developing good policies.

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CHAPTER 6

CIVIL REGISTRATION SYSTEMS AND VITAL STATISTICS

Vital statistics generated from records of vital events from civil (or vital) registration systems are essential for planning human development at the national and subnational levels. While population censuses and household demographic surveys offer alternative and complementary sources of vital statistics, there is no substitute for continuous information on vital events as obtained from civil registration systems. This chapter examines the use of data on vital events from the civil registration systems in the health information system of a country. It discusses issues affecting the coverage and quality of vital statistics collected from the vital registration systems, with a view to strengthening their use for monitoring health goals and targets including the Millennium Development Goals (MDGs). Experiences of the five case study countries of Mongolia, Nepal, Palau, Sri Lanka, and Viet Nam on the status and use of data from civil registration systems serve as the basis for drawing up recommendations. While strengthening civil registration systems will be a long-term process, alternative methods for collecting vital statistics, such as sample registration systems could be used as interim measures until fully functional civil registration systems are in place.

6.1 INTRODUCTION

"Civil registration is the continuous, permanent, compulsory and universal recording of the occurrence and characteristics of events, including vital events, pertaining to the population, as provided by decree or regulation, in accordance with the legal requirements of a country" (United Nations 2001, p.4).

"A system of civil registration includes all institutional, legal technical settings needed to perform the civil registration functions in a technical, sound, coordinated and standardized manner throughout the country, taking into account cultural and social circumstances particular to the country" (United Nations 2001, p.50).

The vital events of interest are live births, fetal deaths, infant deaths, marriages, divorces, legal separations, annulments of marriage, recognitions of children born out of wedlock, legitimations, and deaths in general. Civil registration is usually a legal system that serves an essential civil purpose of creating records of vital events, such as documents and certificates of birth, death, marriage, and divorce whenever an event is registered with the designated registrar under the statutory or other administrative provisions of the country. These are legal documents that are used by citizens as proof of age, to establish legal identity and family relationships in cases involving inheritance of property, or as proof of death.

The legal documents of registration also entitle citizens of a country to certain individual human rights that have been proclaimed in various international declarations, covenants, and conventions that have been adopted by many countries. For example, the International Covenant on Civil and Political Rights proclaimed that every child shall be registered immediately after birth and shall have a name, thus establishing the right to register and have a name.

Vital Statistics System

"A vital statistics system is defined as the total process of (a) collecting information by civil registration or enumeration on the frequency of occurrence of specified and defined vital events, as well as relevant characteristics of the events themselves and of the person or persons concerned, and (b) compiling, processing, analysing, evaluating, presenting and disseminating these data in statistical form. The vital events of interest are: live births, adoptions, legitimations, recognitions; deaths and foetal deaths; and marriages, divorces, separations and annulments of marriage..." (United Nations 2001, p.3).

A civil registration system, apart from generating legal records and documents of registrations of the vital events for a country's population, is also needed for health sector planning and policy making. A by-product of a civil registration system is therefore the availability of vital statistics on an ongoing basis. A civil registration system that provides statistics on deaths by age and cause of death assigned through medical certification becomes a very important source of data for studying the causes of death by age and sex and their geographic distribution.

Vital statistics generated from records of vital events from civil registration are an essential input for the planning of human development and in improving the health outcomes at the national and subnational levels and have several uses (Box 6.1).

Box 6.1:   Why Do We Need Vital Statistics?

Vital statistics produced on a continuing basis from the civil registration system help in:
  (i)   estimating the natural increase (or decrease) and the annual change in population size and structure, and thus making sounder annual population projections;
 (ii)   understanding the dynamics of reproduction through information on live births;
(iii)   calculating life tables and estimating the probability of dying at various ages by studying deaths, classified by age and sex, which are also used for insurance and social security purposes;
(iv)   estimating fertility and mortality for understanding the growth dynamics of the population;
 (v)   monitoring the health status of a population by directly measuring adult mortality and analyzing causes of death and other characteristics of the dead;
(vi)   assessing for the planning of adequate health intervention strategies by providing early insights into trends in disease prevalence;
(vii)   analyzing nuptiality from the data on marriages, divorces, annulments, and judicial separations;
(viii)   setting targets and evaluating social and economic plans, including monitoring of health and population intervention programs; and
(ix)   measuring important demographic indicators of levels of living or quality of life, such as expectation of life at birth, infant mortality rate, under-5 mortality rate, and maternal mortality rate, among others.

Source: Compiled from United Nations. 2001. *Principles and Recommendations for a Vital Statistics System,* Revision 2. New York: United Nations.

Other sources of vital statistics. Civil registration records of vital events that can provide vital statistics on a continuing basis are the best source of vital statistics. "The gold standard is a civil registration system providing complete births and deaths records (100% coverage) that includes medically certified causes of death" (Health Metrics Network 2008). However, civil registration systems in many developing countries are deficient in terms of coverage and registration of vital events and in accurately providing medically certified cause of death. In these countries, other possible sources of vital statistics are (i) population censuses, (ii) household demographic surveys, (iii) sample registration systems, and (iv) routine reporting of vital events by the health facilities to the health authorities.

Population censuses. A population census is an important source of benchmark data on population structure and vital statistics as population census data are used to estimate vital rates—mortality, fertility, and migration. Specifically, a population census elicits data on past vital events for estimating fertility and mortality. Indirect estimation techniques are used to estimate some vital rates, such as infant and child mortality rates.

On the other hand, census data are also needed to estimate the denominators—the reference population or the population-at-risk—for calculating vital rates and ratios, with numerators based on data from the civil registration systems. It is therefore important that the concepts, definitions, and classifications followed in the civil registration system and the population census are uniform so that data in the numerator and denominator are coherent. However, while population censuses are useful in generating the needed vital rates for small areas, censuses are undertaken usually once in 10 years and can only cover limited topics. Chapter 2 discusses the advantages and limitations of population censuses.

Household demographic surveys. Household demographic surveys have been conducted in many developing countries to collect data on fertility, infant mortality, child mortality, reproductive health, and morbidity. These surveys gather data on past vital events to estimate fertility and mortality through specific questions on birth or pregnancy history from women of reproductive age group. Using data collected from these interviews, direct or indirect estimation techniques (depending on the details of birth histories collected in the survey) are used to estimate vital rates, such as infant and child mortality rates.

A number of survey programs, such as the world fertility survey, demographic and health surveys, and multiple indicator cluster surveys, etc., have been designed to meet data gaps in vital statistics in developing countries. The demographic surveys are generally good for providing estimates at the national level and are conducted once in 3 to 5 years. These surveys have their own advantages and limitations. The problems faced in eliciting maternal histories through interviews relate to errors on dates of births and deaths and inaccurate reporting of age and cause of death. Despite this, in the absence of complete vital registration systems, demographic surveys provide a good alternative to collecting data on fertility and child mortality.

Sample registration systems. Sample registration systems (SRS) are alternative methods of collecting data on vital statistics in the absence of fully functional civil registration systems. This involves continuous recording of vital events—births, deaths, and migration in a nationally representative sample of clusters. The SRS can be gradually expanded to a full-fledged civil registration system. Section 6.4 further discusses the SRS.

Routine reporting by health facilities. In the absence of good vital registration systems, the routine reporting of births and deaths, with information on the cause of death, by health facilities is also a useful source of vital statistics. However, coverage of the events through routine reporting is low in countries where health services are not easily accessible and a large number of births and deaths occur in the community.

Thus, while censuses, surveys, and routine reporting are good complementary sources of vital statistics, and the SRS a good alternative to collect vital statistics, there is no substitute for continuous information on vital events as obtained from civil registration systems.

Organization of Civil Registration Systems

Most countries have established systems that register births, deaths, and marriages. Two essential features of any civil registration system are (i) a legal framework, and (ii) an organizational structure for registering events.

Legal framework. To discharge the functions of civil registrations, governments are required to design and establish a legal basis through vital events registration acts and related regulations. The law (i) identifies the vital events to be registered and defines each event, (ii) identifies the persons and/or institutions responsible for informing the occurrence of vital events and the time frame for registering events, (iii) assigns responsibilities on designated authorities (registrars) to register the events and maintain the records, (iv) issues legal documents, (v) assigns the duties and rights of the informants and the civil registrars, and (vi) issues other provisions depending on the country's specific needs (United Nations 1998). The United Nations publication *Handbook on Civil Registration and Vital Statistics Systems: The Preparation of a Legal Framework* (1998) provides a model of an organic civil registration law and regulations.

Organizational structure. The organizational structure and arrangements for the civil registration work should also be stated in the civil registration legislation. The civil registration organizational structure in a country could be centralized or decentralized, depending on the administrative and political structure. A centralized system will have a central agency that will implement, coordinate, and monitor the registration system in the country in a standard manner. In a decentralized system, usually in countries with a federated political system, the states or provinces implement and administer civil registration. In such a case, a central agency should coordinate the overall system and set model civil registration laws to standardize procedures and tools for registering vital events and for generating vital statistics for the country.

In the five case study countries, laws and regulations have been framed, and a centralized authority implements civil registration (Table 6.1). The law provides for designated authorities at the subnational levels in the rural and urban areas as registrars. They register vital events and issue related documents of registration, such as birth, death, and marriage certificates, and other events prescribed under the law. In all the five countries, the organizations responsible for the civil registration system also collect, compile, and disseminate vital statistics.

Table 6.1:   Civil Registration Law and Organization Responsible for Civil Registration in Mongolia, Nepal, Palau, Sri Lanka, and Viet Nam

Country	Civil Registration Law and Regulation	Organization Responsible for Civil Registration and Vital Statistics
Mongolia	Law on Civil Registration, 1999	General Authority for State Registration, Ministry of Justice and Internal Affairs
Nepal	Birth, Death and Other Personal Events Registration Act, 1976 Birth, Death and Other Vital Personal Event Registration Regulations 1977 (amended in 1981 and 1992)	Vital Event Registration Management Section, Ministry of Local Development
Palau	Republic of Palau Public Law 5–7: Title 34 Public Health, Safety and Welfare Division 5 Vital Statistics, Chapter 40— Records and Reports of Population and Residence	Bureau of Health Services, Ministry of Health
Sri Lanka	Registration of births and deaths became compulsory in 1897. The present law—Births and deaths Registration Act, 1951	Registrar General's Department, Ministry of Public Administration and Home Affairs
Viet Nam	Most recent version of the relevant Ministry of Justice decree of 2005 sets down the organization of the vital registration system more clearly.	Ministry of Justice

Source: Country reports of assessment study for improving administrative data sources for the monitoring of MDG indicators for Mongolia, Nepal, Palau, Sri Lanka, and Viet Nam (ADB 2009a, 2009b, 2009c, 2009d, 2009e); Rao, C. et. al (2009).

The provisions in the vital registration laws of the countries vary in terms of mandatory provisions for events identified for registration, the time period prescribed for reporting and registering an event, items and information included in the prescribed records and forms of registration, roles and responsibilities of legal informants, registration fees (if any), fines prescribed (if any, for late registrations), organizational structure and authorities assigned to be the registrar and other functionaries, and statistical reports to be submitted, etc. The coverage of vital events and vital statistics are also at different stages of development. For example, Nepal has very low coverage (less than 50%) of registration of births and deaths, with the available vital statistics limited only to the number of vital events registered. In Sri Lanka, registration of births and deaths is considered to be more than 90%, and vital statistics from civil registration are used to compile key indicators of maternal, child, and infant mortality (Box 6.2).

Box 6.2:   Vital Registration System in Sri Lanka

Legal framework. In Sri Lanka, the vital events registration was introduced as early as 1867 with the creation of the Registrar General's Department. Under the Births and Deaths Registration Act, the registration of both births and deaths has been compulsory in Sri Lanka since 1897. The act provides for sanctions for late registrations and false declarations.

Organizational structure. Under the act, the registrar general is vested with "the general control and superintendence of the registration of births, deaths and still-births in [Sri Lanka], and of all persons appointed for, and engaged in, carrying out the provisions of the Act." A network of 914 registrar divisions registers events across the country. A registrar who refuses to register the information, a medical officer who refuses to issue a certificate, and a person who removes a corpse in contravention of the statutory provision, are also liable under the act.

Data collection and data flow. The local registrars complete the statistical returns prescribed for births and deaths. The completed statistical returns of births and deaths, along with duplicates of birth and death certificates, are handed over to the 330 relevant divisional secretariat division offices.

The divisional secretariat division offices encode, assure accuracy and completeness of data, and submit the statistical returns to the 33 scanning centers at the district level.

Box Figure 6.2.1: Organizational Structure of the Civil Registration System in Sri Lanka
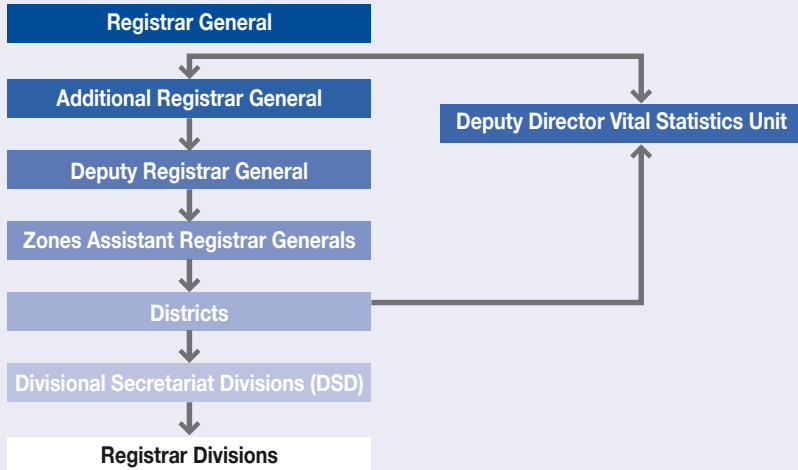
The statistical forms of births and deaths are scanned at the district scanning centers and data files are then transmitted to the Vital Statistics Unit at the Registrar General's Department. This unit is managed by a deputy director who is a professional statistician posted from the Department of Census and Statistics, and who supervises the work of a senior statistician, 6 statistical officers, and 12 coding clerks. This unit checks and verifies the data reported from the districts and finalizes the tabulation and data dissemination.

Box 6.2 continuation

Box Figure 6.2.2: Vital Statistics Data Collection
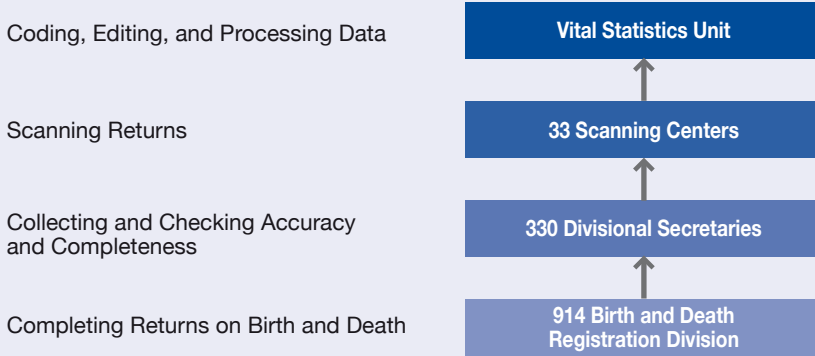
Coding, Editing, and Processing Data	**Vital Statistics Unit**
Scanning Returns	**33 Scanning Centers**
Collecting and Checking Accuracy and Completeness	**330 Divisional Secretaries**
Completing Returns on Birth and Death	**914 Birth and Death Registration Division**

Sources: Asian Development Bank. 2009. *Country Report of Assessment Study for Improving Administrative Data Sources for the Monitoring of MDG Indicators, Sri Lanka*. Consultant's report. Manila (TA 6356-REG); Registrar General's Department. 2010. Presentation made at the Third Global Forum on Gender Statistics. Manila. 11–13 October.

6.2 VITAL STATISTICS AS INPUT TO THE MILLENNIUM DEVELOPMENT GOALS INDICATORS

Vital statistics are an important source for preparing reliable population projections at national and subnational levels using baseline population census data. Many MDG indicators require information on population or components of population in their estimation as denominators, as most of the indicators are ratios, rates, and proportions. Timely and reliable data generated from the vital registration system on at least two vital events of births (by sex) and deaths (by age, sex, and cause of death) are therefore highly desirable.

Apart from being a major source of data for making reliable population projections, vital statistics with complete coverage of births and deaths and accurate recording of cause of death are considered as the gold standard in constructing four crucial indicators for monitoring women and child health in the MDG program (Table 6.2).

Vital statistics data can also directly provide information on population-at-risk for two MDG indicators: (i) indicator 4.3—proportion of 1-year old children immunized against measles, and (ii) indicator 5.2—proportion of births attended by skilled health personnel. Further, if the birth registration forms seek information on medical attendance at birth, MDG indicator 5.2 can also be entirely compiled using data from the vital registration system.

