DEVELOPMENT ASSISTANCE TO HEALTH INFORMATION SYSTEMS STRENGTHENING

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The World Bank

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0. EXECUTIVE SUMMARY

The ultimate goal of Health, Nutrition and Population (HNP) interventions is to improve health outcomes in low- and middle-income countries. However, impact assessment requires the development of systems for effective monitoring and evaluation (M&E). As a consequence, there is increasing momentum toward supporting national health information systems (HISs) strengthening among development organizations.

The new primary direction of the WB, as stated in the new HNP Strategy, is the renewed focus on HNP results. For this purpose, the WB intends to support the launch of a major effort to assist client countries to improve their national HISs.

In preparation for implementing the Action Plan, the Performance Monitoring and Statistics Team (PMS Team) aims to identify and document the assistance that different development organizations have been providing in recent years to countries in order to improve their national HISs.

The objectives of this report are:
1. To compile an inventory of activities that development partners - including the WB, other UN agencies, bilateral development agencies, global health partnerships (GHP), and private foundations - have implemented in order to support the development of HISs in developing countries.
2. To review a sample of success stories in improving the capacity for collection of routine health information in developing countries.

Since the subject-matter covered in this review is very broad, this report does not intend to be an exhaustive register of all activities being conducted, but rather to provide an overview of the role and actions of a comprehensive list of development organizations and partnerships working in this field, including the World Bank (WB), United Nations Statistics Division (UNSD), WHO, UNAIDS, UNICEF, UNDP, IMF, OECD, African Development Bank, Asian Development Bank, Inter-American Development Bank, European Commission, the main bilateral donor countries - USA, Japan, France and United Kingdom, among others-, Health Metrics Network (HMN), Global Fund (GFATM), GAVI Alliance, Roll Back Malaria, INDEPTH Network, PARIS 21, Routine Health Information Network (RHINO), Gates Foundation, Rockefeller Foundation, Rotary International Foundation, Association of Public Health Laboratories (APHL), Institute for Healthcare Improvement (IHI), IntraHealth International, John Snow Inc. (JSI), Management sciences for health (MSH) and Harvard School of Public Health (HSPH).

This report also assembles four stories where countries successfully improved one or more aspects of routine health information collection. Each case study analyses: the context and information needs that led to the development of the system; the process that took place as well as the main actors involved; and the impact and limitations of the system. The success stories that have been analysed are:
- Improvement of cause-specific mortality estimates through sample vital registration in China.
- Development of the Brazilian disease surveillance and control system.
- Development of second generation surveillance system for HIV/AIDS in Indonesia.
- Design and implementation of the national HIV/AIDS monitoring and evaluation system in Malawi.

The last section of this report summarizes the main conclusions and recommendations inferred from the analysis:
- Comprehensive HISs reforms need to be country driven, in order to reflect national priorities, reduce redundancy and be sustained.
- National HISs development should involve comprehensively all relevant stakeholders, including public and private sector organizations as well as research institutions.
- Successful HIS reforms need to be aligned with broader management changes.
- Decentralization of decision-making poses a critical challenge to HIS and management reforms.
- Efforts need to be made to harmonize donors’ data requirements in order to avoid fragmentation in national HIS.
- The development of partnerships ensures that all partners subscribe to common goals and it promotes sharing of HIS knowledge and resources.
- Since health services coverage is far from universal, it is a priority of HIS reforms to develop population-based data sources.
- Main sources of financial and technical assistance are bilateral organizations, UN agencies and development banks; although partnerships and private organizations are acquiring increasing importance.
- More analysis on the cost-effectiveness of developing HISs is needed in order to facilitate decision-making in this field.
- Some innovative financial tools, such as budget funding and performance-based financial support, are being useful in the development of HIS.
- Increase of research capacity is imperative in order to develop innovative HISs tools that are more cost-effective.

The WB is in a privileged situation to provide technical assistance to client countries in order to strengthen their national HIS systems. However, it should increase its own capacity in disease surveillance and performance monitoring in order to develop its comparative advantage. This involves hiring professionals with broad experience in this field and partnering with those agencies that have developed expertise in different areas of health information, such WHO and CDC in disease surveillance. Since the Health Metrics Network (HMN) was specially created in order to provide assistance to countries in strengthening national HIS, the PMS Team should specially ally with HMN in order to build upon existing efforts. Work in this direction is on the way, since the HNP Unit is building up the Performance Monitoring and Statistics Team (PMS Team).

The WB should also closely collaborate with other development organizations in order to harmonize data requirements and provide coherent international support to developing countries. This organization should also ensure that governments take a central role in health monitoring and development of national HISs. At a minimum, this
team should be able to ensure that health monitoring activities included in all WB-funded HNP projects make part of comprehensive and inclusive national HIS.

Therefore, the assistance provided by the PMS Team should be demand driven and ought to be adapted to national health information needs and institutional structures. Nevertheless, the WB should advocate for the development of a national overarching structure as well as the collection and use of basic health information in client countries, including at least vital statistics. This information subsystem is essential for health monitoring and, unlike other data sources such as surveys and census, does not seem to be receiving the deserved attention from major development organisations. It is also suggested that this team conducts cost-effectiveness analysis of these activities.
1. ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>ADB</td>
<td>Asian Development Bank</td>
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<tr>
<td>AfDB</td>
<td>African Development Bank</td>
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<td>CDC</td>
<td>Centers for Disease Control and Prevention</td>
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<td>DAH</td>
<td>Development Assistance for Health</td>
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<tr>
<td>DHS</td>
<td>Demographic and Health Survey</td>
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<td>DSP</td>
<td>Disease Surveillance Points</td>
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<td>EMR</td>
<td>Electronic Medical Records</td>
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<td>GDDS</td>
<td>General Data Dissemination System</td>
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<tr>
<td>GFATM</td>
<td>Global Fund for AIDS, Tuberculosis and Malaria</td>
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<td>GHP</td>
<td>Global Health Partnership</td>
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<tr>
<td>GIS</td>
<td>Geographic Information System</td>
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<td>HIS</td>
<td>Health Information System</td>
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<td>HMN</td>
<td>Health Metrics Network</td>
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<td>HNP</td>
<td>Health, Nutrition, and Population</td>
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<td>HRIS</td>
<td>Human Resources Information System</td>
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<td>IADB</td>
<td>Inter-American Development Bank</td>
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<td>ICD</td>
<td>International Statistical Classification of Diseases and Related Health Problems</td>
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<tr>
<td>LIS</td>
<td>Laboratory Information System</td>
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<td>LMIS</td>
<td>Logistics Management and Information System</td>
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<td>M&amp;E</td>
<td>Monitoring and Evaluation</td>
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<tr>
<td>MAPS</td>
<td>Marrakech Action Plan for Statistics</td>
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<td>MICS</td>
<td>Multiple Indicator Cluster Survey</td>
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<tr>
<td>MOH</td>
<td>Ministry of Health</td>
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<td>NAC</td>
<td>National AIDS Commission</td>
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<td>NAP</td>
<td>National AIDS Program</td>
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<td>NHA</td>
<td>National Health Accounts</td>
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<td>NSDS</td>
<td>National Strategy for the Development of Statistics</td>
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<td>NSO</td>
<td>National Statistics Office</td>
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<td>NSS</td>
<td>National Surveillance System</td>
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<tr>
<td>NSS</td>
<td>National Statistical System</td>
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<td>PARIS21</td>
<td>Partnership in Statistics Development in the 21st Century</td>
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<tr>
<td>PEPFAR</td>
<td>USA: President's Emergency Plan For AIDS Relief</td>
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<td>PLWHA</td>
<td>People Living with HIV/AIDS</td>
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<td>PRSP</td>
<td>Poverty Reduction Strategy Paper</td>
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<td>RHINO</td>
<td>Routine Health Information Network</td>
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<td>RHIS</td>
<td>Routine Health Information Systems</td>
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<td>RHS</td>
<td>Reproductive Health Survey</td>
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<tr>
<td>SAVVY</td>
<td>Sample vital registration with verbal autopsy</td>
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<td>SGS</td>
<td>Second Generation HIV Surveillance</td>
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<td>SMP</td>
<td>Statistical Master Plan</td>
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<td>SRS</td>
<td>Sample Registration System</td>
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<td>STI</td>
<td>Sexually Transmitted Infection</td>
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<td>TAG</td>
<td>HMN Technical Advisory Group</td>
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<td>UNSD</td>
<td>United Nations Statistics Division</td>
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<td>WHS</td>
<td>World Health Survey</td>
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2. INTRODUCTION AND OBJECTIVES

The ultimate goal of World Bank work in Health, Nutrition, and Population (HNP) is to improve health outcomes in low- and middle-income countries, in the context of its overall strategy for poverty alleviation. The new HNP Strategy updates the 1997 WB HNP strategy in light of the changes that have taken place in the international architecture of development assistance for health (DAH) during the past decade, and the persisting and new HNP challenges. The recently approved strategy states the Action Plan to enhance Bank capacity to better serve client countries in areas of Bank comparative advantage, such as health systems strengthening (WB HNP Strategy 2007).

The last decade brought relevant achievements in HNP in the developing world, but focus on monitoring and evaluation (M&E) was weak during that period and results-based data are scarcely available. This impedes the attribution of results to specific actions (WB HNP Strategy 2007).

Currently, governments and organizations are facing internal and external demands and pressures for improving their performance and demonstrating tangible results to their stakeholders—including the government officials and program managers themselves, parliaments, opposition parties, civil society, development partners, the media, and so forth—(Kusek and Rist 2004). However, impact assessment requires the development of systems for effective M&E. As a consequence, there is increasing momentum toward supporting health information systems (HISs) strengthening among development organizations.

As it is pointed out in the 2007 strategy, the new primary strategic direction of the Bank is the renewed focus on HNP results. For this purpose, the Bank intends to increase its M&E capacity and to support the launch of a major effort to assist client countries to improve their national public health surveillance and performance-monitoring systems (WB HNP Strategy 2007).

The Performance Monitoring and Statistics Team in the Health, Nutrition, and Population Unit of the Human Development Network (HDNHE) has two main tasks: (1) improving the availability, quality, and use of health statistics; and (2) monitoring and enhancing the performance of the HNP portfolio. In preparation for implementing the Action Plan, this team aims to identify and document the assistance that different development organizations have been providing in recent years to countries in order to improve their national HISs.

The objectives of this report are: (1) to compile an inventory of activities that development organizations—including the World Bank, other UN agencies, bilateral development agencies, global health partnerships (GHP), and private foundations—have implemented in order to support the development or strengthening of HISs in developing countries; and (2) to review a sample of success stories in improving the capacity for collection of routine health information in developing countries.

Since the subject-matter covered in this review is very broad, this report does not intend to be an exhaustive register of all activities being implemented by
development partners, but rather to provide an overview of the role and actions of a comprehensive list of development organizations working in this field\(^1\), as well as to capture some specific examples of their activities.

Regarding the set of case studies, the criteria that were used in order to select the success stories included in this report are:
- They involved improvements in one or more aspects of routine health information collection.
- Information systems were designed and implemented at the national level.
- Experts from international organizations and national stakeholders considered them successful HIS reforms.
- Processes were already at the stage where its impact was evident.
- The different aspects of the intervention - including the pre-existing circumstances that led to the development of the subsystem, the processes that took place, as well as its successes and limitations - were well documented.

\(^1\) Note that this list does not include several institutions from developing countries that are providing South-South cooperation, such as the Observatoire Economique et Statistique d’Afrique Sub-Saharienne (AFRISTAT), Banque Centrale des Etats de l’Afrique de l’Ouest (BCEAO) and Banque des Etats de l’Afrique Centrale (BEAC).
3. BACKGROUND ON HEALTH INFORMATION SYSTEMS

A health information system (HIS) refers to the integrated effort to collect, process, and report health information to influence policy-making. A country HIS comprises the multiple sub-systems and data sources that together contribute to generating health information (HMN 2006).

No single method of data collection can meet all needs. The most appropriate data source depends on: the information needed, cost-effectiveness of the method, financial, human and technical capacity to collect and manage the data, and time constraints. Sources of health data can be divided into two groups (HMN 2006, Fig. 1):

- Sources that generate population-based data:
  - Census.
  - Vital registration.
  - Population-based surveys.
- Sources that generate health-services-based data:
  - Health and disease records: including report of notifiable conditions - sometimes referred to as disease surveillance-, individual patient records -also referred to as health management information systems (HMIS)-, and special disease registries -i.e. cancer registries-.
  - Health system monitoring data:
    - Health service records: including systems related to availability and quality of services.
    - Administrative records: including systems related to financial resources, human resources, and logistics.

Fig. 1. Data sources in a comprehensive health information system

(Source: HMN 2006)
Core health indicators are needed to assess change in three major areas (HMN 2006):

- Health status: including information on natality, morbidity, disability, and mortality.
- Determinants of health: including information on socioeconomic, environmental, behavioural, and genetic determinants or risk factors.
- Health systems: including information on inputs - such as policy, financial resources, human resources, equipment, and supplies -, outputs - such as health services availability and quality -, and outcomes - such as coverage of the population with key health services -.