Table 6.2:   Vital Statistics as Source of Millennium Development Goals Indicators

Goal 4: Reduce child mortality	
Target 4.A: Reduce by two-thirds, between 1990 and 2015, the under-5 mortality rate	4.1 Under-5 mortality rate 4.2 Infant mortality rate
Goal 5: Improve maternal health	
Target 5.A: Reduce by three quarters, between 1990 and 2015, the maternal mortality ratio	5.1 Maternal mortality ratio 5.4 Adolescent birth rate

Source : United Nations. 2008. *Official list of MDG Indicators, Effective 15th January 2008,* Millennium Development Goals Indicators. The official United Nations site for MDG Indicators. New York: United Nations. http://mdgs.un.org/unsd/mdg/Resources/Attach/Indicators/OfficialList2008.pdf

In many developing countries, vital registrations—and hence vital statistics—suffer from incomplete registration of events and incomplete and/or inaccurate recording of the causes of death. As such, sample surveys, together with direct and indirect estimation techniques, have been relied upon to estimate the MDG indicators of infant, child, and maternal mortality. The survey data however have several limitations in measuring these indicators (Box 6.3).

The definitions, data required and data sources, and data limitations for the MDG indicators in Table 6.2, for which vital registration systems are the most desired source of data, are discussed in Boxes 6.4 to 6.7. For the discussion on definitions, data sources, and limitations, the following publications have been extensively referred to and used. The discussion also draws from the experiences in compiling these indicators from the five case study countries.

   (i) World Health Organization. 2010. *World Health Statistics Indicator Compendium.* Interim version. http://www.who.int/whosis/indicators/WHS10_IndicatorCompendium_20100513.pdf

   (ii) United Nations. 2003. *Indicators for Monitoring the Millennium Development Goals: Definitions, Rationale, Concepts and Sources.* New York: United Nations.   http://unstats.un.org/unsd/mdg/Host.aspx?Content=Indicators/Handbook.htm

   (iii) United Nations. Millennium Development Goals Indicators. The official United Nations site for MDG Indicators. http://mdgs.un.org/unsd/mdg/metadata.aspx Metadata developed for the monitoring of health-related MDG indicators.

Box 6.3:   Limitations of Household Surveys in Measuring the Millennium Development Goals Indicators of Infant, Child, and Maternal Mortality

In the absence of complete and reliable vital statistics, household surveys and censuses are used to estimate indicators of infant, child, and maternal mortality using a variety of indirect estimation techniques. The surveys, however, have the following limitations:

- Unless the survey sample size is very large (which also makes it costly), surveys are not useful in monitoring indicators at a local level or identifying health disparities among anything but the broadest subgroups in the population.

- Even where levels of maternal mortality are high, the actual number of maternal deaths is likely to be relatively small because maternal deaths are rarer than infant deaths for a fixed reference period. Thus, very large sample sizes are needed for reliable results.

- Estimates obtained from household surveys have attached confidence intervals that need to be considered when comparing values along time or across countries. Similarly, these estimates are often affected by non-sampling errors that may affect equally recent levels and trends of mortality.

- Surveys can provide estimates of vital rates for past years only, making timely interventions impossible.

- Surveys designed to measure national or regional infant mortality rate or maternal mortality rate have very limited use in impact evaluations. Specially designed surveys are required for this purpose.

Sources: Danel, Isabella and Marcelo Bortman. 2008. An Assessment of LAC's Vital Statistics System: The Foundation of Maternal and Infant Mortality Monitoring. *HNP Discussion Paper* 44862. Washington, DC: International Bank for Reconstruction and Development and World Bank. Box 2, p.7; World Health Organization and the United Nations Children's Fund. 1997. *The Sisterhood Method for Estimating Maternal Mortality: Guidance notes for potential users*. World Health Organization. http://whqlibdoc.who.int/hq/1997/WHO_RHT_97.28.pdf?. p.4.

Box 6.4:   Millennium Development Goal Indicator 4.1: Under-5 Mortality Rate

Definition. The under-5 mortality rate (U5MR) is the probability (expressed as a rate per 1,000 live births)[a] of a child born in a specified year dying before reaching the age of 5 if subject to age-specific mortality rates of that period.

U5MR as defined is strictly speaking not a rate (i.e., the number of deaths divided by the number of population at risk during a certain period of time) but a probability of death derived from a life table and expressed as a rate per 1,000 live births.

The indicator is a measure of child survival and reflects the social, economic, and environmental conditions in which children (and others in society) live, including their health care.

Box 6.4 continuation

Data required and source. Data needed are the survival status of different birth cohorts along time and of specific ages since they are born. Vital registration systems with complete coverage are the most preferred source of data on U5MR because they collect information prospectively and cover the entire population. Other sources used in most developing countries—due to lack of complete civil registration systems—are sample registration systems, national population censuses, and household-based surveys, such as multiple indicator cluster surveys and demographic and health surveys (DHS), that use direct[b] and indirect[c] estimation techniques.

Data limitations. Civil registration systems are the most preferred source of data on under-5 mortality because they collect information prospectively and cover the entire population. Good vital registration systems would enable annual estimates of the indicators at the national and subnational levels, unlike child mortality rates of the past based on retrospective birth histories of children through the censuses and surveys conducted at infrequent intervals. Vital statistics from the civil registration system had been used in Sri Lanka and Palau to compile U5MRs for national Millennium Development Goals monitoring purposes. In Mongolia, the under-5 mortality is calculated based on the routine reporting system of births and deaths of the ministries of health, despite more than 90% coverage of vital births and deaths.

The antenatal care coverage of pregnant women is very wide in Mongolia and is supposed to cover 98% of total births (which are also attended by skilled health personnel). The births and deaths reporting by the health facility and hospitals is considered to have higher coverage and is also considered more timely and reliable in comparison with the data on same items produced by the civil registration system. Omissions in the civil registration system of stillbirths and infant deaths occurring within a few hours of birth have been reportedly affecting accurate measurement of child mortality rates and therefore routine health reports are preferred.

In Viet Nam, the registration of births and deaths in the civil registration system is deficient and data on births and deaths from routine reporting of the Ministry of Health is used. However, a large number of deaths occurring in the community and in remote places and mountainous areas are likely to be missed out in the health ministry's reporting system. Moreover, child deaths, including those of newborns, and deaths of the young due to stigmatized diseases (e.g., HIV/AIDS, tuberculosis, and leprosy), are socially sensitive and concealed by families.

As mentioned earlier, household surveys are the alternative source in developing countries for estimating the indicator in the absence of a complete civil registration system. For this reason, the indicator has been sourced from the demographic and health survey in Nepal. However, survey data are subject to recall error and may omit births and deaths, including stillbirths. Other limitations of sample surveys are discussed in Box 6.3.

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[a] A live birth is defined as the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of the pregnancy, which, after such separation, breathes or shows any other evidence of life, such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles, whether or not the umbilical cord has been cut or the placenta is attached.

Box 6.4 continuation

[b] A direct method (used in DHS) is based on birth history—a series of detailed questions on each child a woman has given birth to, whether the child is still alive, and if the child has died, the age at death, during her lifetime. To reduce sampling errors, the estimates are generally presented as period rates, for 5 or 10 years preceding the survey.

[c] In the censuses and in some other surveys like the multiple indicator cluster survey, an indirect method (Brass method) is used based on questions to each woman of reproductive age as to how many children she has ever borne and how many are still alive.

Sources: WHO 2010; United Nations 2003; United Nations. Millennium Development Goals Indicators. The official United Nations site for MDG Indicators. http://mdgs.un.org/unsd/mdg/Metadata.aspx; Huy T.Q., A. Johansson, N. H. Long. 2007. Reasons for not reporting deaths: A qualitative study in rural Vietnam, Vietnam–Sweden Uong Bi General Hospital, Uong Bi, Vietnam. *World Health and Population* 9(1):14–23. Abstract available: http://www.longwoods.com/content/18739; Rao, C., B. Osterberger, T. D. Anh, M. MacDonald, N. T. K. Chúce, and P. S. Hilla. 2009. Compiling Mortality Statistics from Civil Registration Systems in Viet Nam: The Long Road Ahead. *Policy & Practice*. Geneva: WHO Press; country reports of assessment study for improving administrative data sources for the monitoring of MDG indicators for Mongolia, Nepal, Palau, Sri Lanka, and Viet Nam (ADB 2009a, 2009b, 2009c, 2009d, 2009e).

Box 6.5:   Millennium Development Goal Indicator 4.2: Infant Mortality Rate

Definition. The infant mortality rate (IMR) is the probability (expressed as a rate per 1,000 live births) of a child born in a specified year dying before reaching the age of 1 if subject to current age-specific mortality rates.

IMR is strictly speaking not a rate (i.e., the number of deaths divided by the number of population at risk during a certain period of time) but a probability of death derived from a life table and expressed as a rate per 1,000 live births.

Infant mortality represents an important component of under-5 mortality. The indicator is a measure of child survival and a leading indicator of the level of child health and overall development in countries.

Data required and source. Needed data and the sources are similar to those for the under-5 mortality rate.

Data limitations. Vital registration systems are the most preferred source of data on infant mortality because they collect information prospectively and cover the entire population. However, many developing countries lack fully functioning vital registration systems that accurately record all births and deaths. The data limitations for this indicator are similar to those discussed for under-5 mortality rate. The five case study countries have similar experiences in compiling this indicator for monitoring of the Millennium Development Goals.

Source: WHO 2010; United Nations 2003; United Nations. Millennium Development Goals Indicators. The official United Nations site for MDG Indicators. http://mdgs.un.org/unsd/mdg/Metadata.aspx; country reports of assessment study for improving administrative data sources for the monitoring of MDG indicators for Mongolia, Nepal, Palau, Sri Lanka, and Viet Nam (ADB 2009a, 2009b, 2009c, 2009d, 2009e).

Box 6.6:   Millennium Development Goal Indicator 5.1: Maternal Mortality Ratio (per 100,000 live births)

Definition. The maternal mortality ratio[a] (MMR) is the annual number of female deaths from any cause related to or aggravated by pregnancy or its management (excluding accidental or incidental causes) during pregnancy and childbirth or within 42 days[b] of termination of pregnancy, irrespective of the duration and site of the pregnancy, for a specified year (expressed per 100,000 live births).

$$\text{MMR} = \frac{\text{No. of recorded (or estimated) maternal deaths in a given period}}{\text{Total recorded (or estimated) live births in the same period}} \times 100{,}000$$

MMR (whose denominator is the number of live births) indicates the risk once a woman becomes pregnant, thus does not take fertility levels in a population into consideration.

MMR is used to monitor deaths due to pregnancy, which are affected by various factors including general health status, education, and services during pregnancy and childbirth.

Data required and source. The data needed for the numerator is the number of maternal deaths, and for the denominator, the number of live births during the reference year. The data required can be obtained from civil registration systems, sample registration systems, national population censuses, and household-based surveys. Civil registration systems, with medical certification of cause of death, are the most preferred source of data on maternal mortality because they collect information prospectively and cover the entire population. When civil registrations are complete—at least covering 90% of the vital events in the country—MMR can be computed based on the number of maternal deaths and number of live births recorded. The annual data from civil registration can be used to prepare annual estimates of maternal mortality.

MMR is also estimated based on household-based surveys or routine reporting. Vital registration and health information systems in most developing countries are weak. Women's access to health services in rural areas is often limited. Consequently, in developing countries, it is more usual to use survey data. The most common sources of data are the demographic and health survey and similar household surveys. However, sample surveys have their own limitations—as measuring maternal mortality, which is a rare event is unusually difficult (see data limitations).

Since maternal mortality is a relatively rare event, very large sample sizes are needed to improve the accuracy of the estimate. Alternative methods have been developed to overcome the sample size problem by using what is known as "sisterhood method,"[c] which measures maternal mortality by asking respondents about the survivorship of sisters.

Data limitations. Civil registration and health information systems in most developing countries are weak, and thus cannot provide an accurate assessment of maternal mortality. The deaths that occur outside the hospital systems may not be fully captured, resulting in underreporting in the routine reporting. Misclassification of maternal deaths is another major reason for inaccurate information on maternal deaths. As a consequence, household surveys, such as the DHS are used. Household surveys require very large sample sizes to reliably measure maternal mortality. Further, these surveys cannot produce disaggregated subnational data for the same reason. In addition, as a result of

Box 6.6 continuation

the margins of error in the estimates, it is difficult to use survey data to monitor trends. Estimates obtained from household surveys have attached confidence intervals that need to be considered when comparing values along time.

In Mongolia and Viet Nam, administrative statistics from the facility reporting systems of the Ministry of Health have been used in compiling this indicator to monitor the Millennium Development Goals. In Sri Lanka, the indicator is based on vital registration statistics; and in Nepal, the estimates available are based on the DHS. In Palau, with a small population and falling fertility rates, pregnancies are few, and with good institutional coverage for pregnant women, only one maternal death has been reported between 1990 and 2007.

The data for the indicator, when sourced from the reporting system, will be adequate where all the births in the country occur in the hospitals or at health facilities and the coverage is complete. Such a reporting system should include all health facilities, including those from the private sector.

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a   MMR should not be confused with maternal mortality rate (whose denominator is the number of women of reproductive age), which reflects not only the risk of maternal death per pregnancy or birth but also the level of fertility in the population.
b   The 10th revision of the International Classification of Diseases (ICD10) makes provision for including late maternal deaths occurring between 6 weeks and 1 year after childbirth.
c   For details of the method, refer to World Health Organization and United Nations Children's Fund. 1997. *The Sisterhood Method for Estimating Maternal Mortality: Guidance notes for potential users*. http://whqlibdoc. who.int/hq/1997/WHO_RHT_97.28.pdf

Source: WHO 2010; United Nations 2003; United Nations. Millennium Development Goals Indicators. The official United Nations site for MDG Indicators. http://mdgs.un.org/unsd/mdg/Metadata.aspx; country reports of assessment study for improving administrative data sources for the monitoring of MDG indicators for Mongolia, Nepal, Palau, Sri Lanka, and Viet Nam (ADB 2009a, 2009b, 2009c, 2009d, 2009e).

Box 6.7:   Millennium Development Goal Indicator 5.4: Adolescent Birth Rate

Definition. The adolescent birth rate measures the annual number of births to women 15–19 years of age per 1,000 women in that age group. It represents the risk of childbearing among adolescent women 15–19 years of age. It is also referred to as the age-specific fertility rate for women aged 15–19.

$$\text{Adolescent birth rate} = \frac{\text{No. of live births to women aged 15 to 19}}{\text{Total no. of women aged 15 to 19}} \times 1{,}000$$

Data required and source. Data needed for the numerator are number of live births to women aged 15–19 years during the reference year and the population of women aged 15–19 years in the same year for the denominator. The most preferred data source for the numerator is the vital registration, i.e., when the vital registration is complete; while data for the denominator usually come from the national statistics offices based on population census and population projections.

Box 6.7 continuation

In the case of survey data, the adolescent birth rate is generally computed based on retrospective birth histories. The numerator refers to births to women that were 15–19 years of age at the time of the birth during a reference period before the interview. The denominator is person-years lived between the ages of 15 and 19 by the interviewed women during the same reference period.

Data limitations. Civil registration systems in most developing countries are deficient in terms of completeness of birth registrations, particularly for infants born alive but who have died before registration, and the quality of data reported relating to mother's age, etc. The population estimates for the denominator may also suffer from limitations connected to misreporting of age and coverage. For survey and census data, both the numerator and denominator come from the same population. However, the main limitations concern misreporting of age and date of birth of the child, birth omissions, and sampling variability in the case of surveys.

Source: WHO 2010; United Nations 2003; United Nations. Millennium Development Goals Indicators. The official United Nations site for MDG Indicators. http://mdgs.un.org/unsd/mdg/Metadata.aspx; country reports of assessment study for improving administrative data sources for the monitoring of MDG indicators for Mongolia, Nepal, Palau, Sri Lanka, and Viet Nam (ADB 2009a, 2009b, 2009c, 2009d, 2009e).

The discussion on the indicators in Boxes 6.4 to 6.7 is limited to the MDG indicators for which the vital registration systems are the best sources of data. The vital registration system is a continuous source of information for many other population- and demography-related indicators. Readers may refer to the standard technical manuals and guidelines from WHO and other UN agencies, a few of which are listed in sections 6.2 and 6.5.

6.3 OBSERVATIONS AND LESSONS FROM THE COUNTRY STUDIES ON THE USE OF DATA FROM CIVIL REGISTRATION SYSTEMS IN COMPILING THE MILLENNIUM DEVELOPMENT GOALS AND OTHER INDICATORS

The case study countries have established systems for vital registration and compilation of vital statistics. The vital statistics systems in these countries are at different stages of development and have various limitations, such as incomplete coverage of events, poor data quality, and delays in data release, etc. This limits their use in compiling various indicators of fertility and mortality needed for monitoring MDGs and for other health planning and policy needs.

Incomplete Registration and Coverage of Vital Events

A vital registration system is considered good and satisfactory for statistical purposes if the vital events registration is at least 90% complete. The completeness of vital

registration systems varies across countries. For example, in Nepal, geographical and logistical issues and lack of awareness about the registration process have made coverage incomplete, with less than 50% of births and deaths registered. In Sri Lanka and Mongolia, registered births and deaths are considered to be more than 90%. In Palau, registration of births and deaths is considered nearly complete. In Viet Nam, coverage of registrations has been low, especially in the rural areas and in remote and mountainous areas with high density of ethnic minorities. The culture of ethnic minorities and low awareness also affect the coverage.

Sample surveys are an instrument to evaluate the extent of registration of vital events in the case study countries. The performance evaluation of the vital events registration of Sri Lanka has not been conducted recently but a survey conducted in 1980 disclosed the coverage of births to as high as 98.8% and coverage of deaths at 94.0% (Table 6.3A). On the other hand, in Nepal, the Demographic and Health Survey 2006 revealed only about 35.0% birth registration for children below 5 years of age (Table 6.3B).

Table 6.3A: Percentage of Births and Deaths Registered, Sri Lanka

Sector	Births			Deaths		
	1956	1967	1980	1953	1967	1980
All	88.1	98.7	98.8	88.6	94.5	94.0
Urban	96.8	100.0	98.6	94.6	100.0	92.9
Rural	86.6	98.3	99.3	86.9	91.7	92.2
Estate	⋯	100.0	93.6	⋯	100.0	100.0

⋯ = data not available.
Source: Registrar General's Department, Sri Lanka. 2007. Administrative Data Systems and Their Use for Statistical Purposes and Developing MDG Indicators – Existing Practices, Problems and Prospects. Paper presented at the inception workshop of the Asian Development Bank's regional technical assistance for Improving Administrative Data Sources for Monitoring of the Millennium Development Goal Indicators. Bangkok. 9–11 July.

Table 6.3B: Percentage of *De Jure* Children under 5 Years Whose Births Are Registered, Nepal, 2006

Category	Age < 2	Age 2–4	Male	Female	Urban	Rural	Mt.	Hill	Tarai	Total
Percent registered	21.1	43.3	36.0	33.9	41.9	34.0	24.4	29.8	41.0	35.0

Sources: Demographic and Health Survey 2006 and Asian Development Bank. 2009. *Country Report of Assessment Study for Improving Administrative Data Sources for the Monitoring of MDG Indicators, Nepal.* Consultant's report. Manila (TA 6356-REG).

Table 6.3B shows that child registration in Nepal has depended on the need, rather than on the requirement of registering within 35 days as prescribed under the Birth, Death, and other Vital Events (Registration) Act 1976. Children under 2 years are less likely

to be registered (21%) than children aged 2–4 years (43%) because of requirements of producing certificates while enrolling in schools. Children in urban areas and those living in *tarai*[1] are more likely to have their births registered.

Several barriers to registration of vital events lead to incomplete registrations in the developing countries. Box 6.8 lists common barriers to registration, which were also identified in the five case study countries and are commonly found in most developing countries.

Box 6.8: Common Barriers to Civil Registration

- Lack of awareness of rights and duties about registration
- Lack of incentives or lack of awareness of the incentives or benefits (or disincentives) to register
- Geographic constraints – lack of transportation to registration centers
- Illiteracy and language barriers
- Economic reasons – travel costs, registration and late registration fees, and loss of income for time spent pursuing registration
- Limited staff and registration centers leading to high workload and inefficient services
- Complex registration processes requiring identity documents of informers, which are sometimes not available
- Reporting period impinges upon naming ceremony, burial, and mourning customs
- No perceived social benefit from death registration (as opposed to birth registration)
- Sensitivity about reporting of death and the cause of death

Sources: Rao, C., B. Osterberger, T. D. Anh, M. MacDonald, N. T. K. Chúce, and P. S. Hilla. 2009. Compiling Mortality Statistics from Civil Registration Systems in Viet Nam: The Long Road Ahead. *Policy & Practice*. Geneva: WHO Press; Cody, C. 2009. *Count every child: The right to birth registration*. Woking: Plan Ltd.; country reports of assessment study for improving administrative data sources for the monitoring of MDG indicators for Mongolia, Nepal, Palau, Sri Lanka, and Viet Nam (ADB 2009a, 2009b, 2009c, 2009d, 2009e).

Addressing barriers to registration

The following items discuss ways to address barriers to registration.

(i) Organize vital event registration (VER) awareness campaigns and special registration drives in coordination with the local teachers, health workers, and local nongovernment organizations to highlight benefits of registration.

(ii) Consider mobile civil registration units to cover remote and mountain areas. This is particularly useful for countries like Nepal and Viet Nam. For regions with extreme weather conditions, establish seasonal offices for registration of vital events.

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[1] Region in southern Nepal at the foothills of the Himalayas.

(iii) Expand the pool of officials and persons who could inform events, for example, village health workers, school teachers, local police officials, village watchers, village school teachers, priests, funeral services personnel particularly in the rural areas.

(iv) Encourage priests to perform name-giving rituals only when birth registration is done. Provide incentives, such as providing a mobile phone to priests, midwives, and health workers who provide vital information.

(v) Promote the use of registration certificates, e.g., birth certificates for school admissions, and death certificates for burial purposes and acquiring hereditary and property rights.

(vi) Link incentives to registration, e.g., in Mongolia, parents need a child's birth certificate to be covered in health insurance, which is paid by the government until the child reaches 18 years (however, guard against multiple registrations to corner benefits).

(vii) Launch onsite registration campaigns and use innovative methods, such as short messaging services through mobile phones to reach the people and media campaigns through celebrities.

(viii) Make death registration essential for burial purposes (such as in Mongolia and Sri Lanka) and for publishing obituaries.

(ix) Create awareness regarding registration of stillbirths and registration of births and deaths in case of early neonatal deaths.

(x) Strengthen civil registration law to bind hospitals and/or institutions to report births and deaths with cause of deaths to vital registration authorities.

(xi) Declare a national VER day or week or month for the promotion of VER and creating awareness at all levels (Box 6.9).

(xii) Relax the fees and penalties and encourage mass mobilization of registrations (Box 6.10) in countries where registrations are very poor and fees and penalties for late registrations are barriers.

Box 6.9: Civil Registration Month Celebration in the Philippines

In the Philippines, February is celebrated every year as the Civil Registration Month. The declaration of the month of February of every year as the Civil Registration Month was issued by then President Corazon Aquino through Proclamation No. 682 issued on 28 January 1991. It aims to "remind the citizenry of their duty to register acts and events concerning status of persons, and enhance nationwide awareness and appreciation of the legal, administrative and statistical values of civil registry documents." Likewise, it seeks to "underscore the necessity for Congress to provide adequate funds for enforcement and administration of laws on civil registration."

Source: http://www.census.gov.ph/data/pressrelease/2000/pr0008tx.html Accessed on 13 March 2010.

Box 6.10:   Mass Mobile Registration in Cambodia

Plan International[a] has been integral to birth registration success in Cambodia. Following on from the national government's commitment to rebuilding the registration system, Plan International piloted a mobile registration scheme in 2004.

The scheme was supported by the Ministry of Interior and the Asian Development Bank and was so successful that the initiative was rolled out across the country.

Plan International provided technical assistance including training volunteers to help with local planning, undertaking public information campaigns, and supporting the government to alter the civil registration law. Throughout the campaign, birth and death certificates were provided free of charge.

The Ministry of Interior assembled 1,621 commune registration teams comprising over 13,000 people and trained them in registration procedures. These teams were mobilized to register Cambodians and create awareness on birth registration.

After 10 months of Plan International's mobile birth registration program, more than 7,000,000 Cambodians—close to 50% of the population—had received their birth certificates.

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[a] Plan International is a children's development organization working in 48 developing countries across Africa, Asia, and the Americas to promote child rights and lift millions of children out of poverty.

Source: Cody, C. 2009. *Count every child: The right to birth registration*. Woking: Plan Ltd.

Vital Registration Laws and Regulations

The legislation that supports VER is an important element that determines the completeness of registrations. The reporting of vital events is usually mandatory under the law and subject to sanctions for failure to do so. However, these sanctions sometimes also act as barriers to registrations. From the viewpoint of the collection and compilation of timely and reliable vital statistics, the legislation governing the registration of vital events should be reviewed so that the statistical requirements for health planning could be met. The law and associated regulations must include provisions regarding confidentiality of information related to the vital events submitted by individuals and the use of the information, including for statistical purposes. Table 6.4 shows the evolution of the legal framework for vital registration (with reference to death) in Viet Nam (Rao, C. et.al., 2009, p. A). It may be seen that as the law evolved, the provisions for statistical reporting were incorporated for the first time in 1998 and then further amended in 2005.

Table 6.4: Evolution of Legal Framework for Vital Registration in Viet Nam

Characteristic of the Legal Framework	Historical Evolution and Status
Duties and responsibilities for registration and vital statistics	• 1956–1998: Death registration operated by Ministry of Domestic Affairs; 1998 onwards operated by Ministry of Justice • 1956–1998: Registration and issue of certificates free of charge; 1998 onwards, fees for registration and issuance of certificates. • 2005 decree provides clear instruction on maintenance of vital records, issuance of certificates, processing corrections, submission of statistical returns, and registration services for Vietnamese citizens living abroad, in liaison with the Ministry of Foreign Affairs.
Coverage	• Vietnamese decrees all mandate complete coverage.
Reporting responsibilities and penalties	• 1956–1998: Duty of relatives and/or persons of authority to notify death at place of occurrence; late registration punishable by law. • 1998–2005: Notification document not required for death at place of usual residence; late registration subject to financial penalties. • 2005: Death notice mandatory from health authority or responsible person for all deaths; no penalties for delayed registration.
Reporting period	• 1956–1961: Death reported to local police within 24 hours to get burial permit, which is submitted within 7 days for death registration. • 1961–1998: Death registration to be completed within 24 hours. • 1998–2005: Death registration to be completed within 48 hours in urban areas, within 15 days in remote and rural areas. • 2005 onwards: Death registration is required within 15 days of death.
Definitions for early age mortality	• No definitions of fetal death in terms of duration of gestation and/or birth weight in any version of Vietnamese decrees. • 1956 onwards: (According to civil code) fetal deaths require only burial permission, not registration. Neonatal deaths require both birth and death registration. • 2005 onwards: (According to Ministry of Justice guidelines) deaths within 24 hours of birth do not require birth and/or death registration. • 2005 onwards: Infant deaths not reported by parents can be registered by the justice clerks.
Requirements for reporting cause of death	• 1956–1961: No mention of requirement to report cause of death. • 1961–1998: Declarant should mention cause of death in death notice. • 1998: "Doubtful death"[a] requires cause of death issued by police. Death notice from health facilities must include cause of death. • In 2005 decree, cause of death must be mentioned for all deaths. However, there is no stipulation regarding medical opinion as to the cause, nor specific format for reporting cause of death.
Compilation and submission of vital statistics	• 1998: Compilation and submission of vital statistics first stipulated in the decree, including an annual report to government. • 2005: Submission of statistical reports from commune upwards every 6 months. Ministry of Justice responsible for summarizing the events and reporting to the government annually. First annual national compilation of statistics achieved for 2007.

[a] For example: sudden death with no clear cause, death by accident, death by killing, suicide, doubtful murder, driven suicide; missing death; or others regulated by law.
Source: Rao, C., B. Osterberger, T. D. Anh, M. MacDonald, N. T. K. Chúce, and P. S. Hilla. 2009. Compiling Mortality Statistics from Civil Registration Systems in Viet Nam: The Long Road Ahead. *Policy & Practice*. Geneva: WHO Press.(p.A).

The *Handbook on Civil Registration and Vital Statistics Systems, Preparation of a Legal Framework* (United Nations 1998a) provides a comprehensive method for developing an appropriate legal framework for a national civil registration system that highlights its statistical function and its role in the national vital statistics program. The handbook provides necessary elements and a procedure for preparing an organic civil registration law, which ensures that all vital events and records affecting civil status occurring in a given country are recorded within the statutory time limits, while complying with the established rules. The handbook also provides for a draft organic law on civil registration and is a useful reference for countries planning to revise their vital registration law in line with international recommendations.

Statistics on Cause of Death

Recording the cause of death and compiling statistics on cause of death by age and sex are some of the most important activities and outputs of vital registration systems. Information on cause of death by age and sex is needed to understand the burden of disease and with complete coverage of death registrations, it provides needed information on the geographical distribution of diseases for initiating interventions for disease control.

The attending physician, or in cases of medically unattended deaths, the medical-legal officer (coroner or medical examiner), usually records the cause of death in a medical certificate. The responsibility to issue a medical certificate should be provided under a country's laws. The International Statistical Classification of Diseases and Related Health Problems (ICD) of the World Health Organization is the standard international classification for coding diseases, signs, symptoms, and other factors causing morbidity and mortality, for compiling comparable statistics on morbidity and mortality.

A combination of causes affect the quality of data on cause of death: (i) absence of any standard provisions for recording the cause of death; (ii) use of non-standard certificates of cause of death; (iii) inaccurate recording of cause of death on the death certificate; (iv) recording a high proportion of deaths under an ill-defined category; (iv) illegible and incomplete descriptions on cause of death, making it difficult for the coders to assign appropriate codes as per the ICD 10th revision (ICD-10); (v) lack of trained registrars and doctors, coders, etc.; and (vi) no medical certification for deaths taking place at homes or outside health facilities.

Good quality of cause-of-death statistics depends on (i) the use of the International Form of Medical Certificate of Cause of Death (Box 6.11), and (ii) correct and legible recording of cause of death by the doctors in the certificate as per ICD-10.

Box 6.11: International Form of Medical Certificate of Cause of Death

Whenever the cause(s) of death is determined by a medically qualified individual or a medical-legal officer, the diseases or injuries should be reported and recorded in the format and detail contained in the most current version of the International Form of Medical Certificate of Cause of Death, which is shown below.

Cause of Death	Approximate interval between onset and death
I Disease or condition directly (a) …………………………………… leading to death* **Antecedent causes** (b) …………………………….……………… Morbid conditions, if any, giving rise to the above cause, due to (or as a consequence of) stating the underlying conditions last (c) …………………………………………………… due to (or as a consequence of) (d) ……………………………………………………………………	………………...... ………………...... ………………......
II Other significant conditions…………………………………... contributing to the death but not related to the disease or condition causing it ………………………………............. * *This does not mean the mode of dying, e.g., heart failure or respiratory failure. It means the disease, injury or complication that caused death.*	………………...... ………………...... ………………......

Source: United Nations. 2001. *Principles and Recommendations for a Vital Statistics System*, Revision 2. New York: United Nations. p. 41.

Maternal mortality ratio and cause of death statistics. Maternal mortality ratio is one of the MDG indicators whose measurement is severely affected because of problems in measuring causes of death. "This is because the identification of a maternal death requires not only a death certificate, but one that is filled out accurately enough so that it is clear the death was related to a pregnancy. Hence, the measurement of maternal mortality is affected not only by low coverage, but widened further by the poor quality of cause of death reporting. This happens even in developed countries where 100 percent of deaths are reporting. Improvement in maternal mortality measurement requires other actions to assure that maternal deaths are identified. Nevertheless, the process starts with death registration" (Danel and Bortman 2008, p.16).

In Sri Lanka, the vital statistics unit faced a major difficulty in identifying the death of a woman as a maternal death using the standard definition. Details on the cause of death written by the registrars were not enough to identify a maternal death as it did

not mention whether a woman died during pregnancy, childbirth, or within 42 days of termination of pregnancy. Therefore, additional items and/or questions were included in the death form in case of death of a woman whose age is less than 49 years to determine her pregnancy status. Another similar example is the pregnancy status check boxes in the United States Standard Certificate of Death (Box 6.12).

Box 6.12:   Additional Information to Identify Maternal Deaths

Additional Questions in the Vital Statistics of Death – Registration Form B 153, Sri Lanka

(1) Was she expecting a child (pregnant) at the time of death?   YES   NO

(2) Did she deliver a child within 6 weeks (42 days) before   YES   NO
    the date of death?
            Or
    Did she have an abortion within 6 weeks (42 days) before the date of death?

(3) Length of time from delivery or abortion to death (No. of days)

Pregnancy Status Check Boxes in the United States Standard Certificate of Death (Revision 2003)

☐ Not pregnant within past year

☐ Pregnant at the time of death

☐ Not pregnant, but pregnant within 42 days of death

☐ Not pregnant, but pregnant 43 days to 1 year before death

☐ Unknown if pregnant within the past year

Sources: Form of Vital Statistics of Death – Registration 'B' 153, Registrar General's Department, Sri Lanka; United States, National Center for Health Statistics, U.S. Standard Certificate of Death. http://www.cdc.gov/nchs/data/dvs/death11-03final-acc.pdf

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To improve the data quality and accuracy of cause of death statistics, some suggestions are made below:

(i) Medical practitioners' certification of causes of death should be made compulsory under vital registration legislation and regulations.