Furthermore, the existence of legal and policy framework and statistical capacity at the national level are a prerequisite for the development and strengthening of HISs.
## 4. INVENTORY OF ACTIVITIES

### a. Panel of development organizations and activities

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<th>NAME</th>
<th>INTERVENTION</th>
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<td><strong>UN Agencies</strong></td>
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| United Nations Children Fund (UNICEF)                     | - Technical assistance and training for the implementation of the Multiple Indicator Cluster Surveys (MICS).  
- Development of the software DevInfo and training workshops in order to assist countries in monitoring the MDGs.                                    |
| United Nations Development Program (UNDP)                 | - Statistical capacity-building through the implementation of the project "Statistical Literacy and Capacity Building for MDG Monitoring at the Country Level" in Africa and LAC.                                               |
| United Nations Populations Fund (UNFPA)                   | - Financial support and capacity-building activities, including technical assistance as well as training and organization of workshops, for the implementation of the 2010 round of population and housing censuses. |
| United Nations Statistics Division (UNSD)                 | - Adoption of the Fundamental Principles of Official Statistics, in order to assist heads of national statistical offices through the establishment of a set of principles for official statistics.  
- Technical assistance for countries to undertake programs to strengthen their civil registration and vital statistics systems through the International Program for Accelerating the Improvement of Vital Statistics and Civil Registration Systems.  
- Technical support in the implementation of the 2010 World Program on Population and Housing Censuses through the Interregional Advisor on Population and Housing Censuses. |
| World Bank (WB)                                           | - Financial support to develop statistical capacity at the country level through the Trust Fund for Statistical Capacity Building (TFSCB) and the STATCAP program.  
- Financial assistance through other IBRD and IDA projects to develop statistical capacity and strengthen national HISs, including disease surveillance, population-based surveys, vital registration, HMIS, GIS, and national health accounts.  
- Financial assistance to other international organizations. |
| **World Health Organization (WHO) and Joint United Nations Program on HIV/AIDS (UNAIDS)** | agencies and networks that support national statistical capacity-building -including PARIS21 and UNSD-, through the Development Grant Facility (DGF).  
- Technical support for statistical capacity-building through the Statistical Capacity-Building Program implemented by the Technical Assistance in Statistics (TAS) team of the Data Group in the Development Economics Vice Presidency (DECDG).  
- Technical assistance in the design and implementation of the Living Standards Measurement Study (LSMS) household surveys, through the Development Economics Research Group (DECRG).  
- Technical support in monitoring of specific conditions, such the assistance provided by the Global HIV/AIDS Monitoring and Evaluation Team (GAMET).  
- Financial and technical support to countries in the Latin America and Caribbean (LAC) region to strengthen vital statistics systems.  
- Technical and financial support in disease-specific surveillance, such as the assistance provided by the UNAIDS/WHO Working Group on Global HIV/AIDS and STI Surveillance.  
- Technical assistance in vital registration, including sample mortality registration.  
- Capacity-building in survey design, implementation and analysis, through the World Health Survey (WHS) program.  
- Technical support in LMIS development, through its collaboration with the AIDS Medicines and Diagnostic Services (AMDS).  
- Development of applications for GIS and technical assistance for its implementation, such as the HealthMapper.  
- Technical assistance in enhancing country statistical capacity, through the WHO Program on Health Statistics.  
- Technical support in the implementation of the Integrated Disease Surveillance and Response (IDSR) in countries of the AFRO region.  
- Organization of inter-country meetings for the exchange of knowledge and experience in patient monitoring for HIV/AIDS care and treatment, in the PAHO/AMRO region.  
- HMN partner and secretariat host. |

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### Other Development Banks

**African Development Bank (AfDB)**
- Financial support for strengthening statistical capacity in African countries in the context of the International Comparison Program for Africa (ICP-Africa).
- Coordination of the implementation of the Reference Regional Strategic Framework for Statistical Capacity Building in Africa (RRSF), developed at the second Forum for Statistical Development in Africa (FASDEV-2) in collaboration with national statistical officers from 51 African countries.
- Technical support to African countries in order to develop and implement their NSDSs, through regional and sub-regional training seminars carried out by the Statistics Department.
- Financial and technical support to Statistical Training Centers in the African region.
- Statistical network in the region through subsidized statistical units in 4 main sub-regional organizations -AFRISTAT, COMESA, ECOWAS, and SADC- and in 52 member countries.

**Asian Development Bank (ADB)**
- Financial and technical assistance for statistical capacity-building, through the implementation of national and regional technical support projects in Asia.

**Inter-American Development Bank (IADB)**
- Financial and technical support for the development and strengthening of vital registration systems in LAC countries.
- Financial and technical assistance to improve other types of information sources in the LAC region, including the disease surveillance and population-based surveys.

### Other Multilateral Agencies

**European Commission (EC)**
- Financial assistance for statistical capacity-building and development of some types of information systems, such as Second Generation HIV Surveillance systems and population census, through the Directorate General for Development (DG DEV) -policy formulation- and the DG Europe Aid Cooperation Office (AIDCO) -project implementation supervision-.
- Training and technical assistance for national statistical capacity improvement through numerous programs and activities implemented by DG EUROSTAT.
| International Monetary Fund (IMF) | - Technical assistance in the implementation of the General Data Dissemination System (GDDS) through regional seminars for the training of country officials. The on-going GDDS regional projects are: Anglophone African countries, Pacific Island countries, and West Africa countries.  
- Technical assistance to improve national statistical capacity through six IMF Regional Technical Assistance and Training Centers in the Pacific, the Caribbean, Africa, and the Middle East. |
- PARIS21 partner and Secretariat host. |

### Bilateral Agencies

**Canada**

- Canadian International Development Agency (CIDA/ACDI): financial and technical support for statistical capacity-building through a few statistics projects in Africa and economic contribution to the African Capacity Building Forum.  
- Statistics Canada: technical assistance to developing countries on an institutional basis, as well as participation in regional assistance projects, such as the International Comparison Program (ICP) in LAC and the Partnership on Measuring Information and Communication Technology (ICT) for Development in Africa.

**Denmark**

- Danish Agency for Development Assistance (DANIDA): statistical support in the context of sector programs to several countries, including Tanzania, Benin, and Burkina Faso.  
- Statistics Denmark: long-term institutional cooperation projects in several countries and regions through its International Consulting Unit.  
- Financial support to HMN

**Finland**

- Statistics Finland: international statistical cooperation.

**France**

- National Institute of Statistics and Economic Studies (INSEE): technical assistance to national statistical services of developing countries and training activities to their statisticians, including the creation of the Centre of Support to African Statistical Training Institutes (CAPESA) in the framework of a convention linking the statistical institutes of Abidjan, Dakar and Yaoundé.  
- Ministry of the Economy, Finance and
<table>
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<tr>
<th>Country</th>
<th>Assistance Activities</th>
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</table>
| **Germany**  | - Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ): statistical capacity-building projects in partner countries, generally included in priority sector programs.  
               - Capacity Building International (InWEnt): development of statistical literacy focused on MDGs and PRSPs monitoring in partner countries, through its Centre for Economic, Environmental and Social Statistics.  
               - Federal Statistical Office (DESTATIS): training and consultation in different areas of statistical capacity-building, aimed at improving the skills of staff of national statistical offices in partner countries. |
| **Ireland**  | - Irish Aid: financial contribution to PARIS21.                                        |
| **Italy**    | - Directorate General for Development Cooperation (DGCS): financial and technical support to statistical capacity-building in Cape Verde and Mozambique.  
               - National Institute of Statistics (ISTAT): institutional strengthening of statistical institutes of countries in transition and developing countries, through its Office for International Relations and Cooperation. |
| **Japan**    | - Statistics Bureau: capacity-building, through statistical experts sent to foreign countries for extended periods and education of visitor trainees at the Bureau.  
               - Statistical Institute for Asia and the Pacific (SIAP): training in statistics to officials from countries in the Asia-Pacific Region, and financial support through fellowships for major training courses.  
               - Financial support to other organizations aimed at increasing statistical capacity in countries, such as IMF -through the GDDS projects-. |
| **Netherlands** | - Financial support to PARIS21 and the WB TFSCB.                                      |
| **Norway**   | - Ministry of Foreing Affairs (MFA) and the Norwegian Agency for Development Cooperation (NORAD): financial support to several long-term statistical programs.  
               - Statistics Norway: capacity-building activities |

Industry: technical cooperation with partner countries in statistics -including social surveys- and information technology for data processing, through the initiative Assistance to the Development of Economic and Financial Technologies (ADETEF).
- Financial support to PARIS21.
and institutional support to national statistical offices, through its Division for Development Cooperation.
- Financial support to PARIS21.

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<thead>
<tr>
<th>Country</th>
<th>Agency/Support</th>
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<tr>
<td><strong>Portugal</strong></td>
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<td></td>
<td>Portuguese Institute for Development Support (IPAD): financial support to statistical capacity-building activities, mainly in Portuguese-speaking countries.</td>
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<td></td>
<td>National Institute of Statistics (INE): technical assistance to national statistical offices, through technical advice, training, and fellowships.</td>
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<tr>
<td><strong>Spain</strong></td>
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<tr>
<td></td>
<td>National Statistical Institute (INE): financial support, training -courses, seminars, and workshops-, technical assistance, and institutional development, through its International Relations Directorate.</td>
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<tr>
<td><strong>Sweden</strong></td>
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<tr>
<td></td>
<td>Swedish Agency for International Development Cooperation (SIDA): financial support to capacity-building in national statistical offices.</td>
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<td></td>
<td>Statistics Sweden (SCB): statistical consulting services mainly through long-term “twinning” arrangements with the partner institutions, through its International Consulting Office (ICO).</td>
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<tr>
<td></td>
<td>Economic contribution to PARIS21.</td>
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<tr>
<td><strong>Switzerland</strong></td>
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<tr>
<td></td>
<td>Financial contribution to PARIS21.</td>
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<tr>
<td><strong>United Kingdom</strong></td>
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<td></td>
<td>Department for International Development (DFID): Financial and technical assistance for strengthening countries capacity to monitor health, mainly through the implementation of household surveys, census, and vital registration.</td>
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<td></td>
<td>Financial support and secondment of statisticians for international institutions aimed at building statistical capacity, such as IMF - through the GDDS programs-, the WB - through the TFSCB-, EUROSTAT, PARIS21, and HMN.</td>
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<tr>
<td><strong>USA: Centers for Disease Control and Prevention (CDC)</strong></td>
<td>Training programs in all continents, such as the Field Epidemiology (and Laboratory) Training Program (FE(L)TP), Data for Decision Making, and other courses through the Division of Epidemiology and Surveillance Capacity Development (DESCD) of CDC’s Coordinating Office for Global Health (COGH).</td>
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<tr>
<td><strong>Development Assistance to Health Information Systems Strengthening</strong></td>
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<td><strong>- Technical support to various global health projects such as the Central Asia Regional Program and the Global Surveillance Project, through the DESCD of CDC's COGH.</strong></td>
<td><strong>- Financial and technical support for national HIS strengthening -mainly related to diseases surveillance-, through the COGH's regional offices.</strong></td>
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<td><strong>- Technical assistance for the implementation of Reproductive Health Surveys (RHS), though the CDC Division of Reproductive Health (CDC/DRH) -MEASURE CDC Project-.</strong></td>
<td><strong>- Financial and technical support to HIV surveillance activities, such as behavioral surveillance surveys, demographic and health surveys that have an HIV/AIDS module, AIDS indicator surveys, antenatal clinic surveillance, and most-at-risk population surveys.</strong></td>
</tr>
<tr>
<td><strong>USA: President's Emergency Plan For AIDS Relief (PEPFAR)</strong></td>
<td><strong>- Financial and technical assistance in the development and implementation of HMIS for HIV/AIDS patient tracking and program monitoring.</strong></td>
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<tr>
<td><strong>USA: The United States Agency for International Development (USAID)</strong></td>
<td><strong>- Financial and technical assistance for the design and implementation of different surveys through the MEASURE Demographic and Health Surveys (DHS) Project.</strong></td>
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<tr>
<td><strong>- Financial and technical support for strengthening HISs worldwide through the MEASURE Evaluation project. Areas of the technical assistance include: sample vital registration with verbal autopsy, assessment and strengthening of routine health information systems (RHISs), HIV/AIDS M&amp;E systems for in marginalized populations, M&amp;E of the presence of Avian Flu, instructional support to academic institutions, and promotion of professionals’ connectivity through the Network (AIMNet) listserv.</strong></td>
<td><strong>- Technical assistance and training for statistical capacity-building through the International Programs Center (IPC).</strong></td>
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<td><strong>- Development of the Antiretroviral Therapy Information System (ARTIS) and GIS and mapping tools, as well as technical assistance for their implementation through the Health Systems 20/20 Program.</strong></td>
<td><strong>Global Health Partnerships (GHP) &amp; Networks</strong></td>
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<tr>
<td><strong>Global Health Partnerships (GHP) &amp; Networks</strong></td>
<td><strong>Global Alliance for Vaccines and Immunization (GAVI Alliance)</strong></td>
</tr>
<tr>
<td><strong>- Financial support for HIS strengthening, through the Health System Strengthening (HSS) program.</strong></td>
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<tr>
<td>Organization</td>
<td>Activities</td>
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<tr>
<td>Development Assistance to Health Information Systems Strengthening</td>
<td>- Financial assistance for HIS strengthening, through the Immunization Services Support (ISS) program, promoted by the requirement of Data Quality Audit (DQA) and performance-linked financial support.</td>
</tr>
<tr>
<td>Global Fund for AIDS, Tuberculosis and Malaria (GFATM)</td>
<td>- Financial support to improve national HIV/AIDS M&amp;E systems, including disease surveillance.</td>
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<td></td>
<td>- Financial assistance for M&amp;E systems strengthening, promoted by the performance-based funding model.</td>
</tr>
<tr>
<td>Health Metrics Network (HMN)</td>
<td>- Development of international standards and tools for comprehensive HIS strengthening - such as HMN Framework, the HMN Country Health Information System Assessment Tool, and HMN Planning Tool- as well as technical and catalytic financial support to apply them.</td>
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<td>- Development of tools for the implementation of specific information subsystems, such as a Vital Registration Resource Kit through the Monitoring Vital Events (MoVE) initiative.</td>
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<tr>
<td>INDEPTCH Network</td>
<td>- Execution of comparative studies through development of sentinel demographic sites in severely resource constrained populations</td>
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<td>- Capacity building across the network through the development and dissemination of models for survey design, data processing and analysis, and quality control; the promotion of on-site training courses and internships; and the coordination of multi-site research collaborations and workshops.</td>
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<tr>
<td>Partnership in Statistics Development in the 21st Century (PARIS21)</td>
<td>- Development of a framework for the National Strategy for the Development of Statistics (NSDS) program by the Strategic Statistical Development Plans task team, and implementation of regional workshops to train national statistical representatives to apply it.</td>
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<td>- Technical support to selected countries to undertake urgent improvements in monitoring progress in key development indicators, including the MDGs, through the Accelerated Data Program (ADP).</td>
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<td>- Development of strategies for reducing census costs.</td>
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<td>- Development of a set of Statistical Capacity-Building Indicators (SCBI).</td>
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<td>- Development of advocacy materials, such as the video entitled “Census dissemination: the African perspective”.</td>
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<tr>
<td><strong>Private foundations</strong></td>
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<tr>
<td>Bill &amp; Melinda Gates Foundation</td>
<td>- Financial assistance to several organizations to support the implementation of different activities aimed at developing and strengthening HISs in developing countries, including the creation of HMN and the Institute for Health Metrics and Evaluation.</td>
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<tr>
<td>Rockefeller Foundation</td>
<td>- Financial support to different organizations that work in the development of HISs, such as the INDEPTH Network.</td>
</tr>
<tr>
<td>Rotary International Foundation</td>
<td>- Financial support to implement poliomyelitis surveillance activities at the local and national level through the PolioPlus program.</td>
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<th><strong>NGOs</strong></th>
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<tbody>
<tr>
<td>Association of Public Health Laboratories (APHL)</td>
<td>- Technical support in the development of a Laboratory Information System (LIS) in Mozambique.</td>
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<tr>
<td>Institute for Healthcare improvement (IHI)</td>
<td>- Technical assistance at the sub-national level in strengthening the maternal and neonatal care HMIS in Malawi through the Data Improvement Element of The Health Foundation Consortium (THFC) Program.</td>
</tr>
<tr>
<td>IntraHealth International</td>
<td>- Training and technical assistance to national officials in strengthening human resources information systems (HRIS) through the Capacity Project.</td>
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<tr>
<td>John Snow Inc. (JSI)</td>
<td>- Technical support in the development of logistic management information systems (LMIS) through the DELIVER project.</td>
</tr>
<tr>
<td>Management Sciences for Health (MSH)</td>
<td>- MOH capacity-building activities and technical assistance in the development of information systems -including HMIS and disease surveillance systems- through different components of MSH country programs.</td>
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Development Assistance to Health Information Systems Strengthening

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<tr>
<th>Academic Institutions</th>
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<tbody>
<tr>
<td>Centre Européen de formation des Statisticiens économistes des pays en voie de Développement (CESD)</td>
<td>Training of African statistical economists for the development national statistical infrastructures in the African region.</td>
</tr>
<tr>
<td>Harvard School of Public Health (HSPH)</td>
<td>Development and technical support in the implementation of a PDA-based system to evaluate AIDS patients that allows keeping electronic medical records of patients in South Africa.</td>
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</table>

b. Description of activities

United Nations Children Fund (UNICEF)

UNICEF supports two main activities related to health monitoring and statistics. For data collection, UNICEF developed the Multiple Indicator Cluster Survey (MICS); and for data management and presentation UNICEF created the software DevInfo (UNICEF Website).