(ii) Medical certificates of cause of death should be standardized (internationally recommended).

(iii) Maternal deaths must be clearly defined in civil registration regulations, and should provide additional questions (or check boxes) to probe the death of every female.

(iv) Live births and fetal deaths (stillbirths) must be clearly defined in civil registration regulations and in the guidelines issued for the staff, with a requirement to answer additional questions in case of stillbirths and deaths of children below 5 years of age to clearly identify age at death and cause of death of child.

(v) Registration of all stillbirths must be compulsory in civil registration regulations. Health institutions' reporting of stillbirths to vital registration authorities should also be mandatory.

(vi) Doctors, health staff, coders, etc. must be regularly trained on the use of ICD-10 in reporting and recording the causes of death.

(vii) Methods, such as verbal autopsy (see below) must be used to determine the cause(s) of death for deaths in the community or where a medically certified cause of death is unavailable.

(viii) Technological innovations, such as automation of classification of cause of death (Box 6.13) should be introduced for timely processing of correct codes for causes of death. This is however possible only when the recording of cause of death is of sufficient quality.

Box 6.13: Automated Classification of Cause of Death in Australia

The Australian Bureau of Statistics, Australia's national statistical agency, processes about 140,000 deaths annually using an automated coding system—the Mortality Medical Data System (MMDS), which allows the classification of multiple causes of death in accordance with the current version of the International Statistical Classification of Diseases and Related Health Problems (ICD). This results in the coding of every condition mentioned on a death certificate as contributing to the death.

MMDS has been developed by the United States National Center for Health Statistics. The Australian Bureau of Statistics implemented the MMDS system during 1997, after considerable research and testing using ICD-9 and the subsequent introduction from 1999 of ICD-10.

Three main programs make up the MMDS software suite: SuperMICAR, MICAR200, and ACME/TRANSAX. SuperMICAR is a text searching application designed to automatically encode the medical cause of death data into numeric entity reference numbers (ERN). For example, if "myocardial infarction due to hypertension" is recorded on one line of the certificate, it will be separated into two causes, i.e., the hypertension and the myocardial infarction. Each cause is then analyzed, and

Box 6.13 continuation

a unique numeric code (ERN) for each accepted cause of death term is assigned. SuperMICAR contains a thesaurus, dictionary and word list. MICAR200 performs editing and validation functions by accessing mortality coding rules, which are held in look-up files, together with a dictionary. These rules are applied to the ERNs assigned during the SuperMICAR process to produce ICD multiple-cause codes. ACME/TRANSAX applies World Health Organization rules to the ICD codes determined by MICAR200. ACME uses a number of look-up tables to allocate underlying cause codes appropriately. TRANSAX identifies the relationship between conditions mentioned on the death certificate, and then assigns an ICD code for any significant combinations.

In addition to the benefit of allowing for all the conditions on the death certificate to be coded, this system offers several other advantages, including (i) the potential for substantially improving the cost effectiveness of mortality coding; (ii) removal of the subjectivity inherent in manual systems, through the use of pre-coded logic (a percentage of coding still requires manual intervention); and (iii) more internationally comparable mortality statistics.

This system of automated classification demands good quality of data input and therefore could be adopted in a developing country when the recording of the causes of death on the death certificates has reached a certain acceptable level. The system of automated coding is being tested at present on a pilot basis in Sri Lanka.

Sources: Pritchard, Tara. 2007. Growing data needs and potential of administrative data sources for compiling MDG and other development indicators – Australian Bureau of Statistics experience. Paper presented at the regional workshop on regional technical assistance 6356: Improving Administrative Data Sources for the Monitoring of Millennium Development Indicators. Bangkok. July; Danel, Isabella and Marcelo Bortman. 2008. *An Assessment of LAC's Vital Statistics System: The Foundation of Maternal and Infant Mortality Monitoring. HNP Discussion Paper* 44862. Washington, DC: International Bank for Reconstruction and Development and World Bank.

What is Verbal Autopsy?

"**Verbal autopsy** is a structured interview with caregivers or family members of households after a death occurs, used to determine probable cause(s) of death where most deaths occur outside of health facilities, and where direct medical certification is rare (Health Metrics Network 2008, p. 71)." Though not an accurate method of getting the cause(s) of death, the method provides an interim solution for those countries in the region where most deaths take place at home or in the community and a medically certified cause of death is not available.

For example, Sri Lanka has introduced a verbal autopsy form to be filled out where the cause of death is not given by the medical practitioner or where an inquirer's certificate on sudden deaths is not received (Box 6.14). Many other developing countries also use

Box 6.14:   Cause of Death – Verbal Autopsy Form – Sri Lanka

Registration "B" 155

Cause of death - Verbal Autopsy

Division (Birth and Death) ……………………………………………...………………….. Entry No.

TO IDENTIFY THE CAUSE OF DEATH ONLY

(These particulars shall be entered only If the Cause of Death is not given by a Medical Practitioner or an Inquirer's Cetificate is not received from an Inquirer into Sudden Deaths)

(1) According to your knowledge did the death occur due to one or more of the following diseases?
   (Mark X in correct boxes)

Disease	**Period of Disease**
	*(Delete inapplicable words)
1. High blood pressure	*Years/Months/Days
2. Heart disease	*Years/Months/Days
3. Diabetes	*Years/Months/Days
4. Kidney ailment	*Years/Months/Days
5. Paralysis	*Years/Months/Days
6. Wheeze	*Years/Months/Days
7. Any fever	*Years/Months/Days
8. Cancer	*Years/Months/Days

   Write the place of cancer …………………………………………………………….

(2) If the death was due to any other disease, write the disease here:
   ………………………………………………………………………………………

(3) In your opinion, if the death was not due to any disease, what is the cause of death?
   ……………………………………………………………………………………..

(4) Symptoms shown by the deceased at the time of death or before the death . **(Mark X in the relevant box or boxes)**

1. Numbness		7. Excessive Vomitting	
2. Unable to talk		8. Head ache	
3. Fell down		9. Severe stomach ache	
4. Excessive perspiration		10. Vomit blood	
5. Unconsciousness		11. Loose motions	
6. Chest pain		12. Discharge of phlegm through mouth	

(5) Was he/she addicted to following habits **(Mark X in correct boxes)**
   1. Consumption of Liquor
   2. Smoking
   3. Consumption of drugs

(6) Any other remarks relating to cause of death write here:
   …………………………………………………………………………………………….

Source: Country report of assessment study for improving administrative data sources for the monitoring of MDG indicators for Sri Lanka.

verbal autopsy to meet data gaps on the cause(s) of death. In India,[2] verbal autopsy has also been used in combination with the SRS, and in the People's Republic of China, the Disease Surveillance Points System has reported cause of death through a mix of verbal autopsy and medical certification (Box 6.16).

The World Health Organization has published a manual in 2007, *Verbal Autopsy Standards: Ascertaining and Attributing Causes of Death* (WHO 2007b), to disseminate new standard data collection and cause-of-death assignment resources for verbal autopsy. The manual provides (i) verbal autopsy questionnaires for three age groups: (a) under 4 weeks, (b) 4 weeks to 14 years, and (c) 15 years and above; (ii) cause-of-death certification and coding guidelines for applying the ICD-10 to verbal autopsy; and (iii) a cause-of-death list for verbal autopsy with corresponding ICD-10 codes.

The manual is a useful reference for countries with existing systems of verbal autopsy and for developing countries with deficient medical certification of deaths for improving their database on the cause of death.

Timeliness in Vital Registration Statistics

The organization of vital registration systems is through a large network of local registrars spread throughout the country, where the primary records and documents are created. For example, Sri Lanka has 914 registrars and in Nepal, each of the more than 4,000 village development committees and municipalities has a registrar. Experiences from Mongolia, Nepal, Sri Lanka, and Viet Nam suggest that the local and district level offices depend on paper-based manual record-keeping and for reporting and compiling vital statistics. They also depend on traditional modes, such as post or fax to transmit original reports, paper copies, and vital registration records for further processing to the data processing centers that are usually at the provincial or central offices.

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[2] Four verbal autopsy tools were used in India in a large study undertaken from 2001 to 2003 by the office of the registrar general in collaboration with the Centre for Global Health Research, aimed to gather information about risk factors and causes of death for a large sample of households. These tools were designed for (i) neonatal death (28 days or less of age), (ii) child death (29 days to 14 years of age), (iii) adult death (15 years or older), and (iv) maternal death (females aged 15–49 years). The causes of death were determined using an advanced form of verbal autopsy called the "RHIME" or the Representative, Re-sampled, Routine Household Interview of Mortality with Medical Evaluation method. The assignment of cause of death involved medical evaluation by two independent trained physicians who examined the field reports using a web-based system developed specifically for this study. Selected cases were treated as equivalent while continuing disagreements were referred via the web-based system to a senior third physician who adjudicated the final ICD-10 code. The verbal autopsy tools used and other documents of the study can be accessed at http://cghr.org/index.shtml

One of the main concerns in this process are the delays that occur due to the manual preparation of statistical reports by the local registrars and sending out these reports and documents to the data processing centers. Lack of availability of timely data diminishes its usefulness for timely inputs in policy and planning. Another reason is that the complete computerization of all processes of a vital registration system requires massive investments in hardware, software, and networking infrastructure. Given the scarce financial and skilled manpower resources in developing countries, this could be a long-term objective and could be implemented in stages.

However, emerging technologies can help countries improve the timeliness in data processing and also streamlining the data recording and storage operations. Sri Lanka presents an example of adoption of information technology in quickening the process of data capturing and its transmittal from the districts to the central office (Box 6.15).

Box 6.15: Processing of Vital Statistics Forms in Sri Lanka – Use of Scanners

Sri Lanka has an organization of 914 registrars all over the country and 330 divisional secretary offices at the next level, with 33 district offices and the Vital Statistics Unit at the center in the Registrar General's Department. The collection of data at the local registrar levels and its flow upwards takes place from the local registrar offices to the higher levels of the administrative hierarchy (Box 6.2).

To reduce the huge time lag in releasing vital statistics due to the data processing delays, a new data processing system was introduced in 2006. The new system is based on an improved and low-cost technology. Under the new system, the 914 registrars prepare the paper-based statistical returns associated with each birth and death, along with the cause of death-related documents. The completed statistical returns with the duplicates of birth and death certificates are handed over to the relevant divisional secretaries' office, where the contents of the statistical returns are checked for accuracy and completeness. After assuring the accuracy and completeness of data, common identification codes are assigned and statistical returns are submitted to the 33 district scanning centers. District offices check statistical returns on a sample basis for correctness and accuracy of data before scanning. Each of the paper-based statistical returns are then scanned at the district scanning centers, thus obviating the need for data entry of the forms. The scanned images of the reports are sent from the district offices to the Vital Statistics Unit at the Registrar General's Department in the center where the images are converted into data files. The data files thus created are used to produce relevant data tables.

Box 6.15 continuation

Box Figure 6.15: Data Flow and Processing System of Vital Statistics Forms
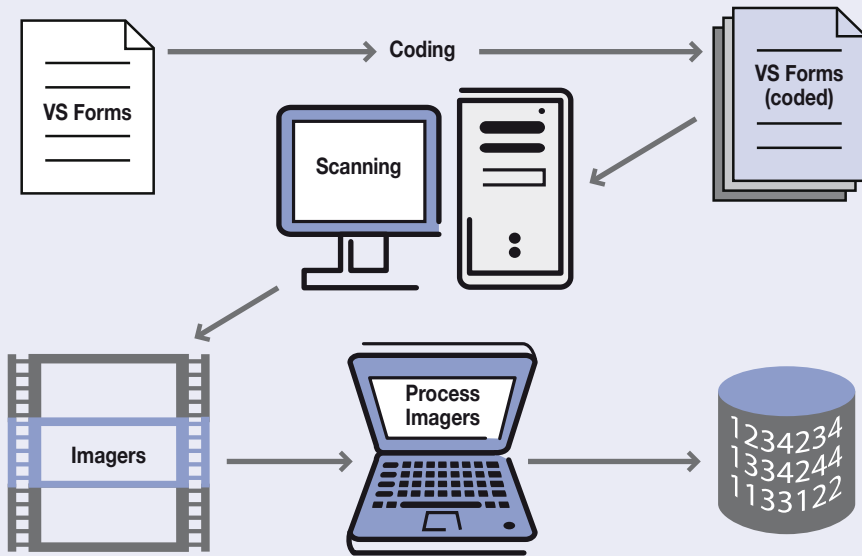
VS = vital statistics.
Source: Asian Development Bank. 2009. *Country Report of Assessment Study for Improving Administrative Data Sources for the Monitoring of MDG Indicators, Sri Lanka*. Consultant's report. Manila (TA 6356-REG); Registrar General's Department, Sri Lanka. 2010. Presentation made at the Third Global Forum on Gender Statistics. Manila. 11–13 October.

Mongolia, which has a very wide territory, also experienced delays in receiving hard copies of the vital registration documents from the lowest levels of administration to *soums,*[3] from *soums* to *aimags* (provinces), and finally at the central level to the General Authority for State Registration (GASR), where the vital records were translated into an electronic form. To cut delays in transmitting records to the central data processing unit, the GASR in 2009 implemented a project that connects 21 *aimags* and 9 districts of Ulaanbaatar city through an online network. In this way, GASR collects and disseminates data through the online network, which has significantly reduced the delays in data transmission.

In Nepal, a study by the Ministry of Local Development has recommended the process and methods to computerize the vital statistics system processes from the village development committee to the central levels. The Ministry of Local Development, with assistance from Plan International and others, initiated a pilot project for the

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[3]   *Soum* is an administrative subdivision of the *aimag* in Mongolia, similar to a district.

development of a software for registration of vital events. The intention is to replicate the project after reviewing the results of its implementation in few districts. This will facilitate data collection at the local level and data compilation at the district development committee and ministry levels.

Advantages of decentralized data processing. The shifting of data entry functions to the lower levels will not only speed up the processing of vital events information, but will also improve data quality and the storage of documents in electronic form. As countries move toward implementing the information technology infrastructure to improve timeliness and data quality in the vital registration systems, one issue that should be kept in mind is to provide extensive training and capacity building to the local registrars, health department staff, and other staff involved. As investments in modernizing the entire civil registration system of a country are very high, a study should be undertaken to identify the most appropriate hardware and software infrastructure.

Organizational Issues and Coordination

In most countries, different agencies are involved in the collection and production of vital statistics. The key agencies that are involved in collecting and producing vital statistics are (i) the vital registration agency through the vital registration system, (ii) the national statistics office through the population census and household surveys, and (iii) the ministry responsible for health through its facility reporting system and household surveys on health and demography. Thus, agencies need to coordinate to integrate the vital statistics system with respect to coverage, definitions, classification schemes, and methodologies, etc., and to share and compare information generated by different agencies. While the population census provides a baseline for the age and sex distribution of the population by small areas, a good vital registration system is needed to update the population data to estimate the population for the intercensal years.

Information on vital events should be provided to the agency responsible for population estimates. Similarly, vital statistics generated by other agencies, such as the Ministry of Health should be shared with the vital registration agency. The best way to do so is through establishing a standing interagency coordination committee representing relevant agencies for discussing technical issues and harmonizing data from different sources. Absence of good coordination mechanisms between agencies might result in different series of vital statistics that are inconsistent.

Table 6.5 gives different estimates of births and deaths compiled by three different agencies—the GASR, the Ministry of Health, and the National Statistics Committee (NSC) of Mongolia based on their data collection systems. A joint study (ADB 2009f)

was conducted by the NSC, GASR, and the Ministry of Health, under the Asian Development Bank's regional technical assistance on Improving Administrative Data Sources for Monitoring of the Millennium Development Goal Indicators (ADB 2006), to identify the reasons for discrepancies in the three sets of data. The study found operational and technical reasons for the differences. As a result of this study, the NSC and the GASR issued a joint order No. 01/591 66 in May 2009 to establish a working group under the chairmanship of the vice chairman of NSC, with members from both organizations to harmonize the data on permanent population, vital statistics, and migration based on registration.

Table 6.5: Estimates of Births and Deaths by the Ministry of Health, the General Authority for State Registration, and the National Statistics Committee, Mongolia

Year	Number of Births			Number of Deaths		
	GASR	NSC	MoH	GASR	NSC	MoH
2005	48,101	45,326	45,171	15,338	16,480	15,469
2006	48,805	49,092	47,376	15,185	16,682	15,665
2007	55,075	56,636	55,774	15,418	16,259	15,510

GASR = General Authority for State Registration, MoH = Ministry of Health, NSC = National Statistics Committee.
Source: Asian Development Bank. 2009. *Pilot Study – Improving Quality of Administrative Statistics of Births, Deaths, and Migration in Mongolia for Compiling Better MDG and Other Indicators.* Consultant's report. Manila (TA 6356-REG).

6.4 SAMPLE REGISTRATION SYSTEMS AND VERBAL AUTOPSY—ALTERNATIVE SOURCES OF VITAL STATISTICS

The vital registration systems in many developing countries have been underperforming in generating timely and reliable statistics on births and deaths with cause of death, limiting their utility in evidence-based health policy and monitoring of health goals and targets. Although the most preferred long-term goal for good vital statistics is a fully functional civil registration system of births and deaths with medical certification of causes of death, attaining this objective for most countries is not likely to happen in the near future. With inadequate civil registration systems in several countries, alternative methods have been devised and are in practice. Sample vital registration systems are one alternative that can be implemented as an interim solution to the establishment of a complete vital registration system.

Sample registration systems. These are population-based systems of continuous recording of demographic events over time including cause of death via verbal

autopsy in a nationally representative cluster sample. "Many countries where civil registration systems are not fully developed can adopt sample registration to register vital events and estimate the vital rates. They record vital events on a continuous basis as in a full civil registration system. If properly conducted and gradually expanded, sample registration can develop into a national civil registration system. In this case, a well prepared plan of expansion should be adopted from the beginning. The main drawback of this approach is that it does not provide vital rates estimates for the local level. Moreover, the denominators for calculating the demographic rates must come from population censuses" (United Nations 2001, p. 93).

An important consideration in the implementation of a sample registration system and deciding the sample size is to choose which indicators of fertility, mortality, and other vital rates are targeted and the population groups of interest at the national and subnational levels that the sample would be representative of. For example, in the SRS in India, infant mortality is the decisive indicator for estimating sample size at the natural division[4] level, the ultimate level for estimation and dissemination of indicators for rural areas. The permissible level of error has been taken as 10 percentage relative standard error (prse) at the natural division level for rural areas, and 10 prse at the state level for urban areas, in respect of major states having a population of more than 10 million as per Census 2001. For minor states, 15 prse has been fixed at the total state level. Based on the above criteria, the number of units has been decided at 7,597, with 4,433 in rural and 3,164 in urban areas.

India's SRS and the People's Republic of China's disease surveillance points (DSP) are good alternative systems of collecting vital statistics. The systems of SRS established in India and the DSP in the People's Republic of China are presented in Box 6.16.

Box 6.16: Alternative Methods for Collecting Vital Statistics – India and the People's Republic of China

Sample Registration System in India

Various methods based on the application of sampling techniques have been tried and tested in many developing countries. Such methods include single and multiround retrospective surveys and the dual record system. India's Registrar General initiated the scheme of sample registration of births and deaths popularly known as the sample registration system (SRS) in 1964–1965 on a pilot basis and on full scale from 1969–1970, covering about 3,700 sample units. Since 2004, SRS covers 7,597 sample units (4,433 rural and 3,164 urban) in all states and union territories. The main objective of SRS is to provide reliable estimates of birth rate, death rate, and infant mortality rate

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4   Natural divisions are classified groups of contiguous administrative districts with distinct geographical and other natural characteristics.

Box 6.16 continuation

at what are known as the natural division level for the rural areas and at the state level for the urban areas. It also provides data for other measures of fertility and mortality including total fertility, and infant and child mortality rate at higher geographical levels.

The main components of the SRS are:

- Baseline survey of the sample units to obtain usual resident population of the sample areas
- Continuous (longitudinal) enumeration of vital events pertaining to usual resident population by the enumerator
- Independent retrospective half-yearly surveys for recording births and deaths that occurred during the half-year under reference, and updating the house list, household schedule, and the list of women in the reproductive age group along with their pregnancy status by the supervisor
- Matching of events recorded during continuous enumeration and those listed in the course of the half-yearly survey
- Field verification of unmatched and partially matched events
- Filling out of verbal autopsy forms for finalized deaths.

The SRS in India is based on a dual record system. The field investigation under SRS consists of continuous enumeration of births and deaths in sampled villages and urban blocks by a resident part-time enumerator, and independent 6 monthly retrospective surveys by a full-time supervisor. The data obtained through these two sources are matched. The unmatched and partially matched events are re-verified in the field to get an unduplicated count of correct events. The advantage of this procedure, in addition to elimination of errors of duplication, is that it leads to a quantitative assessment of the sources of distortion in the two sets of records, making it a self-evaluating technique.

The system of verbal autopsy is used to identify the most probable cause of death based on "lay diagnosis reporting (post-death verbal autopsy)" method through post-death enquiry based on symptoms, conditions, duration, and anatomical site of the disease as observed by family members of the deceased at the time of death. The supervisors of SRS have been trained by medical professionals in the art of collecting data on causes of deaths and a well-designed verbal autopsy instrument has been developed and introduced in SRS.

The People's Republic of China's Disease Surveillance Points System

The People's Republic of China's (PRC) population of 1.3 billion has made complete civil registration and medical certification of every single death virtually unattainable. Moreover, approximately 70% of deaths take place at home, thus, making it difficult for a local doctor to determine the cause of each death and to make accurate report due to distances and unfamiliarity with each case. These and the increasing awareness on the crucial role cause of death data play in the development of health programs and policies have prompted the PRC authorities to improve its system of counting deaths. Two systems of counting deaths currently exist, namely, the Ministry of Health vital registration system and the disease surveillance points (DSP) system, which

Box 6.16 continuation

is monitored by the country's Center for Disease Control and Prevention. Since its launch in 1989, the DSP system has reported on causes of death through a mix of verbal autopsy and medical certification. Since many indicators were not reliable, the system has been adjusted over the years by increasing the coverage to better reflect the entire population. From the initial 145 sites, current coverage stands at 160 sites accounting for 6% of the country from the 1% coverage in 1989. It makes the DSP system more representative because sites are selected on the basis of the census data to make them better reflect the entire population.

To reduce running costs and increase efficiency, the Government of the PRC is planning to merge the DSP and vital registration systems, which are already complementary. In the meantime, the two systems will continue to run for several more years until such time that an adequate number of doctors have been trained to certify deaths and when the DSP system is able to provide data that can be converted into usable statistics.

Sources: Office of Registrar General and Census Commissioner, India. http://www.censusindia.gov.in/Vital_Statistics/SRS/Sample_Registration_System.aspx; Mooney, P. 2006. Counting the Dead in China. *Bulletin of the World Health Organization.* Vol. 84, No 3. March. Geneva: WHO Press. http://www.who.int/bulletin/volumes/84/3/news30306/en/

Sample vital registration with verbal autopsy. One of the methods being used in some poor and developing countries is known as Sample Vital Registration with Verbal Autopsy (SAVVY) developed by MEASURE Evaluation and the US Census Bureau. SAVVY[5] is a family of methods that allows direct measurement of vital events and the determination of causes of death in a nationally representative sample, or selected "sentinel" areas. SAVVY also provides short- to medium-term needs for critical information on births, deaths, and cause of death at the population level.

A complete SAVVY system combines vital registration with the application of validated verbal autopsy procedures implemented in a nationally representative sample of population clusters. It follows a simple stepwise process:

  (i)   A complete baseline census of all households and residents in relevant areas is conducted;[6]
 (ii)   A local key informant notifies a verbal autopsy interviewer of all deaths occurring in the key informant's assigned area;
(iii)   A verbal autopsy interview is conducted by an interviewer at the household where the death occurred; and

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[5]   A series of SAVVY mortality surveillance system manuals and guides, together with the WHO verbal autopsy standards publication and other documents, is available at no cost as a CD-ROM resource kit or as documents that can be downloaded from MEASURE Evaluation. http://www.cpc.unc.edu/measure/tools/monitoring-evaluation-systems/savvy

[6]   The census information on the residents of each sample area is updated annually.

(iv) A panel of physicians reviews the forms, assigns a specific cause of death, and writes death certificates according to protocols based on ICD-10.

Successful implementation of SAVVY requires coordinated efforts of the vital registration agencies, the national statistics office, Ministry of Health, local government, and the public in general. A general outline of the field operations of SAVVY is provided in Figure 6.1.

Figure 6.1:   Chart of a SAVVY System
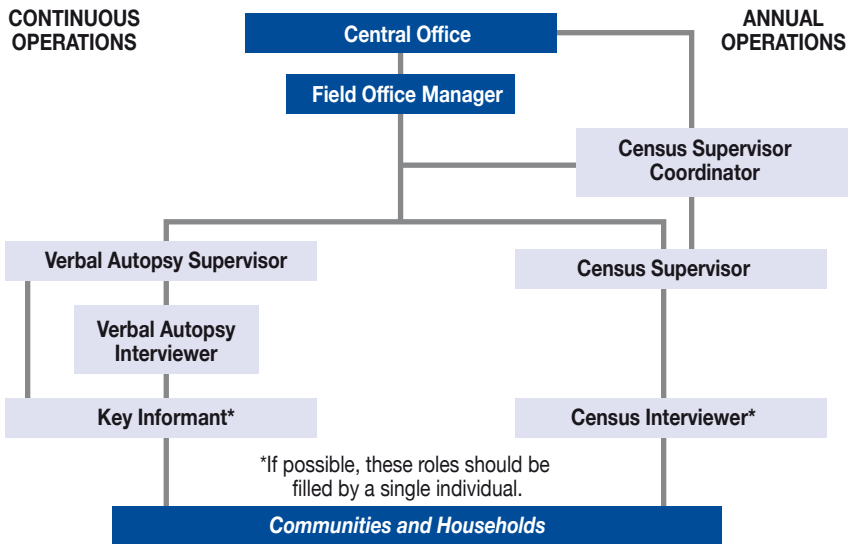
Source: MEASURE Evaluation. Sample Vital Registration with Verbal Autopsy (SAVVY). An overview. http://www.cpc.unc.edu/measure/publications/pdf/ms-07–26-OB.pdf

6.5   RESOURCES AND TOOLS ON CIVIL REGISTRATION AND VITAL STATISTICS

Civil or vital registration systems are the best sources for producing vital statistics on a continuing basis. However, evidence from the current state of vital registration systems in the five case study countries shows that these systems need to be strengthened so that they develop into timely and reliable sources of vital statistics and causes of death may be accurately ascertained. The increase in the use of indicators for monitoring socioeconomic development and the need for population-related statistics has raised the need to strengthen vital registration systems.

International organizations concerned have provided guidelines and classifications on the technical aspects of the organization of the vital registration system for the guidance of national authorities in implementing vital registration systems. While the WHO has published the ICD and its periodic updates and the verbal autopsy standards, the United Nations Statistics Division, as part of its work on vital statistics, has issued the revised version of the *Principles and Recommendations for a Vital Statistics System,* Revision 2 (United Nations 2001)*.* In addition, the United Nations Statistics Division has issued a series of six handbooks, which deal with the methods of implementing different aspects of civil registration and vital statistics and their improvement. These publications are excellent reference materials in establishing a vital registration and vital statistics system. Some of these key publications include:

(i) United Nations. 2002. *Principles and Recommendations for a Vital Statistics System,* Revision 2*.* http://unstats.un.org/unsd/demographic/sources/civilreg/civilreg3.htm

(ii) United Nations. 2002. *Handbook on Training in Civil Registration and Vital Statistics Systems.* http://unstats.un.org/unsd/demographic/sources/civilreg/civilreg3.htm

(iii) United Nations. 1998. *Handbook on Civil Registration and Vital Statistics Systems: Computerization.* http://unstats.un.org/unsd/demographic/sources/civilreg/civilreg3.htm

(iv) United Nations. 1998. *Handbook on Civil Registration and Vital Statistics System: Developing Information, Education and Communication.* http://unstats.un.org/unsd/demographic/sources/civilreg/civilreg3.htm

(v) United Nations. 1998. *Handbook on Civil Registration and Vital Statistics Systems: Management, Operation and Maintenance.* http://unstats.un.org/unsd/demographic/sources/civilreg/civilreg3.htm

(vi) United Nations. 1998. *Handbook on Civil Registration and Vital Statistics System: Policies and Protocols for the Release and Archiving of Individual Records.* http://unstats.un.org/unsd/demographic/sources/civilreg/civilreg3.htm

(vii) United Nations. 1998. *Handbook on Civil Registration and Vital Statistics Systems: Preparation of a Legal Framework.* http://unstats.un.org/unsd/demographic/sources/civilreg/civilreg3.htm

(viii) World Health Organization. 2007. *International Statistical Classification of Diseases and Related Health Problems. 10th Revision,* version for 2007. World Health Organization. http://apps.who.int/classifications/apps/icd/icd10online/

(ix) World Health Organization. 2007. *Verbal Autopsy Standards: Ascertaining and attributing causes of death.* Geneva: World Health Organization. http://www.who.int/whosis/mort/verbalautopsystandards/en/index.html

The Health Metrics Network and WHO, in collaboration with other development partners, have developed a useful resource kit for monitoring vital events. The resource kit provides a collection of key documents and standards on vital statistics at one place (Box 6. 17).

Box 6.17: Monitoring Vital Events Resource Kit: Stepping Stones for Strengthening Vital Statistics Systems

A resource kit on vital statistics, *Monitoring Vital Events Resource Kit: Stepping Stones for Strengthening Vital Statistics Systems*, is a collection of key documents, standards, guidelines, and relevant technical resources necessary to establish and maintain civil registration and the complementary systems at one place. It represents international best practice and global standards in the areas of population and health. This resource kit is intended to aid national agencies, development partners, and technical experts to strengthen the monitoring of vital events by providing easy, user-friendly access to technical documents relating to civil registration, cause of death attribution, sentinel and sample registration with verbal autopsy, and demographic surveillance.

The resource kit is a compilation of available materials from the World Health Organization, the United Nations Statistics Division, and technical experts around the world. It also provides abstracts of papers and links to the full papers appearing in *The Lancet* in 2007 entitled "Who Counts?" and provides an excellent starting place for those who require an introduction to issues, including (i) gaps in information policy left by inadequate vital events and cause of death data, (ii) the current state of civil registration, (iii) technical aspects of alternative vital events data systems and sources, and (iv) proposed next steps that the global community and countries can undertake to strengthen the monitoring of vital events.

Source: Health Metrics Network. 2007. *Monitoring Vital Events Resource Kit: Stepping Stones for Strengthening Vital Statistics Systems*. CD-ROM. Geneva: World Health Organization.

While innovative technology-based solutions would be needed to cut delays and improve data quality, staff engaged in collecting, compiling, and processing of information should be trained and re-trained, and their skills upgraded to adopt the new methodology and technology. Data compiling and processing centers will have to be upgraded and supported by computer processing facilities, with the provisions for electronically generating vital records at the level of the registrar. An important element in a vital registration system is its use by the population for which it is meant to serve. Thus, creating awareness among the citizens on the benefits of vital registration will go a long way in improving its coverage and hence its use for statistical purposes in producing timely and reliable vital statistics.

Improvements in vital registration systems are a long-term and resource-intensive process and should be implemented through a stepwise approach, after a comprehensive assessment of the state of the vital registration system in the country. Interim measures developed and in use in some countries to collect vital statistics need to be seen as long-term alternatives to civil registration systems and the ultimate goal should be a fully functional and complete civil registration system with medical certification of cause of death. In view of the benefits of a vital registration system to the citizens and benefits for evidence-based planning and policy making for the population and health, governments must undertake these investments in cooperation with development partners.

KEY POINTS

→ The main agencies involved in collecting and producing vital statistics are (i) the vital registration agency through the vital registration system, (ii) the national statistics office through the population census and household surveys, and (iii) the ministry responsible for health through its facility reporting system and household surveys on health and demography.

→ A fully functional vital registration system with complete coverage of births, deaths, and other vital events, along with a good system of ascertaining the cause of death, is the most important or preferred source of demographic and health statistics needed for monitoring health outcomes.

→ While the censuses, surveys, and routine reporting are good complementary sources of vital statistics, and SRSs are good alternatives to collect vital statistics, there is no substitute for continuous information on vital events as obtained from the registration of vital events in a civil registration system.

→ Vital registration systems are the most preferred source of data on fertility and mortality because they collect information prospectively and cover the entire population. Vital registration systems are also considered the gold standard for compiling the MDG indicators for monitoring maternal, child, and infant mortality.

→ In the absence of fully functioning vital registration systems, population censuses and household surveys are widely used in many developing countries as alternative or complementary sources of vital statistics. However, survey data are subject to recall error and require large samples in estimating certain vital events whose incidences are uncommon.

→ While the population census provides a baseline for the age and sex distribution of the population by small areas, a good vital registration system is needed to update the population data to estimate the population for the intercensal years, which is needed in compiling many indicators as a denominator value.