UNICEF has been instrumental in supporting countries to collect relevant data through household surveys. This organization developed the Multiple Indicator Cluster Survey (MICS) methodology in the mid-1990s, in response to the need for filling data gaps for indicators used to track progress toward the World Summit for Children goals. Currently, MICS surveys are a major source of data for MDGs monitoring, as well as the assessment of progress toward other international goals such as those included in A World Fit for Children, the UNGASS on HIV/AIDS, and the Abuja targets for malaria.

The surveys are typically carried out by government organizations, with the assistance of UNICEF. Technical assistance and training is provided through a series of regional workshops, covering: questionnaire content, sampling and survey implementation, data processing, data quality and data analysis, and report writing and dissemination.

The first round of MICS was conducted around 1995 in more than 60 countries. A second round of surveys was conducted in 2000 in around 65 countries and, for the first time, it allowed the monitoring of trends in many indicators. The current round is going to be executed around the year 2005 in more than 50 countries, including Georgia, Kazakhstan, Montenegro, Mongolia, Burundi, Algeria, Lebanon, Tunisia, Bangladesh, Belize, Trinidad and Tobago, Guinea Bissau, Cameroon, Sao Tome and Principe, and Togo.

The survey questionnaires are modular tools that can be customized to the needs of a country. They consist of 3 questionnaires: a household questionnaire, a questionnaire for women aged 15-49, and a questionnaire for children under the age of 5 -addressed to the mother or primary caretaker of the child-. The selection of countries and the choice of questions is done and in conjunction with the Demographic and Health Surveys (DHS). This ensures that there is maximum coverage of countries.
in the household surveys and provides comparability across surveys (UNICEF Childinfo website). The cost of conducting a MICS survey is less than 50 USD per household (HMN no. 5 Unedited).

UNICEF has also developed the software DevInfo in order to assist countries in monitoring the MDGs. This tool is a package for the compilation and presentation of data. UNICEF supports the organization of national and regional workshops. ChildInfo, the previous version, has been used extensively and DevInfo is currently being used in the implementation of the UNDP project “Statistical Literacy and Capacity Building for MDG Monitoring at the Country Level”. Many countries use this system, including 32 IDA countries, of which 22 countries are in Sub-Saharan Africa. Malawi and Tanzania have even piloted a web-based version (DevInfo website).

United Nations Development Program (UNDP)

The United Nations Development Program (UNDP) is implementing a project on “Statistical Literacy and Capacity-Building for MDG Monitoring at the Country Level”. The objectives of this project are to build national statistical capacity by increasing statistical skills within a large number of users across government and civil society, and to raise use of data for policy-making and advocacy. The project is working with key regional partners to pilot learning activities nationally and locally in selected countries. The results from this work will be used to revise the modules and assist other countries embarking upon similar initiatives (UNDP Statistical Literacy website).

This project provides support to countries in the following areas (AfDB MDGs Monitoring website):

- Make data more accessible: (1) technical assistance is provided to gather existing data that could be used for monitoring progress, (2) set up a central repository of data, using the software DevInfo or any preferred software, (3) train database managers to maintain the system, and (4) facilitate discussion among stakeholders to ensure the database meets user needs.

- Enhance statistical capacity and literacy: training is provided to make better use of MDG data and indicators to improve evidence-based development policies. An initial course is offered to train national trainers: the training of trainers (TOT) workshops. Seed funding is provided to each pilot country to train an additional 100-200 national and local users. Training covers: (1) MDGs and indicators for monitoring progress, (2) sources, methods and metadata, (3) accessing the data through DevInfo, and (4) basic statistical analysis for improving participatory decision-making and advocacy.

The statistical literacy project is working with the African Development Bank (AfDB) to pilot the initiative in six African countries: Ghana, Kenya, Malawi, Tanzania, Uganda and Zambia. Two TOT workshops have been organized by AfDB for three countries each, one in Kampala in August 2005 -for Uganda, Kenya, and Tanzania-, and a second one in Lusaka in November-December 2005 -for Zambia, Ghana, and Malawi-. The implementation of the project in the countries is to be spearheaded by the trained participants. So far, four countries -Tanzania, Uganda, Ghana, and Malawi- have rolled out the project by implementing their respective country plans. Two
countries -Kenya and Zambia- are in the process of finalizing their country plans. Further roll-out to the francophone countries is planned. UNDP is financing the implementation of the project including the cost of organizing TOT workshops. In this respect, UNDP has made a provision of 70,000 USD for each participating country to cover the expenses of carrying out the project at country level (AfDB MDGs Monitoring website).

In the Latin America and the Caribbean region, the statistical literacy project is working with the Inter-American Development Bank (IADB) and its Social Development Institute (INDES) to offer the training to all countries of the region (UNDP Statistical Literacy website).

United Nations Population Fund (UNFPA)

UNFPA assists countries in the implementation of the 2010 round of population and housing censuses. Apart from engaging in inter-agency collaboration to ensure that key measurements for maternal mortality and international migration are included in censuses, this organization provides financial support and capacity-building activities to several countries, including Haiti, Nigeria, Sudan, Afghanistan, Iran, and Bangladesh. Collaboration involves technical assistance as well as training and organization of workshops in different areas, such as cartography, country data collection, data processing and analysis, and dissemination of results.

For instance, UNFPA supported in 2006 the implementation of a population census in Haiti, the first in the past 24 years in this country. Results from this census revealed that half of the country’s population is younger than 20 years old, the school attendance rate is 49%, and maternal death ratio is the 523 deaths per 100,000 live births -the highest in the Western Hemisphere-. Therefore, this census was helpful in determining where more resources were needed -namely, in education and reproductive health services-.

UNFPA recently provided technical expertise for the implementation of the first census in 15 years in Nigeria, Africa’s most populous country. The Fund trained 73 government officials and instructed 70 journalists on how to report data, and conducted a radio and television awareness-raising campaign. After two years of preparatory work, UNFPA deployed census monitoring staff on the ground in 21 of the country’s 36 states during the weeklong event.

In Afghanistan, UNFPA is helping organize the first full population census, to be completed in 2008. In addition to mobilizing half of the total funding needed, UNFPA supported the planning process by establishing collaboration between the Afghan Central Statistics Office, the Statistical Centre of Iran and the University of Tehran. UNFPA also played an important role in finalizing Afghanistan’s provincial socio-economic profiles, which are providing key information for census planning and development (UNFPA 2006).
United Nations Statistics Division (UNSD)

The United Nations Statistics Division (UNSD) is committed to the advancement of the global statistical system. Its work is largely guided by the deliberations of the United Nations Statistical Commission (UNSC), which meets annually, bringing together chief statisticians from countries of all regions and other supranational statistical organizations.

Among other functions, UNSD develops standards and norms for statistical activities, and supports countries’ efforts to strengthen their national statistical systems (NSS). To carry out these functions, it promotes international standards of methods, classifications and definitions used by national statistical offices, and assists member states -at their request- by giving advice and training (UNSD website).

The UNSD, in its Special Session of April 1994, adopted the Fundamental Principles of Official Statistics, in order to assist heads of national statistical offices through the establishment of a set of principles for official statistics. These principles include: relevance, impartiality and equal access; professional standards and ethics; accountability and transparency; prevention of misuse; sources of official statistics; confidentiality; legislation; national coordination; use of international standards; and international cooperation (UNSD 1994). In 2003, UNSD conducted a global review of the implementation of the Fundamental Principles to prepare a report to be discussed at the Commission’s session in 2004, coinciding with the 10th anniversary of their adoption. On the basis of this self-assessment carried out by 112 countries, it seems that the Fundamental Principles of Official Statistics are remarkably well implemented. Some major problems that prevented a better implementation included: political interference at the dissemination stage; the need to adapt international standards to national circumstances; and lack of resources (ESC 2003).

In terms of data sources, UNSD plays a principal role in supporting the development and implementation of civil registration and censuses at the national level. UNSD is responsible for overall substantive coordination of the International Program for Accelerating the Improvement of Vital Statistics and Civil Registration Systems. Since its adoption in 1991, this program provides technical assistance for countries to undertake programs to strengthen their civil registration and vital statistics systems, with an emphasis on national efforts. For this purpose, UNSD has issued the Principles and Recommendations for a Vital Statistics System to assist national statistical authorities in establishing and maintaining reliable civil registration systems. It provides technical guidance on standards, concepts, definitions, and classifications for civil registration and vital statistics to further increase international comparability of data (UNSD Civil registration website).

The UN promulgates a World Population and Housing Census Program every decade to encourage countries carry out a census (UN 2006). The current 2010 World Program on Population and Housing Censuses started on January 2005, as endorsed by the United Nations Statistical Commission. As part of this program, an Interregional Advisor on Population and Housing Censuses was appointed to ensure active involvement and participation of member states and to provide them technical support -through correspondence, email, field missions, and multi-lateral workshops- (UNSD
website). The list of countries that conducted or are planning to conduct a census is available on the UNSD website.

**World Bank**

The World Bank (WB) offers both financial and technical support to member countries for statistical capacity building, and strengthening of all sources of health information cited in the background.

In October 2002, an information paper entitled “Building Statistical Capacity to Monitor Development Progress” was prepared for the Bank’s Board of Executive Directors in order to request a briefing on the state of national statistical capacity. It highlighted the need for action through a strategic approach to statistical capacity building at country level, and the importance of engagement in this area by the WB (WB Statistical Capacity website).

In recognition of this transition to evidence-based policy-making, nearly 200 representatives from developing countries, WB, AfDB, ADB, IADB, and the OECD/DAC convened the Second International Roundtable on Managing for Development Results held in Marrakech, Morocco in February 2004. The Roundtable endorsed a Marrakech Action Plan for Statistics (MAPS), which consists of six actions, including to mainstream planning of statistical systems and prepare national strategies for the development of statistics (NSDS) for all low-income countries, and to increase financing for statistical capacity building. Following the Second Roundtable on Managing for Development Results, activities of the WB have focused on implementing the MAPS (WB Marrakech Action Plan website).

The WB provides financial support to develop statistical capacity at the country level and strengthen national HISs mainly through four financing instruments: the Trust Fund for Statistical Capacity Building (TFSCB), the STATCAP program, other IBRD and IDA projects, and the Development Bank Facility (WB Statistical Capacity website).

STATCAP is a financing program approved by the Bank’s Board in March 2004 in order to make investments in statistical capacity easier and more effective. Through this program, countries can obtain separate loans, credits, or grants to finance their national statistical capacity building projects. The cornerstone is the development of a comprehensive and integrated national action plan for statistical capacity building, a Statistical Master Plan (SMP), often linked to a National Strategy for the Development of Statistics (NSDS), prepared through consultation with both data providers and data users. The plan or strategy is required to contain components to improve: statistical policy and the regulatory and institutional framework, statistical operations and procedures, human resource development, and physical infrastructure and equipment. Work to develop a NSDS and SMP may be financed through a grant from the TFSCB. Some examples of projects funded through STATCAP are: “Development of the State Statistical System for Monitoring the Social and Economic Transformation” in Ukraine - approved in 2004-, “Strengthening the National Statistical System” in Tajikistan - approved in 2006-, and “Development of the National Statistical System Project” in Kenya -approved in 2007-.

According to the progress report “Statistical Capacity Improvements in IDA countries”, published by the WB in May 2006, 22 IDA countries have developed new NSDSs since 2002. Eleven of these were supported by TFSCB. Of these, four - Burkina Faso, Kenya, Nigeria, and Tajikistan- sought to implement their strategies using the STACAP lending program. For instance, Burkina Faso prepared, with financial support from the TFSCB, a NSDS for 2004-09 that was adopted by the National Council of Burkina Faso in July 2003. Following the adoption of this strategy, the government developed a project to implement key elements of it, which is now being financed by IDA through the STATCAP program. During the first year of this project, the legal status of the National Institute of Statistics and Demography (INSD) was evaluated, system-wide training programs were designed, dissemination and IT development plans were developed, preparations were made for the construction of appropriate offices for INSD headquarters, and regional statistical offices were created. These institutional strengthening activities were complemented by a number of activities aimed at collecting better data for compiling national accounts and statistics relevant to health (WB 2006).

Furthermore, IBRD and IDA have also provided financial support to other projects that have significant statistical components and/or that aim at developing or strengthening national HISs. Some of these projects concentrate on improvements in a particular sector and other take a system-wide approach. Some examples are (WB Projects and operations website):

- “Health Sector Support and Multisectoral AIDS Project” in Burkina Faso - approved in 2006-: this project supports strengthening of the health information and surveillance systems, including enhanced use of information for decision-making, as well as the HIV/AIDS program monitoring system. Assistance is also provided for periodic household surveys on health and HIV/AIDS risky behaviors -including DHS 2008-, and strengthening community-level surveillance and vital registration systems.

- “Integrated Disease Surveillance Project” in India -approved in 2004: this project supports three components: (1) Establishment and operation of a
Central-level Disease Surveillance Unit to help coordinate and decentralize disease surveillance activities; (2) Integration and strengthening of disease surveillance at the state and district levels -specific activities include: management and analysis of surveillance data through use of computers, standard software including GIS and the internet; preparation and reporting of monthly summaries of the disease situation to the central level; implementation of periodic surveys for non-communicable diseases and/or risk factors; and rapid dissemination of health alerts; and (3) Training for disease surveillance and action, in order to reorient health staff to an integrated surveillance system and provide the new skills needed.

- “Reproductive and Child Health Second Phase” in India -approved in 2006-: this project supports two components: (1) Implementation of the district-based Reproductive and Child Health Rapid Household Survey to collect information on the utilization of Reproductive and Child Health services -this survey, which was first conducted in 1998-99 and repeated in 2001-02, will be repeated in 2006-07 and 2009-10--; and (2) Monitoring of progress towards polio eradication through the special monitoring arrangements that have been established in the context of the global campaign for polio eradication.

- “Maharashtra Health Systems Development Project” in India -approved in 1998-: this project supported five components: (1) Strengthening of district-level data collection capacity -by providing training to HMIS staff in data analysis and computer use, as well as appropriate equipment and supplies- in order to facilitate decentralized participatory planning; (2) Improvement in data collection from various agencies, and coordination between agencies currently collecting data on specific diseases; (3) Development of HMIS to gather information on civil works, equipment, drugs, major communicable diseases, hospital activity and financial management; (4) Implementation of a baseline survey on the conditions of physical infrastructure and services and customer use and satisfaction; and (5) Strengthening of the collection, compilation and reporting of birth and death statistics.

- “Malaria Booster Program for Health Sector Wide Approach (SWAP)” in Malawi -approved in 2006-: this project supports two components: (1) Design and implementation of a robust and sustainable M&E system. At the central level this involves: (a) (i) reorganizing the present HMIS Unit into a M&E Unit with the ability to commission, coordinate, and supervise all monitoring, evaluation and research relevant to the SWAP; and (ii) strengthening the ability of the MOH and the districts to use M&E data for policy formulation, program planning and resource mobilization; (b) conducting selected studies and surveys to assess key outcome indicators of the National Malaria Control Program. At the district level, activities strengthen community and facility level data collection, and support district M&E teams; and (2) Increase of the existing physical, financial, technical and human capacity for M&E. At the central level this involves, a comprehensive analysis of HMIS resource gaps, extension of technical support, piloting of information technology tools, and planning and phased building of staff capacity. At the district level this involves preparation of effective district M&E technical leadership, comprehensive staff training, distribution of appropriate data management tools, provision of
additional equipment for operational support and harmonization of data collection activities.

- “Disease Surveillance and Control Project (VIGISUS)” in Brazil -approved in 1998-: this project supported the strengthening of the national disease surveillance and control system to reduce mortality and morbidity resulting from communicable diseases. The project supports two surveillance-related components: (1) Strengthening of National Surveillance System through (a) improvement of the data management telecommunications system, (b) rehabilitation, extension, and equipment of the laboratory work, (c) training of municipal, state, and central National Health Foundation (FNS) staff; and (d) studies and research in epidemiological surveillance; and (2) Strengthening of disease control in selected areas, including the Amazon Region.

- “Second Disease Surveillance and Control Project” in Brazil -approved in 2004-: this builds on the accomplishments of the first phase, while supporting the decentralization of health surveillance activities. The project supports one surveillance-related component: Strengthening of the public health surveillance and disease control system at the national, state and municipal levels. It also supports improved vital statistics, a tool to monitor and prevent maternal and infant mortality and to assess health disparities.

- “HIV/AIDS and Health (MAP Program)” in the Democratic Republic of Congo - approved in 2004-: this project supports M&E of HIV/AIDS, necessary for rational planning of investments in health and in the fight against this disease. This project also supports a Congo demographic and health survey.

- “Public Health Surveillance and Disease Control Project” in Argentina - approved in 1999-: The objective of this project is to strengthen national, provincial, and municipal institutions responsible for public health policy and practice. It supported two monitoring-related components: (1) Strengthening the public health surveillance system at the national level, in order to provide the MOH with institutional capacity to monitor changes in health trends, make informed decisions on prevention, and allocate resources effectively; and (2) Institutional building at provincial levels, to better monitor certain diseases, such as tuberculosis and dengue as well as other infectious and emergent diseases.

- “Partnership for Polio Eradication Project” in Nigeria - approved in 2003-: The project aims to assist the Government of Nigeria to achieve its goal of interrupting transmission of wild poliovirus. One of its components provides support for epidemiological and laboratory surveillance.

- “Health Sector Reform II” in Romania - approved in 2004-: this project supports the development of National Health Accounts (NHA) in order to adapt the internationally validated methodology, propose changes of regulations regarding reporting of financial information in the health sector, perform analysis of existing financial information and surveys, conduct additional surveys, train staff, and prepare, publish and disseminate reports. The project finances: participation in training, seminars and workshops, investments in IT
equipment and software, surveys and studies, and local and foreign technical assistance.

The Data Group in the Development Economics Vice Presidency (DECDG) maintains a Statistical Project Information Database to keep track of all projects that are funded by the TFSCB, make part of the STATCAP program, or are funded by IBRD or IDA and have significant statistical components (WB Country Statistical Information Database website).

The Development Grant Facility (DGF) of the WB provides financial support to statistical capacity-building and the implementation of MAPS. It has provided several grants to international organizations and networks working in this field, such as PARIS21 -for the International Household Survey Network and the Accelerated Data Program- and UNSD -for the 2010 census round- (WB DGF website).

The 14th replenishment of IDA resources makes available 34 billion USD to the world's 81 poorest countries. In order to put development results at the centre of the IDA program, the IDA14 agreement established a Results Measurement System (RMS). This enhanced system is built on an interim framework introduced in 2002 as part of the policy framework for the 13th replenishment of IDA resources. It monitors development progress and links IDA country programs and projects to outcomes, enabling better assessment of how both countries and IDA are doing. The new RMS includes three health-related outcome indicators: under 5 mortality rate (per 1000), female prevalence of HIV (% ages 15-24), and proportion of births attended by skilled health staff (% of total). Under the IDA14 agreement, projects are designed to support country monitoring of those core indicators, which in turn helps ensure that countries have the capacity to generate regular data for these fundamental indicators, to use IDA operations to strengthen this capacity, and to help focus on results (WB IDA14 Replenishment website).

The WB provides technical assistance in statistical capacity building to member countries through the Statistical Capacity Building Program. This program is implemented by the Technical Assistance in Statistics (TAS) team of DECDG. The mission of TAS is to provide comprehensive, coordinated, and demand-led technical assistance for building sustainable statistical capacity, necessary to guide policy-making. The team mainly focuses its technical assistance in institutional capacity-building.

TAS technical support includes training in improvement of organization, management, and planning; modification of data collection system and methods; introduction of international statistical concepts and standards; and implementation of the IDA14 RSM. Once the member country formally notifies the Bank of its desire to strengthen its statistical capacity through a loan or a grant, a team of experts from the Bank visits the country in order to assess the statistical areas which need to be addressed. Afterwards, a project implementation plan is generated to clearly address all the crucial statistical components which need to be strengthened. Upon final Bank approval of the project, the TAS Team continues providing technical assistance throughout the implementation phase. The country TAS program preparation is normally financed through grants and the implementation and monitoring through a combination of grants and loans with the participating country paying a small
contribution to encourage ownership (WB Country Statistical Information Database website).

The Policy Research Division of the Development Economics Vice Presidency of the WB established, in 1980, the Living Standards Measurement Study (LSMS), based on household surveys. This research project was initiated in response to a perceived need for relevant data that would allow policy-makers to move beyond simply measuring rates of unemployment, poverty, and health care use, to understanding the determinants of these observed social sector outcomes. The LSMS was designed as a multi-faceted program to: (a) improve the quality of household survey data; (b) increase the capacity of statistical institutes to perform household surveys; (c) improve the ability of statistical institutes to analyze survey data; and (d) provide policy-makers with information to understand the determinants of observed social and economic outcomes.

Phase I of the study was a five year comprehensive review of existing household surveys, and extensive consultations with researchers and policy-makers to determine the types of data needed, as well as the most suitable field work procedures. At the end of this review, the first LSMS surveys were piloted in Côte d’Ivoire and Peru in 1985. The success of these first two surveys has been responsible for the over 60 LSMS surveys that have been carried out in over 40 countries in the past 18 years. Nevertheless, the program has considerably evolved over time, and LSMS surveys have become increasingly customized to fit specific country circumstances. The cost of conducting a LSMS survey is around 100 USD per household (HMN no. 5 Unedited).

DECRG, the Development Economics Research Group of the World Bank, is currently involved in several activities to support the implementation of LSMS surveys. In a few cases, divisional staff or consultants spend several months working on a single country to provide technical assistance. Due to the increased demand of support for the implementation of LSMS surveys, DECRG is increasingly hiring independent consultants to assist countries in the processes of survey design, questionnaire development, and data analysis (WB LSMS website).

The WB also provides technical support in monitoring of specific conditions. The best example is the technical assistance provided to countries by the Global HIV/AIDS Monitoring and Evaluation Team (GAMET). The central mission of this team, hosted by the Global HIV/AIDS Program (GHAP), is to build national capacity to support the achievement of the third “One” -one country-led and country-owned M&E system. GAMET works closely with UNAIDS and other global partners.

GAMET has five areas of work: (1) support the development of national M&E frameworks, operational plans and budgets; (2) improve evidence-based results information; (3) improve data use for programming and decision-making; (4) renew national and international partnerships; and (5) generate and disseminate knowledge. The GAMET specialists provide rapid, intensive, flexible, practical and expert hands-on M&E support to national AIDS authorities in more than 35 countries in all regions - including Angola, Gambia, Burkina Faso, Nigeria, Democratic Republic of Congo, Indonesia, Jamaica, and Guyana-. About half of these 35 countries now have M&E frameworks and operational M&E plans -including Rwanda, Swaziland, and Tanzania-. 
Another important role of GAMET is to support the M&E activities of WB projects, enhancing country capacity to measure progress of the national AIDS response, and use the information for program improvement. For instance, Malawi received an IDA grant in 2003 in order to implement the “Malawi Multi-Sectoral AIDS Project”. This country received parallel technical assistance from GAMET, in order to carry out the M&E component of the project. This component involved the creation of an integrated national M&E system by the Malawi National AIDS Commission. The new M&E system measures inputs, outputs, outcomes and impact, and the information produced is distributed to stakeholders in a timely fashion (WB GAP website).

The WB Regions have also provided technical support to the strengthening of HIS in their coverage area. For instance, the Latin America and Caribbean (LAC) region of has recently conducted an assessment of the status of vital statistics in 18 countries of the region including Argentina, Bolivia, Brazil, Costa Rica, El Salvador, and Mexico, and is now preparing a report with recommendations for improving their coverage, quality, and timeliness. The WB has supported vital statistics systems strengthening in LAC through loans and credits, and is planning to provide more financial and technical support (WB LAC Unedited).

World Health Organization (WHO) and Joint United Nations Program on HIV/AIDS (UNAIDS)

WHO is a HMN partner and hosts the Secretariat of this partnership. WHO contributes to the development and strengthening of national HIS mainly through its collaboration with the HMN partnership. In addition, the different clusters of WHO provide a wide variety of activities to developing countries in order to improve their national information systems, such as disease surveillance, LMIS, electronic medical record (EMR), vital registration, health mapping, and health statistics.

The best example of WHO’s contribution to disease surveillance is the support provided by the UNAIDS/WHO Working Group on Global HIV/AIDS and STI Surveillance. Initiated in November 1996, this Working Group is the coordination and implementation mechanism for UNAIDS and WHO to compile and improve the quality of data needed for informed decision-making and planning at national, regional and global levels. The primary objective of the working group is to strengthen national, regional and global structures and networks for improved monitoring of HIV/AIDS and STIs. For this purpose, the Working Group collaborates closely with WHO Regional Offices, national AIDS programs, and a number of national and international institutions -such as US Bureau of Census, EUROHIV, US CDC, Robert Kock Institute, and Health Canada- (UNAIDS/WHO 2002).

In its present form, the Working Group is a coordination mechanism cutting across several WHO clusters and UNAIDS. It consists therefore of several stakeholders that include (UNAIDS/WHO 2002):

- UNAIDS (Strategic Information Team)
- WHO/EIP/MHI (Measurement Health Information)
- WHO/HTM/HIV (HIV Department)
- WHO/NMH/MSD (Mental Health and Substance Dependence)
Taking stock of the experience gained, this Group has developed the Second Generation HIV Surveillance (SGS) System. This new system builds on the existing HIV surveillance activities and focuses more on the tailored monitoring of epidemics and the more consistent collection and use of behavioral data. The Working Group activities include, in addition to the development of guidelines and new epidemiological tools, the assistance to national HIV, STI and behavioral surveillance activities through regular regional and inter-country meetings and workshops, fielding of staff or external consultants, briefing of national and international staff in headquarters and, in some cases, direct financial support. Furthermore, the Working Group provides technical and financial support to all WHO Regional Offices for inter-country HIV surveillance activities (UNAIDS/WHO 2002).

UNAIDS/WHO started the implementation and field testing of the SGS methodology in 1999, through a pilot project conducted in eight countries: Tanzania, Burkina Faso, Nigeria, Mexico, Dominican Republic, Vietnam, Myanmar, and Mozambique. Through this project, those countries received financial and technical support in order to: make an assessment of their HIV surveillance systems, prepare workshops to achieve consensus among main stakeholders, develop HIV sero-surveillance and behavioral surveillance protocols, and implement those protocols. The country experiences in the initiation and development of HIV SGS systems was compiled and published in 2002 by UNAIDS/WHO in the form of practical guidelines for “Initiating second generation HIV surveillance systems” (UNAIDS/WHO 2002).

When it comes to vital registration, WHO has been working these last years with several countries lacking complete civil registration to move in the direction of sample mortality registration. Assistance has been provided to India, Iran, and Turkey in evaluating the completeness of their registration systems. WHO has also supported the implementation of validation studies to assess the reliability and accuracy of verbal-autopsy methods, notably in China and Tanzania (HMN no. 4 Unedited).