→ The vital statistics systems in developing countries are at different stages of development and suffer from various limitations of completeness in registration of births and deaths and in ascertaining the cause of death. There are issues of poor data quality and timeliness, thus, limiting their use in compiling various indicators and rates of fertility and mortality needed for monitoring MDGs and other development goals and targets.

→ Several structural and societal barriers to registration of vital events exist, which lead to incomplete registrations of vital events. These include lack of awareness and incentives, geographical constraints, costs to the informants, complex registration processes, social and cultural reasons, etc.

→ Legislations on vital events should be reviewed to identify deficiencies in terms of current statistical needs and to modernize the vital registration process. Documents and forms used for reporting should be reviewed and modified to incorporate current data needs.

→ Interim methods for collecting vital statistics, such as SRSs with verbal autopsy (for example SAVVY) have been devised and are practiced in some countries with inadequate civil registration systems. The SAVVY system combines vital registration with the application of validated verbal autopsy procedures implemented in a nationally representative sample of population clusters.

→ While innovative technology-based solutions would be needed to cut delays and improve data quality, staff engaged in collecting, compiling, and processing of information in these subject areas should be trained and re-trained and their skills upgraded to adopt the new methodology and technology.

→ Improvements in vital registration systems are a long-term and resource-intensive process and should be implemented through a stepwise approach after a comprehensive assessment of the state of the vital registration system in the country.

→ Tools and resources on developing the vital registration and vital statistics systems have been developed by the United Nations and development partners for guidance of countries in establishing and improving their civil registration systems and vital statistics.

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CHAPTER 7

PRACTICES IN COMPILING THE MILLENNIUM DEVELOPMENT GOALS INDICATORS IN THE CASE STUDY COUNTRIES

Key Points

Chapter 7 presents the monitoring process for the Millennium Development Goals (MDG) at the international, regional, and national levels. It also presents data needed for compiling the prescribed indicators in the framework of the MDG and the recommended data sources. The chapter reviews the status of availability of MDG indicators and the practices and data sources used in compiling the MDGs for national level monitoring in the five case study countries of Mongolia, Nepal, Palau, Sri Lanka, and Viet Nam. It identifies the data gaps and the MDG indicators that are not compiled in these countries. The country reviews show how the data sources used in compiling the indicators vary across countries—some rely on administrative data sources, where these sources provide a potential alternative, while others use sample surveys more frequently.

7.1 MONITORING THE PROGRESS OF THE MILLENNIUM DEVELOPMENT GOALS

Global and national monitoring of the progress of the MDGs needs a systematic and quantitative tracking and review.

For **global level** monitoring, the United Nations (UN) secretary-general reports to the UN General Assembly on the progress toward the attainment of the MDGs through annual reports that use indicators compiled by competent international agencies (also known as the "custodian agencies"). This facilitates comparison of indicators across countries based on standard concepts, definitions, and methodologies. These international agencies are expected to assemble baseline and current MDG statistics from country sources. As part of global monitoring, the UN released *The Millennium Development Goals Report 2010* (United Nations 2010) in September 2010.

At the **country level**, representatives of development partners and counterparts from the government monitor the progress and periodically prepare national MDG reports. For country monitoring, indicators used are generally those compiled from national sources, as produced by the national statistical system. A **national MDG report** is a

tool by which countries monitor progress toward the attainment of the goals and also to trigger action for accelerating MDG progress.

Monitoring MDG progress at the subnational levels is important as national level indicators may not reveal disparities. For this purpose, some countries present the values of indicators at the provincial or regional levels. For example, the national MDG report of Viet Nam presents data for most indicators for 8 regions and 64 provinces.

Some countries have attempted to localize the MDG monitoring process by preparing MDG reports at district levels. For example, in Nepal, MDG reports for the five districts of Banke, Bhaktapur, Chitwan, Kanchanpur, and Morang were prepared to facilitate localization of the MDGs in support of the government's decentralization process. The reports provided a comparative analysis of the five districts and the existing disparities on selected MDG indicators in 2005.

At the **regional level**, the regional partnership of the Asian Development Bank (ADB), United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), and the United Nations Development Programme (UNDP) regularly produces reports carefully tracking the progress of the Asia and Pacific region toward the attainment of the MDGs. The 2010/11 Asia-Pacific regional report on MDG progress, *Paths to 2015: MDG Priorities in Asia and the Pacific* (ADB, UNESCAP, UNDP 2010) was released in September 2010. Box 7.1 summarizes the status of progress in the region presented in the report, which is based on 21 out of the 60 official MDG indicators from data available in the Global Millennium Development Goals Indicators Database.

Box 7.1: Where Does Asia and the Pacific Stand on the Attainment of the Millennium Development Goals?

Targets achieved. Asia and the Pacific has achieved the targets for some indicators: (i) reducing gender disparities in primary, secondary, and tertiary education; (ii) preventing rise in HIV prevalence; (iii) stopping the spread of tuberculosis, (iv) reducing consumption of ozone-depleting substances; and (v) halving the proportion of people without access to safe drinking water.

Targets on track. The region is on track in halving the proportion of people living in extreme poverty with the reduction in the number of people living on less than $1.25 a day from 1.5 billion in 1990 to 947 million in 2008, despite the increase in the region's population by some 800 million.

Targets achievement slow. The region has been slow in reducing the extent of hunger, in ensuring that girls and boys reach the last grade of primary education, in

Box 7.1 continuation

reducing child mortality, in improving maternal health, in providing basic sanitation, and in scaling up HIV prevention services.

Box Table 7.1 summarizes the progress in the different subregions of Asia and the Pacific for 21 indicators. Subregional disparities in the attainment of MDGs can be seen from the table.

Box Table 7.1: Country Groups On and Off Track for the Millennium Development Goals

Goal	1		2			3			4		5		6			7					
	$ 1.25 per day poverty	Underweight children	Primary enrollment	Reaching last grade	Primary completion	Gender primary	Gender secondary	Gender tertiary	Under-5 mortality	Infant mortality	Skilled birth attendant	Antenatal care (≥ 1 visit)	HIV prevalence	TB incidence	TB prevalence	Forest cover	Protected area	CO₂ emissions	ODP substance consumption	Safe drinking water	Basic sanitation
Asia -Pacific	▶	■	■	◀	■	●	●	●	■	■	■	■	●	●	●	◀	●	◀	●	●	■
Excluding PRC and India	■	■	■	◀	■	●	●	●	■	■	■	■	◀	●	●	◀	●	◀	◀	▶	■
Southeast Asia	■	▶	◀	◀	●	●	●	●	■	■	■	■	●	●	●	◀	●	◀	●	▶	▶
South Asia	■	■	■	■	■	●	▶	▶	■	■	■	■	●	◀	●	●	●	◀	●	●	■
Excluding India	▶	■	■	■	■	●	▶	▶	■	■	■	■	◀	◀	●	◀	●	◀	●	■	■
Pacific Islands		◀			■	◀	■	▶	■	■	◀		◀	●	●	◀	●	◀	●	◀	◀
Excluding PNG			◀	▶	◀	●	●	●	■	■	◀			●	●	◀	●	◀	●	■	■
North and Central Asia	◀	▶	▶	●	●	●	●	●	■	■	●		◀	◀	●	◀	●	◀	◀	■	■
Excluding Russian Federation	◀	●	▶	●	●	●	●	●	■	■	●	●	◀	◀	◀	◀	●	◀	●	■	▶
Asia and the Pacific LDCs	■	■	■	■	■	●	●	▶	■	■	■	■	●	●	●	◀	●	◀	●	■	■

Key: ● Early achiever ▶ On-track ■ Slow ◀ Regressing/No progress

CO₂= carbon dioxide, TB = tuberculosis, LDC = least developed country, ODP = ozone-depleting potential, PNG = Papua New Guinea, PRC = People's Republic of China.
Source: Asian Development Bank, United Nations Economic Commission for Asia and the Pacific, and United Nations Development Programme. 2010. *Paths to 2015 – MDG Priorities in Asia and the Pacific.* Asia-Pacific MDG report 2010/11. Bangkok: United Nations.

7.2 DATA REQUIREMENTS FOR MONITORING THE MILLENNIUM DEVELOPMENT GOALS AT THE NATIONAL LEVEL

At the heart of monitoring the progress of the MDGs is the need for timely and reliable data for compiling indicators based on recommended statistical standards. Progress on attaining the MDGs is therefore a data-intensive process. Indicator values used for preparing MDG reports at any level should ideally be based on data produced by national statistical systems.

To analyze the progress at the subnational levels and across relevant subgroups, indicators should be available at relevant diaggregations, such as subnational geographic area, rural–urban, sex, age, minorities, ethnic classes, etc., where applicable. This imposes further data needs for the countries and challenges for the national statistical agencies. As discussed in chapters 2 and 3, the main sources of data for deriving socioeconomic and MDG indicators are (i) censuses of population and housing, (ii) sample surveys, and (iii) administrative data.

Table 7.1 consolidates the recommended data sources for compiling the 48 MDG indicators out of the 60 indicators in the MDG framework. The 12 indicators not included in the table are indicators 8.1 to 8.12 from MDG 8. These indicators are monitored separately for the least developed countries. Some are related to landlocked developing countries and small island developing states and are used to monitor official development assistance, market access, and debt sustainability under a global partnership. The 48 indicators considered here should not be confused with the 48 indicators prescribed in the original MDG framework of 2003.

Table 7.1 shows that all three data source types—population censuses, household surveys, and administrative data—are used extensively in compiling the MDG indicators. For some indicators, household surveys are the most appropriate source. Indicators in goal 1 fall under this category. Many other indicators can be sourced from both sample surveys and from administrative data, and a few indicators from population and housing census. These indicators are in goals 2 to 8. Administrative data sources (including vital registration records) are potential sources for compiling a number of indicators in goals 2 to 8.

Table 7.1: Recommended Sources of Data for Compiling the Millennium Development Goals Indicators

	Goals and Indicators	Recommended Data Sources[a]
Goal 1: Eradicate extreme poverty and hunger		
1.1	Proportion of population below $1 (PPP) per day[b]	1.1, 1.2, and 1.3 Household income and expenditure surveys, such as living standards and measurement surveys (LSMS).
1.2	Poverty gap ratio[b]	
1.3	Share of poorest quintile in national consumption	
1.4	Growth rate of gross domestic product (GDP) per person employed	1.4 GDP from national accounts and employment preferably from labor force surveys. Alternatively, employment data from population censuses, other household surveys, establishment surveys, administrative records, or official estimates based on a combination of sources.
1.5	Employment-to-population ratio	1.5 Preferably from labor force surveys (LFS). Alternatively from population censuses, other household surveys, administrative records, and official estimates based on a combination of sources. Both components (employment and population) should come from the same source.
1.6	Proportion of employed people living below $1 (PPP) per day[b]	1.6 Household income and expenditure surveys, such as LSMS (for data on poor) and LFS. Alternatively, population censuses, other household surveys, establishment surveys, administrative records, and official estimates based on a combination of sources for estimating labor force.
1.7	Proportion of own-account and contributing family workers in total employment	1.7 Preferably from LFS. Alternatively from population censuses, other household surveys, administrative records, and official estimates based on a combination of sources.
1.8	Prevalence of underweight children under 5 years of age	1.8 Household surveys like demographic and health surveys (DHS) and multiple indicator cluster surveys (MICS), and national nutrition surveys. Alternatively, data are provided by the surveillance systems established to monitor child health.
1.9	Proportion of population below minimum level of dietary energy consumption	1.9 National food balance sheets and household surveys, national household surveys collecting food consumption data.

Table 7.1 continuation

	Goals and Indicators		Recommended Data Sources[a]
Goal 2: Achieve universal primary education			
2.1	Net enrollment ratio in primary education	2.1	Enrollment data from school registers and records collected by education authorities and population projections based on census for reference population. Alternatively, data on current attendance comes from household surveys.
2.2	Proportion of pupils starting grade 1 who reach last grade of primary	2.2	Data on enrollment, promotion, and repetition from school registers and records collected by education authorities and using cohort analysis.
2.3	Literacy rate of 15–24 year-olds, women and men	2.3	Population censuses are the main source. Alternatively, household surveys are a possible source for non-census years.
Goal 3: Promote gender equality and empower women			
3.1	Ratio of girls to boys in primary, secondary, and tertiary education	3.1	Enrollment data from school registers and records collected by education authorities. Alternatively, data come from household surveys.
3.2	Share of women in wage employment in the nonagricultural sector	3.2	From household LFS, enterprise surveys, and population censuses. Alternatively, data from social security schemes (administrative data) having national coverage.
3.3	Proportion of seats held by women in national parliament	3.3	Data available from national parliament and/or state legislatures
Goal 4: Reduce child mortality			
4.1 4.2	Under-5 mortality rate Infant mortality rate	4.1	and 4.2 Data from vital registrations with complete coverage of at least 90% registrations of child and infant deaths and live births. In the absence of complete coverage from vital registration, household surveys using birth history as in the DHS or using indirect Brass method as in the MICS, or from sample registration systems, where available.
4.3	Proportion of 1 year-old children immunized against measles	4.3	Routine reporting from health service providers and/or health facilities with population data for child's reference population projected from population census or from complete civil registration systems. Alternatively, data on immunization come from household surveys (MICS and/or DHS).

Table 7.1 continuation

	Goals and Indicators	Recommended Data Sources[a]
Goal 5: Improve maternal health		
5.1	Maternal mortality ratio	5.1 Vital registration with at least 90% of events registered and with good medical certification of cause of death. Alternatively, DHS-type household surveys or population census if vital statistics are deficient due to coverage and/or misclassification of maternal deaths.
5.2	Proportion of births attended by skilled health personnel	5.2 Usually household surveys like DHS or MICS. Alternatively, administrative data from vital registration or from health facilities and services when the health facility coverage is almost complete.
5.3	Contraceptive prevalence rate	5.3 Mainly household surveys, such as DHS, reproductive health survey (RHS), fertility and family survey (FFS), or other fertility surveys.
5.4	Adolescent birth rate	5.4 Vital registration with at least 90% coverage for live births and census-based projections of reference population. Alternatively, household surveys based on retrospective birth histories.
5.5	Antenatal care coverage (at least one visit and at least four visits)	5.5 Mainly household surveys, such as DHS, RHS, FFS, or other fertility surveys. Alternatively, administrative reporting systems of health facilities in some countries with high coverage of health facilities.
5.6	Unmet need for family planning	5.6 Mainly household surveys, such as DHS, RHS, FFS, or other fertility surveys.
Goal 6: Combat HIV/AIDS, malaria and other diseases		
6.1	HIV prevalence among population aged 15–24 years	6.1 National population-based household surveys (for generalized epidemic) and sentinel-surveillance data on high risk population groups (such as sex workers, injecting drug users, men having sex with men).
6.2 6.3	Condom use at last high-risk sex Proportion of population aged 15–24 years with comprehensive correct knowledge of HIV/AIDS	6.2 and 6.3 Household surveys, such as DHS, MICS, RHS, and behavioral surveillance surveys.
6.4	Ratio of school attendance of orphans to school attendance of non-orphans aged 10–14 years	6.4 Estimation methods applied on data obtained from household surveys, such as DHS, RHS, and MICS to create a nationally representative indicator.

Table 7.1 continuation

Goals and Indicators	Recommended Data Sources[a]
6.5 Proportion of population with advanced HIV infection with access to antiretroviral drugs	6.5 Administrative reporting from service delivery sites and/or health facilities and surveillance systems for number of eligible persons with access, i.e., for numerator.
6.6 Incidence and death rates associated with malaria	6.6 Administrative reporting systems of health service providers and/or health facilities or surveillance systems for incidence. For death rates from the vital registration system with complete coverage and good medical certification of cause of death.
6.7 Proportion of children under 5 sleeping under insecticide-treated bednets	6.7 and 6.8 Household surveys, such as DHS and MICS.
6.8 Proportion of children under 5 with fever who are treated with appropriate anti-malarial drugs	
6.9 Incidence, prevalence, and death rates associated with tuberculosis	6.9 Case notifications for incidence reporting under surveillance systems by health services and/or health facilities. For death rate vital registration systems with complete coverage with good medical certification of cause of death.
6.10 Proportion of tuberculosis cases detected and cured under directly observed treatment short course (DOTS)	6.10 Administrative data from the DOTS program.
Goal 7: Ensure environmental sustainability	
7.1 Proportion of land area covered by forest	7.1 Special studies and surveys, national forest inventories, satellite imageries.
7.2 CO_2 emissions, total, per capita and per $1 GDP (PPP)	7.2 Administrative data on national carbon emissions compiled by environment and/or energy ministries.
7.3 Consumption of ozone-depleting substances	7.3 Variety of methods and sources, including getting numbers on production, imports, exports, and stocks destroyed from the known producers and consumers; use of estimates and surveys, collecting information through (or from) customs, among other methods.
7.4 Proportion of fish stocks within safe biological limits	7.4 Based on formal national stock assessments that relate catches to the fishing effort deployed.