The World Health Survey (WHS) was developed by WHO to help compile comprehensive baseline information on the health of populations and on the outcomes associated with the investment in health systems. Its main objective is to build the evidence base to monitor whether health systems are achieving the desired goals. Using a modular approach, it covers a wide range of issues and provides total or partial information on 16 of the 18 MDG health indicators. The WHS collects data on health outcomes in multiple domains -including child and adult mortality, effective coverage for key interventions, responsiveness of the health system, and health-care expenditure- in a manner that allows comparison across population groups. More than 70 countries are currently participating in the first round of the WHS -the list is available at WHO’s website-. The WHS is implemented in individual countries in collaboration with the people involved in routine HISs and policy-makers. It emphasizes quality assurance and capacity-building -in survey design, implementation and analysis- at the national and regional level (WHO WHS website). The cost of conducting a MICS survey is around 50 USD per household visited (HMN no. 5 Unedited).

WHO also has a relevant role in strengthening LMIS, through its collaboration with the AIDS Medicines and Diagnostic Services (AMDS). WHO/AMDS, together with the GFATM and other partners, are conducting a series of workshops to provide countries with technical knowledge and skills on LMIS (WHO website).
The HealthMapper is a surveillance and mapping application developed by WHO, that aims to address critical surveillance information needs across infectious disease programs at national and global levels. The HealthMapper is a user-friendly data management and mapping system customized specifically for public health users. The system facilitates data collection on epidemiology and on interventions, and provides immediate visualization of data in the form of maps, tables and charts. WHO has provided technical assistance to countries in the use of this system, which is currently in operation in over 60 countries in all regions -mainly Africa and South-East Asia-. Key infectious disease programs using the system include Roll Back Malaria, Polio Eradication, HIV/AIDS/STIs, Tuberculosis, Control of Communicable Diseases in Complex Emergency Situations, Outbreak Alert and Response and Integrated Management of Childhood Illnesses (WHO website).

The production and dissemination of health statistics for action at country, regional and global levels is a core WHO activity mandated in its Constitution. This requires WHO to work closely with countries to produce the best possible estimates of health statistics, and also to create standards and assist countries in applying those standards. The WHO Program on Health Statistics is an integrated WHO initiative to strengthen country, regional and global health statistics for better policy-making and program implementation. The major components are: enhancing country capacity and improving the quality of statistics, in addition to promoting international harmonization and standardization (WHO website).

Countries also receive technical support from WHO for the strengthening of their HISs through specific initiatives carried out by WHO regional offices. For instance, in order to improve the availability and use of surveillance data to control priority infectious diseases, WHO/AFRO conceived the Integrated Disease Surveillance and Response (IDSR), which was adopted by member states in 1998. WHO/AFRO, in collaboration with other partners -including the Rockefeller Foundation, USAID, and CDC- provides technical assistance to countries in order to implement IDSR activities in Africa. IDSR is present in all 46 WHO AFRO countries (HMN no. 6 Unedited).

In 2005, the Pan-American Health Organization (AMRO/PAHO) organized two inter-country meetings, in Tegucigalpa, Honduras, in July 2005, and in Lima, Peru, in September 2005, in order to allow the exchange of knowledge and experience on patient monitoring for HIV/AIDS care and treatment between the national AIDS programs (NAP) of different LAC countries. Participants included NAP officials from different countries -including Honduras, Peru, Dominican Republic, Argentina, Brazil, Chile, Colombia, Cuba, and Mexico- as well as technical experts from WHO, UNAIDS, and CDC.

African Development Bank (AfDB)

Over the past several years, the African Development Bank (AfDB) has steadily intensified its statistical capacity building activities in African countries. This regional development bank provides financial and technical assistance to support numerous activities aimed at strengthening the institutional capacity of African countries. These efforts were further bolstered by the approval in September 2004 of a
grant of 22 million USD by the AfDF Board of Directors to support the Bank’s program for strengthening statistical capacity in African countries in the context of the International Comparison Program for Africa (ICP-Africa). This program aims to strengthen statistical capacity of African countries to meet the urgent demand for reliable and timely data to support the monitoring of progress on the MDGs, the PRSPs, the NEPAD initiative, and the Results-Agenda for development effectiveness.

A total of 51 out of 53 African countries are participating in the ICP-Africa program. Statistical assessments in 49 ICP participating countries were carried out in 2003-04 -including analysis of legal framework, infrastructure, knowledge and expertise of the staff, procedures of data collection and processing, and data dissemination at national level-. Subsequently, the third regional ICP-Africa seminar, held in Yaoundé in April-May 2004, issued a set of recommendations, namely the Yaoundé Declaration on Statistical Development in Africa.

The AfDB coordinates the implementation of the Reference Regional Strategic Framework for Statistical Capacity Building in Africa (RRSF), prepared jointly by the AfDB, ECA, the WB, and PARIS21, in order to provide a coherent mechanism for guiding statistical development on the continent. The Framework was adopted in February 2006 at the second Forum for Statistical Development in Africa (FASDEV-2) organized by the four sponsoring institutions. The Forum brought together key stakeholders, including directors of national statistical offices and staff from statistical training centers from 51 African countries, UN agencies, and multilateral and bilateral institutions. The stakeholders assigned AfDB and ECA responsibility for overseeing the implementation of the RRSF.

The Bank’s Statistics Department is leading the effort of providing financial and technical support to African countries in order to develop and implement their NSDSs. The process is intended to ensure that statistical systems in African countries are aligned with international standards and the countries’ statistical capacities enhanced in order to provide effective support for development policy decision-making processes. Since mid-2003, the Bank’s Statistics Department has carried out over 20 regional and sub-regional training seminars involving a total of over 700 officials from member countries. This department is also providing financial and technical support to Statistical Training Centers, with a view to ensuring that statistical training curricula are relevant to the African development strategies and conditions.

The AfDB is pursuing the policy of gradual decentralization and deconcentration of its activities through opening national and regional offices. In particular, it has a statistical network in the region where it subsidizes statistical units in four main sub-regional organizations -AFRISTAT, COMESA, ECOWAS, and SADC- and in 52 member countries (AfDB Statistics website).

Asian Development Bank (ADB)

The Asian Development Bank ADB provides technical assistance to developing member countries on building and strengthening their statistical systems. Since 1970, ADB has implemented about 60 statistical capacity-building projects, for a total of
more than 22 million USD. From 2001 onwards, the projects increasingly focused on monitoring poverty and the MDGs.

Statistics technical assistance can be directed to a specific country -advisory technical assistance or ADTA- or cover two or more countries -regional technical assistance or RETA-. Some examples of on going ADTA are: “Strengthening the National Statistical System (NEP-3451)” in Nepal -approved in 2000-, “Strengthening the National Statistical System - Phase II (3669-BHU)” in Bhutan -approved in 2001-, and “Improving the Methodology of the National Institute of State Statistics and Information (3937-TKM)” in Turkmenistan -approved in 2002-. Some examples of on going RETA are: “Developing Tools for Assessing the Effectiveness of ADB Operations in Reducing Poverty (6073-REG)” -approved in 2002-, and Enhancing Social and Gender Statistics (6007-REG) - approved in 2001-.

Inter-American Development Bank (IADB)

The Inter-American Development Bank (IADB) provides financial and technical support to the development and strengthening of vital registration systems in LAC countries. Some examples of projects where IADB has financed the improvement of these systems are (IADB website):

- “Support to the modernization of the Civil Registration System” in Nicaragua - approved in 2005-: this project supports the evaluation of the system, in order to develop an Institutional Strengthening Program.
- “Consolidation of the National Population Registry in Honduras” -approved in 2007-: this project supports the implementation of an assessment of the situation of the vital registry in this country in order to identify the actions required to achieve universal coverage.
- “Analysis of the implication of birth under-registration” in nine countries of the LAC region -approved in 2007-.
- “Support to the Civil Registration System of Haiti” -approved in 1996-.
- “Support to the Haitian Civil Registration System” -approved in 2007-: this project supports the assessment of the Civil Registration System of this country and the development of actions for improvement.

Furthermore, the IADB also provides financial and technical assistance to improve other types of HIS in the LAC region. Some examples are (IADB website):

- “The Mesoamerican Epidemiological Surveillance Program” -approved in 2006-: this project aims at promoting the consolidation of a regional system for the epidemiological surveillance of emergent and re-emergent diseases.
- “Improvement of household surveys and measurement of living conditions (MECOVI)” -approved in 2002-: this project supports institutional capacity-building at the national level in LAC countries in order to improve their ability to produce statistical information to monitor progress in national and international poverty reduction goals.
- “Living conditions surveys (MECOVI)” in Guatemala -approved in 2001-: this project supports the strengthening of data management by the Guatemalan National Statistics Institute in order to insure the timely and safe distribution of information to district entities, research centers, and NGOs-. 
European Commission

The European Commission (EC) plays a key role in the implementation of the European Union's foreign policies. The EC provides assistance to countries to improve national HISs and statistical capacity mainly through three of its General Directorates: the Directorate General for Development (DG DEV), the Europe Aid Cooperation Office (AIDCO), and EUROSTAT.

Within the EC, the Directorate General for Development (DG DEV) has the mandate to formulate the Community's development cooperation policy for all developing countries, as defined in Title XX of the Treaty establishing the European Community. It also oversees the programming of aid in the ACP countries (Africa, Caribbean and Pacific) and the Overseas Countries and Territories (OCT), funded mainly by the European Development Fund (EDF). In order to work towards greater coherence of Community policies, DG DEV works in close collaboration with other General Directorates of the European Commission, in particular the Europe Aid Cooperation Office (AIDCO). DG DEV works in partnership with governments, civil society actors, and the private sector in developing countries. DG DEV handles statistical capacity-building in the context of EC assistance.

The mission of the Europe Aid Cooperation Office (AIDCO) is to implement the external aid instruments of the EC, which are funded by the EC budget and the EDF. In this regard, it is responsible for all phases of EC’s assistance projects, ensuring the achievement of the objectives of the programs established by DG DEV and the Directorate General for External Relations (DG RELEX). Hence, it has administrative and budgetary competence.

The EC has supported several projects aimed at strengthening HISs in developing countries. For instance, this organism was the main financial source of a pilot project, started in 1999 and led by WHO, to develop and field-test the second generation surveillance (SGS) system for HIV/AIDS proposed by WHO/UNAIDS in eight countries -described above-. The EC has also provided financial support to UNFPA to provide capacity-building activities to countries for the implementation of the 2010 round of population and household censuses, including a contribution of 15 million euros to help organize Afghanistan’s first full population census -described above- (EC AIDCO website).

When it comes to statistical capacity-building, the main institution that provides training and technical assistance to countries is EUROSTAT. The Directorate General EUROSTAT’s principal objective is to gather and analyze economic and social data from the different European statistics offices in order to provide comparable and harmonized statistics to the European institutions so that they can define, implement and analyze Community policies. In addition, international statistical cooperation is established with:
- EU acceding or candidate countries as well as Western Balkan States (Instrument for Pre-accession Assistance, IPA).
- Africa, Caribbean and Pacific countries (ACP): through numerous programs such as PARSTAT, ECOSTAT, COMSTAT, PALOPSTAT, and the Southern African Development Community (SADC) Statistical training program.
- Asia and Latin America countries (ALA): through several programs, including the Association of South East Asian Nations (ASEAN) Statistical Capacity Building Program, the MERCOSUR Statistics II Cooperation Project, and the Community of Andean Nations (CAN) Statistical Cooperation Projects.
- Mediterranean countries (MED): through the programs MEDSTAT I and MEDSTAT II.
- New Independent States of the former Soviet Union (TACIS), through direct collaboration with the Russian Federal State Statistics Service (ROSSTAT) and the Interstate Statistical Committee of the Commonwealth of Independent States (CISSTAT).
- West Bank and Gaza Strip, through several statistical activities.

EUROSTAT works with national statistical offices in those countries transferring statistical expertise in different areas, including statistical programming, social statistics, and development and application of software -such as EUROTRACE for foreign trade affairs and ERETES for national accounts-. In the cooperation with acceding or candidate countries, special attention is given to alignment to EU standards. For other developing countries and regions, EUROSTAT’s interventions focus on regional statistical programs. In practice, EUROSTAT is involved in activities led by other responsible DGs -including DG DEV and AIDCO-. As a rule, those DGs retain responsibility for the financial management of projects.

COMSTAT, an example of EUROSTAT’s projects, is the product of four Commission projects with cumulated resources of more than 14 million euros. This project has been implemented to provide statistical educational, offering extensive coverage of most ACP regions but particularly African ones. For instance, during several years COMSTAT funded 27 scholarships every year for students at the statistical institutes of Abidjan, Dakar and Yaoundé, in order to produce high quality statisticians for those countries. A weakness of this program was that it did not require students benefiting from scholarships to work for the national statistical institutions or even the public sector, partly due to governments’ budgetary limitations for staffing (EUROSTAT website).

Furthermore, the EC provides financial and technical assistance to other international organizations and networks, such as PARIS21 -of which the EC is a founder member-.

International Monetary Fund (IMF)

The work of the International Monetary Fund (IMF) on data dissemination standards began in October 1995, when the Interim Committee -now the International Monetary and Financial Committee (IMFC)- endorsed the establishment of standards to guide members in the dissemination of their economic and financial data. Those standards consisted of two tiers: the General Data Dissemination System (GDDS), which applies to all Fund members, and the Special Data Dissemination Standard (SDDS), for those member countries having or seeking access to international capital markets. The SDDS was approved by the IMF Executive Board in March 1996, and the GDDS in December 1997.
In February 2002, a revised “Guide to the General Data Dissemination System” was circulated to IMF members. Aimed primarily at national statisticians, the Guide is intended to provide practical guidance to member countries that are considering participation in the GDDS. The GDDS framework is built around four dimensions: data characteristics, quality, access, and integrity.

The GDDS has been implemented in two phases. It consisted of a series of nine regional seminars for the training of country officials and the preparation of pilot metadata -including the description of practices on data production and dissemination, and comprehensive plans for improvement of these practices- for several pilot countries to serve as examples. The second phase started in May 2000. The IMF disseminates the GDDS metadata of participating countries on its website. Participants are requested to update their metadata if significant changes in their statistical practices or plans for improvement take place, and at least once a year.

The design and implementation of the GDDS has benefited from close collaboration with member countries and other international organizations, notably the WB in regards to socio-demographic data. The Statistics Department of the IMF, in collaboration with the WB and other providers of technical assistance, and with financial support from Japan and the United Kingdom, continues to assist member countries wishing to participate in the GDDS through regional projects. These projects draw on local expertise, and encourage collaboration with strong regional institutions, such as regional central banks, and other bilateral and multilateral agencies providing technical assistance, such as AFRISTAT.

The on-going GDDS projects are: a group of 22 Anglophone African countries -including Botswana, Eritrea, Ghana, Kenya, Liberia, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Sudan, and Zimbabwe-, a group of 9 Pacific Island countries -including Fiji, Palau, Papua New Guinea, and Vanuatu-, and a group of 10 West Africa countries -including Guinea and Mauritania, as well as the eight member countries of the West African Economic and Monetary Union (WAEMU), namely, Benin, Burkina Faso, Côte d'Ivoire, Guinea-Bissau, Mali, Niger, Senegal and Togo-. Furthermore, the IMF has created six regional technical assistance centers in the Pacific, the Caribbean, Africa, and the Middle East, with resident statistics advisors, in order to help countries adopt international standards, codes and best practices in the production and dissemination of macroeconomic and financial statistics. The three African Regional Technical Assistance Centers (AFRITACs) -East AFRITAC in Dar es Salaam, Tanzania; West AFRITAC in Bamako, Mali; and Central AFRITAC in Libreville, Gabon- make part of the Africa Capacity-Building Initiative launched by the IMF in 2002. In their statistical work, the AFRITACs focus on capacity building to help improve the quality of the national accounts, and balance of payments data. In the delivery of technical assistance, the TACs work in close coordination with other partners for the implementation of short-term technical assistance and workshops. The AFRITACs are financed by contributions from the IMF, 24 donor partners, and host governments (IMF DSBB website).
Canada

The Canadian International Development Agency (Agence Canadienne pour le Développement International, CIDA/ACDI) is the operational arm of the Canada’s international cooperation agenda. CIDA/ACDI has a few statistics projects in Africa, supports PRSP monitoring in several African countries and contributes to the African Capacity Building Forum - as its second largest donor -, which funds statistical capacity building in Africa.

Statistics Canada has been involved in the provision of technical assistance in statistics for over 25 years. Statistics Canada offers technical assistance on an institutional basis. It has a preference for long-term relationships with partner countries, so as to promote sustainability by ensuring that the cooperative effort follows a logical sequence of: strengthening, consolidation, phasing-out, and follow-up support. Nevertheless, Statistics Canada also provides short-term consultancies. In recent years, Statistics Canada has provided assistance to a large number of countries, with larger longer-term projects in China, Eritrea, Zambia, Peru, Hungary, Poland, and the Czech Republic.

Statistics Canada also participates in regional assistance projects. In the present round of the WB’s International Comparison Program (ICP), Statistics Canada is partnering with the Economic Commission for Latin America and the Caribbean (ECLAC) and ten South American national statistical agencies in a multi-year regional statistical comparison program. The experience has been a success, as the South American countries have produced parities, improved their operations and established best practices for other regions. Statistics Canada is also a major participant in the Partnership on Measuring Information and Communication Technology (ICT) for Development, which assists African countries identify ICT indicators. This is being carried out in the context of work with NEPAD on science, technology and innovation indicators.

Technical assistance offered by Statistics Canada is coordinated by its International Relations Division. Most of its technical assistance projects have been funded by CIDA/ACDI, and it is expected that a recently signed cooperation agreement with CIDA/ACDI will lead to increased Canadian support for statistical capacity building in developing countries (PARIS21 2006, CIDA website).

Denmark

The Danish Agency for Development Assistance (DANIDA), a directorate of the Ministry of Foreign Affairs, implements the Danish Government’s development assistance program. Danish development assistance is focused on a selected number of developing countries - “program countries” -. At present, there are 15 program countries, of which nine are African: Benin, Ghana, Tanzania, Kenya, Uganda, Mozambique, Burkina Faso, and Zambia. DANIDA is currently providing statistical support to several countries - including Tanzania, Benin, and Burkina Faso -, usually in the context of sector programs and monitoring activities.
In addition, Denmark provides technical support to developing countries through Statistics Denmark. The International Consulting Unit of this institution is involved in long-term institutional cooperation projects in several countries and regions, including some DANIDA’s countries, Uganda -with funds from the Nordic Development Fund-, and the East African Community -with funds from the European Commission-.

Moreover, DANIDA provides financial support to HMN (PARIS21 2006, MoFA of Denmark website).

France

The largest share of French overseas development support goes to bilateral assistance, mainly through the French Development Agency (Agence Française de Développement, AFD) -under the direction of the ministries of Economy, Finance and Industry, and of Foreign Affairs- and other institutions under the authority of these two ministries. Much of this assistance goes the countries of Sub-Saharan Africa.

The National Institute of Statistics and Economic Studies (Institut National de la Statistique et des Etudes Economiques, INSEE) -a Directorate General of the Ministry of Economy, Finance and Industry- provides training to statisticians of developing countries and countries in transitions, as well as technical assistance and advice to their statistical services. INSEE’s Training Centre in Libourne, France (CEFIL) organizes seminars and meetings for foreign statisticians and economists. In addition, INSEE created in 2004 the Centre of Support to African Statistical Training Institutes (Centre d’Appui aux Ecoles de Statistique Africaines, CAPESA) in the framework of a convention linking the statistical institutes of Abidjan, Dakar and Yaoundé. CAPESA is responsible for strengthening the capacity of these African statistical institutes.

Through the Assistance to the Development of Economic and Financial Technologies (Assistance au Développement des Echanges en Technologies Economiques et Financières, ADETEF) the Ministry of the Economy, Finance and Industry provides expertise and technical cooperation to France’s partner countries in statistics -including social surveys- and information technology for data processing.

Furthermore, France provides financial support to PARIS21 (PARIS21 2006, AFD website).

Germany

The development policy of Germany is formulated by the German Federal Ministry for Economic Cooperation and Development (BMZ) and carried out by several implementing organizations, including the Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ). Support for statistical capacity building is provided by several German institutions -including GTZ, Capacity Building International (InWEnt), and the Federal Statistical Office (Destatis)-, mostly with funding from BMZ (BMZ website).
The Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) is an international cooperation enterprise, owned by the German Federal Government. Its main client is BMZ, but GTZ also works for other clients, including public or private sector, national or international organizations - such as the EU, the WB, UN organizations, and private companies-. GTZ works in 131 countries through nearly 2630 projects. GTZ carries out statistical capacity-building projects in its partner countries, generally included in priority sector programs (GTZ website).

For more than 30 years, Capacity Building International (Internationale Weiterbildung und Entwicklung, InWEnt) has worked with partners in developing countries, transition states and industrialized nations to strengthen the capacities of specialists and executives in political and organizational change processes. Its capacity-building services make a substantial contribution to the development of statistical literacy focused on MDGs and PRSPs monitoring in partner countries. Its Centre for Economic, Environmental and Social Statistics conducts short-term training as well as 5-6 annual workshops in statistical issues. It also provides customized training and technical assistance on the request of partner countries and international development agencies (InWEnt website).

The Federal Statistical Office (Statistisches Bundesamt Deutschland, DESTATIS), together with the 16 Land Statistical Offices, has provided during the last 15 years training and consultation in different areas of statistical capacity-building. The training and consulting activities of DESTATIS aim at improving the leadership, management and methodological skills of staff of national statistical offices in partner countries. To date, DESTATIS has conducted over 1500 project activities, generally in partner countries or in Germany. The main target regions for statistical cooperation have been Central and Eastern Europe, Turkey, Central Asia, and East Asia (PARIS21 2006, DESTATIS website).

Italy

The Directorate General for Development Cooperation (DGCS) of the Ministry of Foreign Affairs is responsible for implementing Italy’s development cooperation policy. About 40% of Italian aid is allocated to the 49 countries that the UN classifies as Least Developed Countries, the majority of which are in Africa. Italy is currently providing financial and technical support to statistical capacity building in Cape Verde and Mozambique.

Italy’s National Institute of Statistics (Istituto Nazionale di Statistica, ISTAT), through its Office for International Relations and Cooperation, supports institutional strengthening of statistical institutes of countries in transition and developing countries. Its cooperation assistance is mainly provided through technical support by its own experts for the production of official statistics. Its main sources of funding are the Italian Ministry of Foreign Affairs and the European Union. Over its 10 years of technical cooperation, ISTAT has collaborated in statistical capacity building in the Balkan countries, Albania, Bosnia, Mozambique, Cape Verde, and the ex-Soviet republics (PARIS21 2006, Cooperazione Italiana website).
Japan

The Japan International Cooperation Agency (JICA) is the implementation agency for Japanese bilateral grants and technical assistance. The Statistics Bureau, the national statistical office of Japan, sends statistical experts to foreign countries for extended periods when a request is received for technical cooperation, mostly as part of JICA international cooperation programs. The Bureau also accepts in some cases trainees from other countries participating in JICA programs. The Bureau receives more than 100 foreign visitors annually, and exchanges information and knowledge on methodologies and technologies related to statistical censuses and surveys (JICA website).

Based on an agreement between the Japanese Government and the UN, Japan hosts the Statistical Institute for Asia and the Pacific (SIAP), which provides training in statistics to officials from countries, mainly in the Asia-Pacific Region. The Japanese Ministry of Internal Affairs and Communications (MIC) supports SIAP training programs by providing facilities -building space and computers-, staff, and administrative assistance. In addition, Japan provides fellowships for major training courses conducted at SIAP as part of its technical cooperation through JICA. SIAP has trained over 9,800 officials from 115 countries and territories in the world (PARIS21 2006).

Furthermore, Japan provides financial support to other organizations aimed at increasing statistical capacity in countries such as IMF -through the GDDS projects-.

Norway

While statistics is not a separate sector of Norwegian assistance, Norway does support a number of statistical development projects. Norway provides technical assistance in a limited number of developing countries using the statistical expertise of Statistics Norway through long-term programs funded by the Ministry of Foreing Affairs (MFA) and the Norwegian Agency for Development Cooperation (NORAD). For instance, the Division for Development Cooperation of Statistics Norway is providing institutional support and capacity building activities to the Instituto Nacional de Estadística (INE) of Angola; the Statistics and Evaluation Office of Eritrea; and the Ministry of Finance, the Ministry of Economic Planning and Development, and the National Statistical Office of Malawi (PARIS21 2006, Norad website).

Furthermore, Norway provides financial support to PARIS21.

Portugal

The Ministry of Foreign Affairs is responsible for Portugal’s development assistance policy, while the Portuguese Institute for Development Support Instituto Português de Apoio ao Desenvolvimento, IPAD) coordinates, supervises and directs it. IPAD seeks to promote the economic, social and cultural development of Portuguese-speaking countries.
Since the 1980s, the National Institute of Statistics (Instituto Nacional de Estadística, INE) has provided technical assistance to National Statistical Institutes of Portuguese-speaking African countries: Angola, Mozambique, Cape Verde, Sao Tome and Principe and Guinea-Bissau. The annual programs are demand-driven, in order to respond to statistical needs related to government policies -such as the PRSPs- and international development policies -such as the MDGs-. Technical assistance, either through technical advice, training, and fellowships, is provided in the areas of: institutional support, statistical infrastructure, national accounts, and dissemination of official statistics. The fundamental financial partner of these activities is the IPAD (PARIS21 2006, IPAD website).

Spain

Spain's Ministry of Foreign Affairs and Cooperation (MFAC) is responsible for development assistance. The Spanish Agency for International Cooperation (Agencia Española de Cooperación Internacional, AECI) is the executing agency for MFAC’s bilateral development programs. Spain’s development assistance policy now gives special weight to sub-Saharan Africa, shifting from its earlier focus on Latin America. Around 70% of its resources go to its main development partner countries (AECI website).

The National Statistical Institute (Instituto Nacional de Estadística, INE), through its International Relations Directorate, prepares, executes, and monitors the international technical cooperation plan of the INE. For this purpose, it carries out statistical projects and bilateral missions, including training -courses, seminars, and workshops-, technical assistance, and institutional development. The INE implements its cooperation activities in collaboration with the International and Ibero-American Foundation of Public Administration and Policies (FIIAPP) on the basis of a Collaboration Agreement signed between both institutions in 2004. Under the mentioned Agreement, FIIAPP is responsible for the financial and administrative management while INE takes on the technical management of the statistical cooperation activities.

The technical cooperation carried out by the INE covers, principally, the following geographical areas (PARIS21 2006):
- Latin America, through the Training Program for Latin American Statisticians that aims to improve the human resources of the national statistical systems in Latin-American countries, including Argentina, Bolivia, Chile, Colombia, El Salvador, Mexico, and Paraguay. This project is financed by INE's budget and AECI.
- Central and Eastern Europe, through the EU IPA program -former PHARE Program-. INE provides short-term consultancies to the EU new member states and candidate countries -such as Bulgaria and Romania-. This project is financed by the EC.
- Mediterranean countries, through the MEDSTAT II project, financed by the EC. The beneficiary countries are Algeria, Egypt, Israel, Jordan, Lebanon, Morocco, West Bank and Gaza Strip, Syria, Tunisia and Turkey.
- Mozambique, through the Italian support program to the development of the National Statistical System of Mozambique, financed by the Italian cooperation. INE Spain collaborates in the area of strengthening the provincial delegations.

Sweden

The Swedish Agency for International Development Cooperation (SIDA) is a government agency under the Ministry of Foreign Affairs responsible for Sweden’s international assistance. Sweden is involved in development cooperation with almost 40 African countries, including Tanzania, Mozambique, Ethiopia, Uganda, Kenya, Zambia, Sudan and South Africa. SIDA supports statistical development in Africa through long-term relationships with the national statistical offices and usually engages the experience of Statistics Sweden (SCB). Areas of collaboration include housing censuses, household surveys, and national accounts (SIDA website).

The International Consulting Office (ICO) of Statistics Sweden (SCB) was established in 1982. ICO offers statistical consulting services mainly through “twinning” arrangements with the partner institutions, which involve a long-term cooperation between the institutions and gives priority to the transfer of knowledge and skills in order to build capacity in very diverse domains of statistics. Cooperation covers technical, managerial and financial aspects. These activities are mainly funded by SIDA, but also partially by other Swedish and international organizations (PARIS21 2006).

Furthermore, SIDA contributes to the activities of PARIS21.

United Kingdom

The Department for International Development (DFID) manages the United Kingdom’s development aid. It works to improve the quality and use of statistics in developing countries mainly through two mechanisms: (1) working with developing and transition countries to build the capacity of their governments to produce and use statistics, and (2) working with other bilateral and international agencies and networks to improve the quality of statistics available both nationally and internationally.