Table 7.1 continuation

Goals and Indicators	Recommended Data Sources[a]
7.5 Proportion of total water resources used	7.5 Food and Agriculture Organization's AQUASTAT country surveys on water resources and estimates of water use by three main sectors—agriculture, industry, and domestic.
7.6 Proportion of terrestrial and marine areas protected	7.6 Data on protected areas, terrestrial, and marine areas from national authorities.
7.7 Proportion of species threatened with extinction	7.7 Compiled by United Nations Environment Programme based on population and range size and trends, as quantified by the categories of the International Union for Conservation of Nature Red List of Threatened Species, through an inclusive consultative process of stakeholders.
7.8 Proportion of population using an improved drinking water source	7.8 and 7.9 Household surveys that are considered more reliable, and population and housing censuses.
7.9 Proportion of population using an improved sanitation facility	
7.10 Proportion of urban population living in slums	7.10 Mainly household surveys, such as DHS and MICS. Also population and housing censuses.
Goal 8: Develop a global partnership for development	
8.13 Proportion of population with access to affordable essential drugs on a sustainable basis	8.13 Measured by the World Health Organization for international monitoring through interview of experts in each country on the pharmaceutical situation.
8.14 Telephone lines per 100 population	8.14 and 8.15 Administrative data on number of telephone lines and cellular subscribers collected by telecommunication authorities from the service providers.
8.15 Cellular subscribers per 100 population	
8.16 Internet users per 100 population	8.16 Internet users from surveys or based on administrative data on number of subscribers collected by telecommunication authorities.

CO_2 = carbon dioxide, PPP = purchasing power parity.
a   Also refer to Tables 2.2, 2.5, and 3.1 for more details on the use of data from population censuses, sample surveys, and administrative sources in compiling the relevant indicators.
b   Based on national poverty line for monitoring at the country level.

Sources: Summarized from United Nations. 2003. *Indicators for Monitoring the Millennium Development Goals: Definitions, Rationale, Concepts and Sources.* New York: United Nations; United Nations. MDG Metadata. http://www.mdgs.un.org; International Labour Organization. 2009. *Guide to the New Millennium Development Goals Employment Indicators.* Geneva: International Labour Organization; UNESCO Institute of Statistics. 2009. *Education Indicators – Technical Guidelines.* http://www.uis.unesco.org/template/pdf/EducGeneral/Indicator_Technical_guidelines_EN.pdf; World Health Organization. 2009. World Health Statistics. *Indicator Compendium.* Unedited version. http://www.who.int/whosis/indicators/en/

The rest of this chapter reviews the status of the MDG indicators compiled for national MDG monitoring, along with the practices on data sources used in the five case study countries. The status is based on national MDG reports produced until October 2009. These national reports are based on the 2003 official list of MDG indicators. The review however includes the new MDG indicators in the revised official list of MDG indicators, which became effective in January 2008 based on information available on the indicators from official sources at the country level. The review covers 48 out of 60 MDG indicators, leaving out 12 indicators—indicators 8.1 to 8.12 in goal 8—and focusing on MDG monitoring at the national level.

7.3 MONITORING THE MILLENNIUM DEVELOPMENT GOALS IN MONGOLIA, NEPAL, PALAU, SRI LANKA, AND VIET NAM

Mongolia, Nepal, Palau, Sri Lanka, and Viet Nam are signatories to the Millennium Declaration and are committed to achieving the MDGs. The countries have also incorporated the MDGs into their socioeconomic development plans. For example, with increased advocacy, awareness, and interest on the MDGs, the National Parliament of Mongolia approved the MDG-based comprehensive National Development Strategy (Government of Mongolia 2008) through Resolution No. 12 on 31 January 2008. Viet Nam has integrated the MDGs into their Socio-economic Development Plan for 2006–2010 (Government of Viet Nam 2006). In Nepal, the government integrated the MDGs with its Poverty Reduction Strategy Paper in its Tenth Five-Year Plan (2002–2007) (Government of Nepal 2002) by formulating broad action plans for fulfilling sectoral targets catering to the objectives of both the paper and the plan.

National-Level Monitoring of the Millennium Development Goals and Progress Reports

For national-level monitoring purposes, the five case study countries have periodically released national MDG reports in collaboration with the UNDP and other external and internal stakeholders. Palau released its first national MDG report in 2008, while Mongolia, Nepal, Sri Lanka, and Viet Nam had already produced more than one report by 2009.

A review[1] of the status of compilation of MDG indicators in the five case study countries provides useful insights on the experience and practices on use of different data sources in these countries. The national efforts at measuring progress are the first steps in the MDG progress monitoring chain from the national to the international levels.

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[1] The review is based on the country assessment studies undertaken by national consultants under an ADB regional technical assistance (ADB 2006. *Regional Technical Assistance for Improving Administrative Data Sources for the Monitoring of the Millennium Development Goal Indicators*. Manila [TA 6356-REG]).

Millennium Development Goals indicators compiled in the case study countries for national level monitoring

Table 7.2 provides a summary of the status of compilation of the 48 indicators (out of 60 indicators) for monitoring and reporting the MDGs at the national level between 2000 and 2008. To be included in the table, the indicator should be available for at least 1 year between 2000 and 2008. The following observations are based on the information in Table 7.2:

(i) Out of the 48 indicators, the number of indicators compiled at least once from 2000 to 2008 ranges from 30 (Palau) to 37 (Sri Lanka).

(ii) The breakdown of indicators by goals and targets suggests that the indicators needed to monitor MDGs 1 to 5 are better available in all the countries as compared with the indicators in MDGs 6 and 7.

(iii) As many as 10 to 15 MDG indicators are not compiled out of the 48 indicators considered here. These include the indicators that may not be relevant for a particular country.

As the national MDG reports prepared until 2009 for these countries were based on the 2003 official MDG list, these reports do not have information on the latest MDG indicators listed in the revised 2008 official list. The information on new indicators is based on the official data that exist for these indicators. Table 7.2 provides only the information on the number of indicators compiled but does not indicate whether the indicators compiled are of adequate quality or of sufficient frequency, which are some of the major issues in compiling the MDGs.

Some of the case study countries have modified the MDG indicators to suit country-specific needs or circumstances and may therefore not be strictly using the prescribed MDG indicator due to different protocols and standards. For example, MDG indicator 4.3—proportion of 1 year-old children immunized against measles—has been modified as "proportion of 2 year-old children immunized against measles" in Palau. This is because Palau combines measles, mumps, rubella (MMR) and follows the United States' immunization protocols in which MMR is administered in two doses during the second year of life, and protocols preclude administering MMR vaccine to children younger than 12 months (Republic of Palau 2008).

Some of the 48 indicators may not necessarily be applicable to a particular country situation. For example, MDG indicators regarding incidence and death rates associated with malaria, i.e., indicators 6.6, 6.7, and 6.8, are not applicable to Mongolia and Palau.

Table 7.2: Number of Millennium Development Goals Indicators Compiled at Least Once in Mongolia, Nepal, Palau, Sri Lanka, and Viet Nam from 2000 to 2008

Millennium Development Goal	Total No. of Indicators	Number of MDG indicators compiled				
		Mongolia	Nepal	Palau	Sri Lanka	Viet Nam
Goal 1: Eradicate extreme poverty and hunger	9	7	7	4	7	5
Goal 2: Achieve universal primary education	3	3	3	3	3	3
Goal 3: Promote gender equality and empower women	3	3	3	2	3	3
Goal 4: Reduce child mortality	3	3	3	3	3	3
Goal 5: Improve maternal health	6	6	6	5	6	4
Goal 6: Combat HIV/AIDS, malaria and other diseases	10	4	5	4	6	8
Goal 7: Ensure environmental sustainability	10	5	6	7	6	6
Goal 8: Develop a global partnership for development[a]	4	3	3	2	3	3
Total number of indicators compiled	48	34	36	30	37	35
Number of indicators that are not compiled, not relevant, and/or status not known		15	12	18	11	14

[a] Excludes indicators 8.1 to 8.12 under Goal 8, targets 8A, 8B, 8C, and 8D.

Sources: Country reports of assessment study for improving administrative data sources for the monitoring of MDG indicators for Mongolia, Nepal, Palau, Sri Lanka, and Viet Nam (ADB 2009a, 2009b, 2009c, 2009d, 2009e).

Moreover, some indicators compiled by the countries do not follow the standard MDG definitions due to non-availability of data. For example, in Mongolia, indicator 5.3—contraceptive prevalence rate—is based on contraceptives used by women only and does not include contraceptives used by sexual partners. The indicators used nevertheless provide an indication of the status and progress over time at the country level within the existing data constraints.

Data sources used by countries in compiling the Millennium Development Goals indicators

A review of the main data sources used by the case study countries in compiling the MDG indicators for national MDG monitoring is presented in Table 7.3. It again refers to 48 MDG indicators compiled any time during 2000–2008. Sometimes, national authorities have used more than two sources of data to measure the same indicator over time and these cases are also presented in Table 7.3. The table gives information on the availability of data for monitoring the MDGs in these countries and also shows the data gaps in monitoring some targets. The following observations are based on the information in Table 7.3:

   (i)   The five countries have used censuses, sample surveys, and administrative data, i.e., all main sources of data for compiling MDG indicators.

  (ii)   The number of indicators compiled using administrative data sources are 24 in Palau, 23 in Viet Nam, 19 in Mongolia, 13 in Nepal, and 12 in Sri Lanka.

 (iii)   The situation with regard to the use of household surveys for compiling MDG indicators is just the reverse—24 indicators in Sri Lanka, 22 in Nepal, 14 in Mongolia, and 11 in Viet Nam. In Palau, only 2 indicators in goal 1 are based on household survey data.

Based on the data sources used in MDG monitoring, the five countries can be grouped into three categories:

   (i)   The **first category** includes Mongolia and Viet Nam, which relied more on administrative data sources in monitoring the MDGs. These countries moved from a centrally planned economy to a market economy starting in the early nineties. Centrally planned economies depended heavily on administrative data for central planning needs. This explains the continuing high degree of reliance of these countries on administrative data until now. Household surveys were initiated only in the nineties in the two countries with the advent of market economy.

  (ii)   The **second category** includes Nepal and Sri Lanka, which relied more on household surveys rather than on administrative sources. The national statistical systems in Nepal and Sri Lanka have a long history of conducting

household surveys, which are preferred in view of known weaknesses in the administrative data systems.

(iii) The **third category** is represented by Palau—a small island country, where in the process of developing the first MDG report, administrative sources have been exploited to gather data for compiling a large number of MDG indicators. In view of its small population, it is much easier to collect administrative statistics comprehensively rather than conducting complex household surveys. The first national MDG report of Palau in 2008 is evidence of the effective use of administrative statistics in monitoring the MDGs, where as many as 24 indicators are compiled using administrative data.

Table 7.3:   Data Sources for the Millennium Development Goals Indicators Compiled at Least Once during 2000–2008 in Mongolia, Nepal, Palau, Sri Lanka, and Viet Nam

Goal and Indicator		Mongolia	Nepal	Palau	Sri Lanka	Viet Nam
Goal 1: Eradicate extreme poverty and hunger						
1.1	Proportion of population below $1 (PPP) per day [a]	●	●	●	●	●
1.2	Poverty gap ratio [a]	●	●	●	●	●
1.3	Share of poorest quintile in national consumption	●	●	×/♦	●	●
1.4	Growth rate of GDP per person employed	●	×	×/♦	●	×/♦
1.5	Employment-to-population ratio	●	●	■	●	●/□
1.6	Proportion of employed people living below $1 (PPP) per day [a]	×/♦	×/♦	×	×/♦	×/♦
1.7	Proportion of own-account and contributing family workers in total employment	●	●	□	×	×/♦
1.8	Prevalence of underweight children under 5 years of age	●	●	×	●	●
1.9	Proportion of population below minimum level of dietary energy consumption	×	●	×	●	×
Goal 2: Achieve universal primary education						
2.1	Net enrolment ratio in primary education	■	●/■	■	●/■	■
2.2	Proportion of pupils starting grade 1 who reach last grade of primary	■	■	■	■/●	■
2.3	Literacy rate of 15–24 year-olds, women and men	□	□/●	□	□	□/●

Table 7.3 continuation

Goal and Indicator		Mongolia	Nepal	Palau	Sri Lanka	Viet Nam
Goal 3: Promote gender equality and empower women						
3.1	Ratio of girls to boys in primary, secondary and tertiary education	■	■	■	●/■	■
3.2	Share of women in wage employment in the nonagricultural sector	●	●/□	×	●	●
3.3	Proportion of seats held by women in national parliament	■	■	■	■	■
Goal 4: Reduce child mortality						
4.1	Under-5 mortality rate	■	●	■	■	■
4.2	Infant mortality rate	■	●	■	■	■
4.3	Proportion of 1 year-old children immunized against measles	■	●	■	●	■
Goal 5: Improve maternal health						
5.1	Maternal mortality ratio	■	●	■	■	■
5.2	Proportion of births attended by skilled health personnel	■	●	■	●	■
5.3	Contraceptive prevalence rate	■/●	●	■	●	●
5.4	Adolescent birth rate	●	●	■	●	×
5.5	Antenatal care coverage (at least one visit and at least four visits)	●	●/■	■	●	■
5.6	Unmet need for family planning	●	●	×	●	×
Goal 6: Combat HIV/AIDS, malaria and other diseases						
6.1	HIV prevalence among population aged 15–24 years	■	×	■	×	■
6.2	Condom use at last high-risk sex	×	●	×	×	●
6.3	Proportion of population aged 15–24 years with comprehensive correct knowledge of HIV/AIDS	●	●	×	●	●
6.4	Ratio of school attendance of orphans to school attendance of non-orphans aged 10–14 years	×	×	×	×	×
6.5	Proportion of population with advanced HIV infection with access to antiretroviral drugs	×	×	■	×	■
6.6	Incidence and death rates associated with malaria	—	■	—	■	■
6.7	Proportion of children under 5 sleeping under insecticide-treated bednets	—	×	—	●	×
6.8	Proportion of children under 5 with fever who are treated with appropriate anti-malarial drugs	—	×	—	●	■
6.9	Incidence, prevalence and death rates associated with tuberculosis	■	■	■	■	■
6.10	Proportion of tuberculosis cases detected and cured under directly observed treatment short course	■	■	■	■	■

Table 7.3 continuation

Goal and Indicator		Mongolia	Nepal	Palau	Sri Lanka	Viet Nam
Goal 7: Ensure environmental sustainability						
7.1	Proportion of land area covered by forest	■	■	■	■	■
7.2	CO_2 emissions, total, per capita	■	■	■	■	■
7.3	Consumption of ozone-depleting substances	××	■	■	●	×
7.4	Proportion of fish stocks within safe biological limits	—	—	×	××	×
7.5	Proportion of total water resources used	××	××	××	××	××
7.6	Proportion of terrestrial and marine areas protected	■	■	■	■	■
7.7	Proportion of species threatened with extinction	××	××	■	××	■
7.8	Proportion of population using an improved drinking water source	●/□	●	□	●/□	●
7.9	Proportion of population using an improved sanitation facility	●/□	●	□	●/□	●
7.10	Proportion of urban population living in slums	×	×	×	×	×
Goal 8: Develop a global partnership for development						
8.13	Proportion of population with access to affordable essential drugs on a sustainable basis	×	×	×	×	×
8.14	Telephone lines per 100 population	■	■	■	●/■	■
8.15	Cellular subscribers per 100 population	■	■	×	●/■	■
8.16	Internet users per 100 population	■	■	■	●	■

Key:

●   sample surveys.

■   administrative data.

□   population and housing census.

×   Indicator is not compiled by national agencies.

××   status regarding availability of data not known.

—   Indicator is not relevant in the country context.

♦   Indicator can possibly be compiled from existing data sources.

CO_2 = carbon dioxide, GDP = gross domestic product, MDG = Millennium Development Goal, PPP = purchasing power parity.
a   Based on national poverty line.
Notes: 1. Status as of 2008. 2. More than one data source symbol provided in one cell means that both data sources have been used for different years for country MDG reporting.
Sources: Country reports of assessment study for improving administrative data sources for the monitoring of MDG indicators for Mongolia, Nepal, Palau, Sri Lanka, and Viet Nam (ADB 2009a, 2009b, 2009c, 2009d, 2009e).

Use of administrative data for compiling the Millennium Development Goals indicators

This section reviews the administrative data sources used in compiling the MDG indicators in the five case study countries. A wide variety of administrative data sources are being used for MDG monitoring in these countries, commonly used of which include the following: (i) education statistics from school records; (ii) health statistics from facility reporting; (iii) vital registration, births, and deaths; (iv) environment and forest statistics; (v) public utilities statistics; and (vi) government financial statistics.

Administrative data sources used in compiling the MDG indicators in the five countries are presented in Table 7.4. In certain years, the indicator value is also available from a sample survey. Sometimes, the numerator of the indicator alone is sourced from administrative data, while the denominator or the reference population is based on projections from population censuses.

Some of the observations that flow from the review on the use of administrative data on education, health, and vital registration in compiling MDG indicators in these countries are given below.

   (i)   Education statistics generated from school enrollment data collected by the ministries of education are the widely used administrative statistics to measure education-related MDG indicators in all countries.

  (ii)   In Sri Lanka, estimates for primary enrollment rate up to the district level have been estimated from household labor force surveys, rather than from school statistics. However, for estimating survival to last grade of primary, administrative data from schools have been used to generate provincial-level estimates. The district-level estimates were found unreliable for some districts.

 (iii)   Indicators generated from health statistics based on routine reporting from heath facilities are also popular for compiling indicators for the MDGs. These have been used for compiling disease incidence from malaria, tuberculosis, and HIV, and service coverage indicators, such as immunization against measles, birth attendance, antenatal care coverage, and contraceptive prevalence.

 (iv)   In Mongolia and Viet Nam, health facility statistics have also been used to compile important mortality-related MDG indicators namely infant, child, and maternal mortality.

  (v)   Civil registration systems with full coverage of deaths and good reporting on the cause of death are considered the best data sources for estimating infant,

child, and maternal mortality. While in Sri Lanka and Palau, data from civil registration are used to compile these indicators, Viet Nam and Mongolia rely on the health reporting systems. Nepal relies on demographic and health surveys to measure mortality indicators in the absence of good quality data from vital registration or health facilities.

Table 7.4:   Millennium Development Goals Indicators Sourced from Administrative Data Sources

Administrative Data Source	MDG Indicator		Mongolia	Nepal	Palau	Sri Lanka	Viet Nam
Health Administration Records/Routine Reporting	4.1	Under-5 mortality rate	●				●
	4.2	Infant mortality rate	●				●
	4.3	Proportion of 1 year-old children immunised against measles	●		●		●
	5.1	Maternal mortality ratio	●				●
	5.2	Proportion of births attended by skilled health personnel	●		●		●
	5.3	Contraceptive prevalence rate	●		●		
	5.5	Antenatal care coverage (at least one visit and at least four visits)		●	●		●
	6.1	HIV prevalence among population aged 15–24 years	●		●		●
	6.5	Proportion of population with advanced HIV infection with access to antiretroviral drugs			●		●
	6.6	Incidence and death rates associated with malaria		●		●	●
	6.9	Incidence, prevalence, and death rates associated with tuberculosis	●	●	●	●	●
	6.10	Proportion of tuberculosis cases detected and cured under directly observed treatment short course	●	●	●	●	●
Civil Registration Systems	4.1	Under-5 mortality rate			●	●	
	4.2	Infant mortality rate			●	●	
	5.1	Maternal mortality ratio			●	●	
	5.4	Adolescent birth rate			●		

Table 7.4 continuation

Administrative Data Source	MDG Indicator		Mongolia	Nepal	Palau	Sri Lanka	Viet Nam
Land, Forestry, Marine and Environment Resources	7.1	Proportion of land area covered by forest	●	●	●	●	●
	7.2	CO_2 emissions, total, per capita	●	●	●	●	●
	7.3	Consumption of ozone-depleting substances		●	●	●	
	7.6	Proportion of terrestrial and marine areas protected	●	●	●		●
School reports/ census	2.1	Net enrollment ratio in primary education	●	●	●		●
	2.2	Proportion of pupils starting Grade 1 who reach last grade of primary	●	●	●	●	●
	3.1	Ratios of girls to boys in primary, secondary, and tertiary education	●	●	●	●	●
Election Commissions/ Authorities/ Committees for Women Development	3.3	Proportion of seats held by women in national parliament	●	●	●	●	●
Telecommunication regulatory authorities	8.14	Telephone lines per 100 population	●	●	●	●	●
	8.15	Cellular subscribers per 100 population	●	●		●	●
	8.16	Internet users per 100 population	●	●	●		●

CO_2 = carbon dioxide.
●   Implies that the indicator is sourced from administrative data sources.
Sources: Country reports of assessment study for improving administrative data sources for the monitoring of MDG indicators for Mongolia, Nepal, Palau, Sri Lanka, and Viet Nam (ADB 2009a, 2009b, 2009c, 2009d, 2009e).

Millennium Development Goals indicators not compiled in the case study countries

The set of 60 indicators to monitor the MDGs has been selected recognizing the diversity of the countries. Some indicators are not relevant for some countries but may need to be monitored on an ongoing basis in other countries. For example, indicator 6.6, which relates to the incidence and deaths due to malaria, and indicators 6.7 and 6.8, which relate to prevention of malaria under target 6C, are not relevant to Mongolia and Palau but these are important indicators for monitoring incidence and prevention of malaria

in the other three case study countries. Under Target 7A, indicator 7.4—proportion of fish stocks within safe biological limits—will also not be relevant to landlocked countries, such as Nepal and Mongolia. In addition, several indicators under goal 8 are specific to geographic and regional groupings and levels of development, which will not be relevant to all countries.

The following indicators are among the least available indicators for purposes of monitoring the MDGs in the five countries. Other indicators outside the list below may not be compiled in a given country and these are given in Table 7.3.

 (i) Indicator 1.6: Proportion of employed population living below the poverty line (working poverty rate)

 (ii) Indicator 1.9: Proportion of population below minimum level of dietary energy consumption

 (iii) Indicator 6.4: Ratio of school attendance of orphans to school attendance of non-orphans aged 10–14 years

 (iv) Indicator 6.5: Proportion of population with advanced HIV infection with access to antiretroviral drugs

 (v) Indicator 7.5: Proportion of total water resources used

 (vi) Indicator 7.10: Proportion of urban population living in slums

 (vii) Indicator 8.13: Proportion of population with access to affordable essential drugs on a sustainable basis.

These indicators are not available because of (i) lack of adequate data based on the standard definitional needs for the numerator and/or the denominator for compiling the indicators (e.g., indicators 6.4, 6.5, 7.10); (ii) lack of capacity to compile the indicators using standard methods (e.g., indicators 1.9, 7.5); or (iii) lack of clear standards and methodology to compile the indicators (e.g., indicator 8.13).

7.4 NATIONALIZATION OF THE MILLENNIUM DEVELOPMENT GOALS

The MDGs can be adapted to fit specific country conditions depending on country priorities and specific development needs. This process of adapting the global MDGs at the country level is known as nationalization of MDGs. Some countries may include additional goals and targets, modify existing targets, or have additional or modified indicators.

Nationalizing the MDGs promotes national ownership and mobilizes the support of the public and civil society in achieving the MDGs. Mongolia is a good example (Box 7.2 and Table 7.5).

Box 7.2:   Nationalizing the Millennium Development Goals in Mongolia

In 2005, the State Great *Hural* (National Parliament of Mongolia) approved nine
Millennium Development Goals (MDGs) specific to Mongolia (as against eight global
MDGs), with 22 targets and 24 indicators to be attained by 2015. The ninth MDG
Mongolia added to the eight goals in the global list is "Strengthen human rights and
foster democratic governance." Mongolia's goal 9 has 3 targets, and 12 indicators
have been identified to monitor the targets.

With increased advocacy, awareness, and interest on the MDGs, the National
Parliament of Mongolia approved in January 2008 the same nine MDGs but increased
the number of MDG targets to 24 and outcome indicators to 67. Thus in the context
of national MDGs, Mongolia has 9 national MDGs, 24 national MDG targets, and
67 national MDG indicators.

The national target 3, which is the equivalent of the global target 1B, mentions only
"increasing employment rate of population," and "reducing youth unemployment rate
for youth entering the labor market," as against the global target of "achieving full and
productive employment and decent work for all, including women and young people."
However, the national target 2, which is the equivalent of global target 1C—Halve,
between 1990 and 2015, the proportion of people who suffer from hunger—is much
more stringent than the global target. While the global target commits to reducing by
half between 1990 and 2015 the proportion of people who suffer from malnutrition,
the national target commits to reducing to one-sixth during the same period. The
nationally adopted indicators have been selected to reflect national priorities.

Source: Asian Development Bank. *Country Report of Assessment Study for Improving Administrative Data
Sources for the Monitoring of MDG Indicators, Mongolia*. Consultant's report. Manila (TA 6356-REG).

Table 7.5 provides a comparison of related targets and indicators of the UN official
MDG 1 with the national MDG 1 of Mongolia. The national MDG 1 of Mongolia has
four targets compared to three targets in the global MDGs. One additional target is
"Reduce negative effects of population concentration and migration, provide migrants
with basic social services."

Table 7.5:   Comparison of Mongolia's National Millennium Development Goal 1 with the United Nations' Official Millennium Development Goal 1

UN Official MDGs		Mongolian National MDGs	
MDG Targets	**MDG Indicators**	**Corresponding Mongolian National Targets**	**Mongolian National MDG Indicators for Corresponding Target**
Goal 1: Eradicate extreme poverty and hunger			
Target 1.A: Halve, between 1990 and 2015, the proportion of people whose income is less than $1 a day	1.1 Proportion of population below $1 (PPP) per day 1.2 Poverty gap ratio 1.3 Share of poorest quintile in national consumption	Target 1: Halve, between 1990 and 2015, the proportion of people whose income is below the minimum living standard	1. Poverty headcount (percent) 2. Poverty gap ratio 3. Share of poorest quintile in national consumption 4. Per capita gross domestic product
Target 1.B: Achieve full and productive employment and decent work for all, including women and young people	1.4 Growth rate of GDP per person employed 1.5 Employment-to-population ratio 1.6 Proportion of employed people living below $1 (PPP) per day 1.7 Proportion of own-account and contributing family workers in total employment	Target 3: Increase employment rate of population, reduce youth unemployment rate who are newly entering to the labor market	8. Labor force participation rate (percent) 9. Unemployment rate of 15–24 year-olds (percent)
Target 1.C: Halve, between 1990 and 2015, the proportion of people who suffer from hunger	1.8 Prevalence of underweight children under 5 years of age 1.9 Proportion of population below minimum level of dietary energy consumption	Target 2: Reduce to one sixth, between 1990 and 2015, the proportion of people who suffer from malnutrition	5. Prevalence of underweight children under 5 years of age 6. Prevalence of stunting (height for age) among children under 5 years of age (percent) 7. Prevalence of wasting (weight for height) among children under 5 years of age (percent)
		Target 4: Reduce negative effects of population concentration and migration, provide migrants with basic social services	10. Proportion of population living in urban areas without official registration

GDP = gross domestic product, MDG = Millennium Development Goal, PPP = purchasing power parity, UN = United Nations.
Source: Country report of assessment study for improving administrative data sources for the monitoring of MDG indicators for Mongolia (ADB 2009a).

7.5 DIFFERENCES IN THE NATIONAL AND INTERNATIONAL DATA FOR THE MILLENNIUM DEVELOPMENT GOALS

There are instances where the country indicators are deficient in terms of standard definitions and methods of compilation. For example, indicator 2.1—net enrollment ratio—is calculated by some countries using data on children of official school age enrolled in primary education, while the international agency calculates an adjusted net enrollment ratio by including children enrolled both in the primary and secondary. In some countries, indicator 2.2—proportion of pupils starting grade 1 who reach grade 5—is also not compiled using the recommended reconstructed cohort method. Another example is indicator 5.3—contraceptive prevalence rate—which includes only eligible women who report that they are practicing any form of contraception, whereas the standard definition includes contraceptives also used by sexual partners.

The indicators thus estimated would require adjustments using auxiliary information to conform to the standard definitions. Such adjustments are normally not undertaken by countries. International agencies however adjust the country data to conform to international standards and to ensure international comparability. In view of this, the indicator values reported in the national MDG monitoring differ from those that are found in the UN MDG official database, which is used for international monitoring of MDG progress.

The reasons for the differences in the indicator values between the national and international data sources are summarized below:

(i) Use of different definitions in compiling indicators and therefore adjustments made by the international agencies to conform to international standards;

(ii) Use of different data sources—countries might use a time series data from administrative sources, while the international agency prefers data available from sample surveys due to data quality and coverage issues in the administrative data;

(iii) Use of different estimates of reference population in the denominator of some indicators, with international agencies usually relying on the population estimates prepared by the United Nations Population Division; and

(iv) Due to international agencies' (a) adjustments to the nationally reported indicators for international comparability, (b) generation of estimates of the indicator values using country datasets, or (c) use of modeling in the absence of country data.

To explain the reasons for the differences in the two sets of data, the UN MDG database provides information on whether the indicator value is based on country data, and if not, gives information on the other methods used to estimate them. The UN MDG database classifies each of the indicator values into the following categories

   (i) **Country data.** The figure is produced and disseminated by the country (including data adjusted by the country to meet international standards).

  (ii) **Country adjusted.** The figure is produced and provided by the country, but adjusted by the international agency for international comparability to comply with internationally agreed standards, definitions, and classifications (age group, International Standard Classification of Education, etc).

 (iii) **Estimated.** The figure is estimated by the international agency, when corresponding country data on a specific year or set of years are not available, or when multiple sources exist, or there are issues of data quality. Estimates are based on national data, such as surveys, administrative records, or other sources, but on the same variable being estimated.

 (iv) **Modeled.** The figure is modeled by the agency when there is a complete lack of data on the variable being estimated. The model is based on a set of covariates—other variables for which data are available and that can explain the phenomenon.

  (v) **Global monitoring data.** The figure is regularly produced by the designated agency for the global monitoring based on country data. However, there is no corresponding figure at the country level because the indicator is defined for international monitoring (example: population below 1$ a day).

The MDG program and its adoption by countries to monitor progress on the goals and targets at the national and subnational levels has led to a substantial increase in demand for timely and good quality data. Tracking the progress in achieving the MDGs is an exercise that has brought out both the importance and the limitations of current data and of the statistical systems.

While countries use all types of data sources to compile indicators, improving their quality and coverage are needed for their use in monitoring the MDGs. This offers an opportunity for the national and international statistical agencies to undertake concerted efforts to improve and strengthen administrative data systems that are cost-effective in meeting growing data needs.

KEY POINTS

→ The MDGs are key elements of country development plans and policies and their monitoring at the national level is undertaken through periodic national MDG reports prepared in consultation with stakeholders.

→ Countries can nationalize the global MDGs to give priority to their development needs. This can be achieved by adding goals and indicators, and adding or modifying targets. Mongolia's national MDG framework is an example of nationalization of MDGs.

→ Measuring progress toward the MDGs is a data-intensive process requiring timely and reliable data for compiling the identified indicators based on the recommended definitions, methods, and data sources.

→ For some MDG indicators, household surveys are the appropriate source. Indicators in goal 1 fall under this category.

→ Administrative data sources (including vital registration records) are potential sources for compiling a number of indicators in goals 2 to 8. These administrative sources relate to education, health, vital registration, emigration and immigration, and environment and government financial statistics.

→ Countries use all the three data source types—population censuses, household surveys, and administrative data—in compiling the MDG indicators. However, the mix of different data sources varies across countries.

→ Countries such as Nepal and Sri Lanka, where national statistical systems have a long history of undertaking household surveys, have relied more on the use of sample surveys rather than administrative sources in compiling their MDGs. On the other hand, countries such as Mongolia and Viet Nam, which moved from a centrally planned economy to a market economy, tend to rely more on administrative sources rather than on sample surveys. This may be due to the legacy of the tradition of using administrative statistics in central planning.

→ The experience of Palau suggests that administrative data sources should be most exploited in countries with small populations. Comprehensively collecting regular administrative data is less demanding for a small population rather than undertaking complex household surveys.

➜ Some MDG indicators are not compiled by countries due to lack of relevance of a particular indicator in a country context, lack of data needed, lack of methodology, and lack of technical skills and capacity to design appropriate data collection methods.

➜ In view of differences in the definitions, methods, and sources of data used, the UN official MDG indicator database may have values that are different from the values reported in the national monitoring reports. This is because international agencies adjust the country data or use estimated and modeled values for international comparability purposes.

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Administrative Data Sources for Compiling Millennium Development Goals and Related Indicators
A Reference Handbook on Using Data from Education, Health, and Vital Registration Systems Featuring Practices and Experiences from Selected Countries

The handbook is one of the outputs of the Asian Development Bank regional technical assistance (TA) on *Improving Administrative Data Sources for the Monitoring of the Millennium Development Goals Indicators.* It serves as a reference tool for data producers on improving administrative data sources for compiling the Millennium Development Goals and other indicators. Drawing from the experiences of the five case study countries included in the TA, namely, Mongolia, Nepal, Palau, Sri Lanka, and Viet Nam, the handbook combines theoretical issues in using administrative data with the practical problems faced in their use and provides recommendations to help improve administrative data systems. It also provides information on alternative data sources for compiling the Millennium Development Goals and other indicators.

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