DFID involvement with international institutions and networks aimed at building statistical capacity in countries includes providing them financial support and funding statisticians to work in those organizations. For instance, IMF -through the GDDS programs-, PARIS21, the WB -through the TFSCB-, and HMN have benefited from donations from DFID; and this bilateral agency has seconded for some years statistics advisers to work in EUROSTAT, PARIS21 Secretariat, and the WB (PARIS21 2006).

In recent years, DFID has focused its support more specifically on working closely with national governments to strengthen their capacity to monitor health, poverty and the MDGs, mainly through the implementation of household surveys, census, and vital registration. Furthermore, it has broadened the scope of its activities to include collaboration with policy-makers and other users of statistics with the aim to help to establish data needs and use.
For example, DFID has funded in Tanzania the Adult Morbidity and Mortality Project (AMMP). This project, implemented by the Tanzanian MOH in partnership with the University of Newcastle upon Tyne, aims at developing a sustainable National Sentinel Surveillance (NSS) system for the production of community-based health information, within the context of the national health information strategy. AMMP is based upon a demographic surveillance system (DSS) that entails the maintenance of a minimal census and the prospective monitoring of mortality at a district level. Incident deaths are reported through a network of key informants, and verbal autopsy supervisors conduct interviews with the carers of the deceased. Cause of death is determined by broad and specific cause, by a team of physicians who code the verbal autopsy forms. This project has enabled the Tanzanian MOH to rely on real burden of disease data, rather than upon model-based estimates (Tanzania MOH AMMP website).

DFID has also provided recently financial and technical assistance to Pakistan focused on developing statistical capacity in the Federal Bureau of Statistics (FBS) of this country. DFID and FBS are working together to conduct, analyze, and disseminate the results of the Pakistan Integrated Household Survey, designed to help the Government of Pakistan monitor the impact of the Social Action Program. DFID is also assisting the Government of Pakistan to develop a poverty monitoring framework as part of their PRSP. Other countries that receive support from DFID in order to enhance the capabilities of their national statistics offices are: Ukraine, Moldova, Kyrgyzstan, Georgia, Ethiopia, Rwanda, Namibia, Uganda, Tanzania, Mozambique, Bosnia, Malawi, Palestine, Kenya, Croatia, Ghana and Zambia (UK DFID website).

Centers for Disease Control and Prevention (CDC)

The Division of Epidemiology and Surveillance Capacity Development (DESCD) of CDC’s Coordinating Office for Global Health (COGH) aims to strengthen national HIS through training, capacity building, and consultation.

Since 1980, DESCD has developed numerous long-term applied training programs on all continents -such as the Field Epidemiology (and Laboratory) Training Program (FE(L)TP), Data for Decision Making (DDM), and other courses-. Through these programs, DESCD helps MOHs around the world build strong, effective, and sustainable country’s disease surveillance, outbreak detection, and program evaluation capacity. In order to implement these programs, DESCD receives financial and technical collaboration from USAID, WHO, the Ellison Medical Foundation, the WB, and cooperating MOHs.

The Field Epidemiology (and Laboratory) Training Program (FE(L)TP), an applied epidemiology program modelled after CDC’s Epidemic Intelligence Service (EIS), started in 1980. It is a 2-year, full-time training and service program, which involves classroom instruction and field assignments. FE(L)TP trainees take courses in epidemiology, communications, economics, and management. They also learn about quantitative- and behaviour-based strategies. In addition, FE(L)TP trainees work in the field, where they conduct epidemiologic investigations and field surveys, evaluate surveillance systems, and train other health workers.
To establish a FE(L)TP, DESCD provides MOHs with an in-country resident advisor for 4 to 6 years to help guide training and technical assistance. As of May 2007, DESCD had 10 resident advisors in 9 countries: China, Guatemala -two advisors-, India, Jordan, Kazakhstan, Pakistan, South Africa, South Sudan, and Thailand. Moreover, a staff of physicians, epidemiologists, public health advisors, instructional designers, and health communications specialists provide scientific expertise, training consultations, and other programmatic support to sustain FE(L)TPs and related programs around the globe.

DESCD is currently supporting 12 FE(L)TPs, covering 26 countries around the world. These programs cover the following geographical areas: Brazil, Central America -including Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, and Nicaragua-, Central Asia -including Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan-, China, Egypt, India, Jordan, Kenya -including Tanzania and Uganda-, Pakistan, South Africa, South Sudan, and Thailand -including Cambodia, Laos, and Vietnam-.

The Data for Decision Making (DDM) program seeks to increase the effective use of data in priority-setting, program-planning, and policy-making. The goals of DDM are: (1) to strengthen HIS at local, district, regional, and national levels to facilitate the collection, analysis, reporting, and presentation of health data, (2) to enhance the capacity of technical advisors to provide valid and timely data to decision-makers, and (3) to build the capacity of decision-makers to identify data needs and to interpret and use data appropriately.

DDM is a 12-18 month, on-the-job, interdisciplinary training program, targeted at public health leaders. It is customized to the country’s public health priorities and infrastructure. The program combines formal training sessions -in epidemiology, surveillance, communications, and prevention effectiveness- and field projects. DDM programs have been implemented in several countries, including Brazil, Central America, and Jordan.

Besides these training programs, DESCD is involved in various other global health activities and projects such as the Central Asia Regional Program (CAR) and the Global Surveillance Project (GSP).

The Central Asia Regional Program (CAR) has been operational since 1995 in five countries: Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan. It is headquartered in Almaty, Kazakhstan, with a local office in Tashkent, Uzbekistan. This program is a field station of the US global network for infectious disease surveillance, and it encompasses work in several major areas: HIV/AIDS Surveillance, infant mortality, threat agent detection and response, and tuberculosis electronic surveillance. Furthermore, CAR also has a FE(L)TP component.

The Global Surveillance Project (GSP) is the DESCD component of the WHO AFRO Integrated Disease Surveillance and Response (IDSR). This project helps strengthen surveillance systems and a culture of information in Africa using locally available FE(L)TP resources, funding, and staff. These activities take place in targeted countries such as Ethiopia, Ghana, Kenya, Tanzania, Uganda, and Zimbabwe (CDC COGH website).
In addition, the CDC’s Coordinating Office for Global Health (COGH) has regional offices in several countries -including Guatemala, Kenya, Egypt, China, and Thailand- that provide technical support in disease surveillance to MOHs. For instance, the Regional Office in Guatemala for Central America and Panama (CDC/CAP) works in close collaboration with national and international partners in the region in order to ensure that countries have in place national plans, human resources and equipment to implement surveillance and rapid response and containment for avian and human influenza. This office also provides technical assistance to the MOH of Honduras in order to strengthen its National Health Surveillance System and the M&E component of its Plan to Reduce Maternal and Child Mortality.

Furthermore, the CDC Division of Reproductive Health (CDC/DRH), through a Participating Agency Services Agreement (PASA) with USAID MEASURE -the MEASURE CDC Project-, has been providing technical assistance since 1975 for the implementation of population-based Reproductive Health Surveys (RHS) to countries in Latin America, the Caribbean, Central and Eastern Europe, the former Soviet Union, Africa, and the Middle East. Technical support provided by MEASURE CDC includes assistance in sample design, questionnaire development, interviewer training, fieldwork logistics, data entry and analysis, and information dissemination and use. MEASURE CDC currently supports the implementation of four types of surveys: (1) RHS of reproductive-age women -conducted most recently in Ecuador, Paraguay, El Salvador, Guatemala, and Republic of Georgia-, (2) Male RHS -conducted most recently in Honduras, El Salvador, Guatemala, and Albania-, (3) Young Adult Reproductive Health Surveys (YARHS) -completed recently in Mozambique and Zimbabwe-, and (4) Program Evaluation RHS -conducted most recently in Russia-. Each MEASURE CDC-assisted survey is tailored to meet the needs of the country where the survey is conducted. Special purpose modules can be added to investigate topics specific to the country or program, such as young adult issues and domestic violence (CDC GRH website).

President’s Emergency Plan for AIDS Relief (PEPFAR)

Numerous PEPFAR-supported activities at the country level focus on both the availability and the quality of data in the areas of HIV surveillance and HMIS for patient tracking and program monitoring. In order to support host nations in addressing these issues, US government in-country teams, in coordination with host governments and partners, determine strategic information (SI) activities and priorities for the upcoming fiscal year as part of the Country Operational Plan (COP) process.

Regarding HIV surveillance, PEPFAR supports such country efforts as behavioral surveillance surveys, demographic and health surveys that have an HIV/AIDS module, AIDS indicator surveys, antenatal clinic surveillance, and most-at-risk population surveys. For instance, PEPFAR provided financial and technical support to the Ivorian national authorities in order to implement a nationwide population-based AIDS Indicator Survey (AIS), which was launched in September 2004. PEPFAR provided support in all technical aspects of the survey, including preparation of questionnaires and manuals, mapping for sampling, training in data and blood sample collection, and data processing and analysis. As a result, the data
collection phase of the nationwide AIS was successfully completed in 2005, despite the difficult conditions that prevailed in this country.

PEPFAR also provides support in the development of HMIS. For instance, with assistance from PEPFAR, Rwanda implemented TRACnet, a web-based system that allows tracking patients and drug shortages and stock outs. Since internet access is limited in this country, TRACnet accepts both phone and internet-based data entry, unlike many other HMIS. To date, TRACnet has been deployed in 50 out of 53 health facilities offering ART in Rwanda -accounting for 95% of all ART patients-, and allows national policy-makers to make informed decisions.

An important activity in fiscal year 2005 was the development of a number of SI technical working groups focused on developing standards and supporting country programs. Working groups address the areas of surveillance, HMIS, and M&E capacity-building (PEPFAR 2006).

The United States Agency for International Development (USAID)

The United States Agency for International Development (USAID), under the Department of State, is an independent US government agency. USAID puts a great emphasis on the performance M&E in its health systems strengthening efforts. USAID is working in Africa, Asia, Middle East, and Latin America and the Caribbean to institutionalize data collection and dissemination of information for improving programs and policies. USAID is providing financial and technical assistance for strengthening HIS worldwide mainly through two programs: the Monitoring and Evaluation to Assess and Use Results (MEASURE) Program and the Health Systems 20/20 Program (USAID website).

MEASURE has four components: MEASURE DHS, MEASURE Evaluation, MEASURE US Census Bureau-SCILS, and MEASURE CDC/DRH. Together, the four MEASURE partners provide a full range of HIS-related services, which include: (1) promoting the demand for quality data, (2) providing capacity-building services, technical assistance, and systems development; and (3) disseminating information and facilitating its use in decision-making (USAID MEASURE website).

Since 1984, the MEASURE Demographic and Health Surveys Project (MEASURE DHS) has provided technical assistance to 75 countries -including Angola, Azerbaijan, Brazil, Comoros, Dominican Republic, Indonesia, Liberia, Morocco, Nigeria, Sudan, Uganda, Yemen, and Zimbabwe- to implement more than 200 surveys, in order to increase understanding of health and population trends in developing countries. The strategic objective of MEASURE DHS is to institutionalize the collection and use of data by host countries for evidence-based policy-making. The DHS approach to data collection emphasizes integration, coordination, cost-effectiveness, and capacity building. The MEASURE-DHS project is implemented by ORC Macro, in partnership with: Johns Hopkins University Bloomberg School of Public Health, Program for Appropriate Technology in Health (PATH), Casals and Associates, and Jorge Scientific Corporation (JSC).
DHS supports a wide range of surveys, including Demographic and Health Surveys (DHS), AIDS Indicator Surveys (AIDS), Service Provision Assessment (SPA) Surveys, Key Indicators Survey (KIS), and Other Quantitative Surveys—such as Biomarker Collection, Geographic Data Collection, and Benchmarking Surveys—. All these instruments allow collecting data on fertility, family planning, maternal and child health, as well as child survival, HIV/AIDS, malaria, and nutrition (USAID DHS website).

The cost of conducting a DHS survey can easily exceed 150 USD per household (HMN no. 5 Unedited). Within each survey project, MEASURE DHS strives to provide the following services:

- Data Collection and Analysis: Build data collection systems in developing countries through formal and on-the-job training in research design and implementation, sampling, data processing, analysis, and dissemination.
- Collaboration and Coordination: Collaborate with local and international organizations in order to cut costs and increase inter-agency communication and cooperation.
- Dissemination and Data Use: Disseminate research results and facilitate their use in program evaluation through participatory seminars, audience-centered materials, web-based tools, and other technologies.

MEASURE Evaluation Project, implemented by the Carolina Population Center at the University of North Carolina at Chapel Hill in partnership with Tulane University, Macro International Inc., John Snow Inc., and Constella Futures, aims to ensure the availability and use of quality population and health data.

In 2006, MEASURE Evaluation provided more than 30 technical-assistance activities to a total of 11 African nations: Cote d’Ivoire, Ethiopia, Kenya, Mozambique, Namibia, Nigeria, Rwanda, Tanzania, South Africa, Zambia and Zimbabwe. In addition to national activities, technical assistance was provided for the West African, Southern African, and continental African regions. The areas of the technical assistance activities included implementation of the Sample Vital Registration with Verbal Autopsy (SAVVY) system to improve national mortality data collection, and strategic information collection for the PEPFAR Plan. Additionally, MEASURE Evaluation offered two-week workshops in three locations in Africa: workshops in M&E of HIV/AIDS at the University of Pretoria in South Africa, and the Centre Africain d’Etudes Supérieures en Gestion (CESAG) in Dakar, Senegal, as well as a workshop in M&E of population, health, and nutrition programs in Addis Ababa University in Addis Ababa, Ethiopia. Furthermore, MEASURE Evaluation is providing instructional support in the M&E concentration at the University of Pretoria’s School of Health Systems and Public Health.

In the LAC region, MEASURE Evaluation provided in 2006 technical support to several countries—including Paraguay, Honduras, Haiti, Guatemala, and Guyana—in different topics, such as M&E for the Healthy Lifestyles Project and M&E for HIV/AIDS in marginalized populations. Moreover, MEASURE Evaluation provided an assessment of Routine Health Information System (RHIS) currently in place in Brazil and Mexico, and helped Paraguay and Honduras begin work developing new RHIS. Besides, this project held three workshops at Mexico’s Instituto Nacional de Salud Publica (INSP) on Routine Health Information Systems (RHIS); M&E of HIV/AIDS
MEASURE Evaluation is also working with INSP to refine and implement a master’s degree program in M&E.

Seven countries in the Asia and Near East region received technical assistance from MEASURE Evaluation in 2006: Burma, Vietnam, Philippines, Thailand, Cambodia, China, and Bangladesh. Areas of assistance included M&E of the presence of Avian Flu. Additionally, MEASURE Evaluation established a SAVVY community information system in Vietnam, to help the country’s government improve its use of population data. Moreover, this project conducted a workshop on the M&E of HIV/AIDS programs in Mahidol University in Bangkok, Thailand, in 2005. It is also supporting the M&E concentration of the Masters of Population and Social Research program of this university, by providing instructional assistance as well as financial support for selected students.

Outside the mentioned regions, MEASURE Evaluation currently provides technical assistance in Russia, Ukraine, and Kazakhstan, and held regional workshops in 2006 in Kiev, Ukraine, and Almaty, Kazakhstan.

In 2004, MEASURE Evaluation, in collaboration with other partners -including PEPFAR, CDC, UNAIDS, WHO, WB, UNICEF, and GFATM- created the HIV/AIDS Monitoring and Evaluation Network (AIMEnet) listserv, aimed at putting in contact anyone interested in sharing technical experiences, tools and information in M&E of HIV/AIDS programs around the world. More than 1000 members -from MOH, national AIDS coordinating bodies, NGOs, academic institutions, international organizations, and donor agencies- from more than 85 countries are now subscribed (USAID MEASURE Evaluation website).

The International Programs Center (IPC), part of the Population Division of the US Census Bureau, conducts demographic and socioeconomic studies and strengthens statistical capacity around the world through technical assistance and training. Its work is funded by US federal agencies, international organizations, NGOs, private sector organizations, and other governments.

For over 50 years, IPC has provide both short- and long-term technical assistance to over 100 countries on a wide variety of statistical activities, including census and survey design and organization, data processing, dissemination of data.

Since 1947, more than 6000 participants have graduated from long-term programs formerly conducted in Washington, DC, and another 5000 have completed short-term workshops conducted both in Washington and overseas. Participants make part of the staffs of national statistical offices and other agencies in developing countries. Some examples of workshops that have been conducted recently are: “Census and Survey Processing” -sponsored by USAID and held in Dakar, Senegal, in November 2005, with participants from Senegal, Congo DR, Madagascar, and other African French speaking countries- and “Statistical Methods and Sampling” -sponsored by UNFPA and held in Islamabad, Pakistan, in November 2005, with participants from the Federal Bureau of Statistics of Pakistan- (Population Division US Census Bureau website).
The USAID-funded Health Systems 20/20 Program aims to address health system barriers to the use of life-saving priority health services. This program works with government counterparts at the national and local levels to strengthen HISs through capacity-building.

This program developed the Antiretroviral Therapy Information System (ARTIS), both computer- and in paper-versions, and trained staff from pilot sites in order to implement it in Zambia and Kenya. The system has been implemented in ten pilot facilities in each country, in order to track individual patients receiving ART.

Also through the Health Systems 20/20 Project, GIS and mapping tools have been developed to support the Yemen MOH and governorate health office (GHO) officials. The customized GIS application utilizes HMIS data—including data related with staffing, drugs, equipment, infrastructure, and populations served—to improve the health care efficiency, equity, and accessibility in five USAID targeted, underserved governorates. Health Systems 20/20 is coordinating with the WB to train MOH staff at the national and governorate levels on how to make better decisions using GIS. Governorate health officials have already begun shifting resources based on the results (USAID Health systems 20/20 website).

Global Alliance for Vaccines and Immunization (GAVI Alliance)

The GAVI Alliance—formerly known as the Global Alliance for Vaccines and Immunisation—is a public-private partnership focused on extending the reach and quality of immunization coverage within strengthened health services in developing countries (GAVI website).

GAVI offers four types of support: (1) Immunization Services Support (ISS); (2) New and underused Vaccines Support (NVS), (3) Injection Safety Support (INS); and (4) Health System Strengthening (HSS). These grants are a distinct departure from traditional funding systems that impose strict guidelines on use of resources. Instead, this system imposes strict performance requirements, relying upon governments and inter-agency coordinating committees to set goals and monitor progress. By mid 2004, The GAVI Fund and GAVI had made five-year commitments of more than USD 1.2 billion to 71 countries. Of that, approximately two-thirds were used to purchase vaccines and supplies and the rest was used to provide support for capacity development and infrastructure (GAVI website).

Through the Immunization Services Support (ISS), GAVI requires countries to conduct a Data Quality Audit (DQA) to show that their immunization reporting system is robust. The DQA was conceived as a means to verify reported performance as well as enhance immunization monitoring and reporting systems. It reviews both the numbers of children reported to have received a DTP3 injection and the accuracy of the EPI recording, aggregation, and reporting system. The DQA focuses on reporting practice at national level and in a sample of four districts and six health units in each district (24 health units in all). Two external auditors from the audit company work with two internal auditors selected by the EPI or HMIS program management to conduct the DQA (WHO 2003, GAVI 2002).
The DQA has spurred the National Immunization Programs to improve its information systems. In some countries, failing the DQA has had a very significant impact on a country’s spending patterns, it has meant that a larger portion of funds has been spent at central level aimed at improving data quality. Kenya, Tanzania, and Mozambique reacted swiftly to a failed DQA, partly because of the impact on reward shares. Using ISS funds, Mali made large investments -371 000 USD- in computers, while Mozambique also purchased computers, as well as conducted workshops with the Health Information Systems unit to identify ways to improve data management, hired a National Immunization Program data manager, and provided training in formative supervision on information management. Tanzania invested in computers and training for regional and district staff to improve data collection and management (Chee et al. 2004, Ronveaux et al. 2005).

For the GAVI Alliance, it has become increasingly evident that broader health system constraints -such as the lack of the lack of appropriate HISs to track changes- impede progress in many countries. As a result, it was decided in December 2005 to make new funding for Health System Strengthening (HSS) available in parallel with Immunization Services Support (ISS). The intent of HSS is to help countries overcome institutional bottlenecks and barriers that constrain productivity and progress in the provision of child and maternal health services. In 2006, 15 countries developed and submitted proposals for support totaling 275 million USD, and the program is expected to be expanded throughout 2007. Areas of GAVI HSS support include strengthening of information systems. Applications for support in this area are therefore accepted, if the application clearly shows how the support leads to increased and sustained immunization coverage (GAVI 2007).

Global Fund for AIDS, Tuberculosis and Malaria (GFATM)

The purpose of the Global Fund for AIDS, Tuberculosis and Malaria (GFATM) is to attract, manage and disburse resources to fight AIDS, tuberculosis and malaria. This organization does not implement programs directly, relying instead on the knowledge of local experts. The GFATM makes available 5 to 10% of its grant finances to improve national HIV/AIDS M&E systems, including disease surveillance. For instance, in 2003, a regional proposal to strengthen HIV, STI, and behavioral surveillance systems in six representative Pacific Island Countries and Territories (PICTs) -Fiji, Kiribati, Samoa, Solomon Islands, Tonga and Vanuatu- was funded by the GFATM. This SGS project was part of a larger GFATM-funded program, which targeted HIV/AIDS prevention and treatment in eleven Pacific small island countries. A key aim of the project was to strengthen HIV surveillance systems in the Pacific by building capacity to produce epidemiological data on which to design and evaluate program interventions. The first round of SGS surveys was successfully conducted in 2004-05. It provided the most comprehensive estimates to date of the prevalence of HIV, STI, and risk factors in the Pacific, and established a standardized methodology to be applied in future rounds of surveillance surveys.

Just as significantly, the GFATM includes powerful incentives in its performance-based funding model to establish systems for accurate and externally-verifiable reporting. This way, the GFATM processes encourage the development of national M&E systems. The quality of reporting systems is assessed by the Local Fund Agent (LFA) for every grant at the time of grant signing. Moreover, if a grant cannot
show reliable results, financing can be stopped at any stage. In addition, the Global Fund is working with technical partners -mainly WHO and HMN- to build and invest in better national systems to improve health data quality (GFATM website).

Health Metrics Network (HMN)

The Health Metrics Network (HMN), launched at the World Health Assembly in May 2005, is a global partnership that aims to stimulate coordination and alignment of partners around the mission of strengthening country health information systems (HIS) to generate sound data for decision-making at country and global levels. HMN support to countries is predicated on the principles of country leadership and ownership, building in what already exists, in order to ensure long-term sustainability (HMN/WHO 2006).

HMN was initially funded by the Gates Foundation, with an initial grant of 50 million USD. The HMN partners are: MOHs and national statistics offices -such as MOH of Mexico, MOH of Thailand, and Statistics South Africa-, UN agencies -UNICEF, UNSD, UNFPA, WB, and WHO-, bilateral and multilateral donors -DANIDA, DFID, SIDA, USAID, and the European Commission-, global health partnerships -GAVI and GFATM-, private foundations -Gates Foundation-, and other technical agencies -African Population and Health Research Centre (APHRC), CDC, and OECD/DAC- (HMN website).

HMN single goal is to increase the availability, quality, and use of timely health information by catalyzing the joint funding and development of core country HIS. In order to attain its goal, the HMN has three interrelated objectives: (1) to create a harmonized framework for country HIS development, which describes standards for HIS; (2) to strengthen country HIS by providing technical and catalytic financial support to apply the HMN Framework -the resources available are intended to be used to mobilize in-country and external development partners resources-; and (3) to ensure access and use of information by local, regional and global constituencies (HMN website).

The HMN Framework defines the systems needed for generating, analysing, disseminating, and using health information at country and global levels. It is a technical document, but its adoption required strong political endorsement and consensus-building. The Framework consists of three parts: (1) background, rational, and vision, (2) HIS components and standards, including HIS resources, indicators, data sources, data management, information products, and information dissemination and use, and (3) principles, processes, and tools for implementing the HMN Framework -five phases of implementation are identified: assessment, coordination and leadership, planning and priority setting, implementation of HIS strengthening activities, and monitoring, evaluation and reprogramming. The first edition builds upon consultative meetings and country visits by the HMN partners during the period 2003-2005. But the Framework is expected to evolve over time, as HMN learns from working with countries and global partners. The HMN target is that, by 2011, the HMN comprehensive Framework will be the universally accepted standard for guiding the collection, reporting, and use of health information (HMN/WHO 2006).
Three pathfinder countries - Ghana, Mexico, and Thailand - have provided valuable input and feedback to the development of the HMN Framework. These countries have worked with HMN to field-test and fine-tune the HMN framework, including the HIS assessment tool (HMN News Vol. 2 2006).

The HMN Country Health Information System Assessment Tool, published in 2006, enables countries to establish a baseline and monitor progress of HIS development. The main objectives of this assessment are the identification of areas of improvement and the mobilization of joint technical and financial support for implementation of a strategic plan that identifies priority investments during the short- (1-2 years), medium- (3-5 years), and long-term (10 years). The assessment covers comprehensively the many subsystems of the health information system and addresses the resources available, indicators, data sources, data management, information products, and dissemination and use (HMN Assessment tool 2006). The tool, available at HMN website, consists of a standardized questionnaire, to be completed by country stakeholders at central and peripheral levels, through which the current status of the HIS is evaluated against specific criteria. All countries receiving HMN support are required to conduct a baseline assessment using this tool. The Network provides both technical and financial assistance to countries for the assessment (HMN/WHO 2006).

In response to country demand, the HMN Secretariat is now working with two consultants from Management Sciences for Health (MSH) to develop a new instrument, the HMN Planning and Priority Setting Tool. The consultants participated in the HMN-supported planning workshop in Cambodia, using that opportunity to field-test and further develop the tool. The tool will consist of a template and guidelines for the process, in order to enable countries to develop detailed plans for comprehensive HIS reforms, fully integrated into a national health development plan, national statistical development strategy and/or a poverty reduction strategy paper. The tool will build upon the results of the assessment and will be founded upon the work of PARIS21 and their guidance for planning an integrated national statistical system (HMN Monthly update May 2007). Moreover, HMN plans to develop a HMN Costing Tool (HMN 2006).

In October 2005, HMN announced its first round of funding to spur fundamental improvements in HIS. More than 6 million USD in assistance was awarded to 41 countries that submitted formal proposals outlining plans for assessing, improving, and strengthening their HIS. The recipient countries represented all regions of the globe and included countries as diverse as China, Ghana, Oman, the Philippines, and Panama. Countries were selected based upon need - as determined by the nations’ GDP per capita and child mortality rates -, and each country’s ability to implement the proposed plans. A complete list of the countries that received assistance is available on HMN website. This initial round of funding assisted countries in assessing their existing HIS, developing long-term plans, and focusing on specific components of their broader information systems such as vital registration or household surveys (HMN News Vol. 2 2006).

During the first six months of 2006, HMN organized six inter-country workshops in order to support countries in building up a critical mass of human resources in-country and regionally, in Africa - Ghana, Zambia, Tanzania, Republic of the Congo-, Asia -Thailand-, and Latin America and the Caribbean -Panama-. The workshops
brought together high level staff involved in health-related data collection, analysis, and use from the ministries of health and from the national statistics offices, as well as development partners involved in health and statistics strengthening in countries, such as other UN agencies, bilateral donors, and global initiatives (HMN News Vol. 3 2006).

On its Board meeting in November 2006, HMN approved its second round of grants. A total financial support of 1,093,515 USD was awarded to 25 countries to assist them in the assessment of the national health information system (HIS), and prioritization of HIS reforms. (HMN Monthly update December 2006).

Currently, HMN is simultaneously working with the 65 grantees from rounds one and two, assisting “Wave Two” countries in the assessment of their HIS, and supporting “Wave One” countries to continue their efforts in strengthening their HIS through the implementation of the subsequent phases of the HMN Framework. Remarkable achievements have taken place in specific selected countries, such as Sierra Leone, Syria, Cambodia, and Ethiopia.

In Sierra Leone, key stakeholders have completed an assessment of the country’s HIS and drafted a 10-year strategic plan to develop a data warehouse and carry out a census-based measure of maternal mortality. The plan included nationally representative household and health facility surveys and national health accounts, which will be completed for the first time in 2007 and updated annually thereafter. The strategy also includes a plan to precisely measure maternal mortality in the 2014 national population census. The integrated data warehouse is a key part of the 10-year plan. It will pool data at district levels from multiple routine sources, including specific vertical programs, surveillance systems, facility services, logistics, human resources and finances. This comes as the WB and DFID collaborate with government officials to design a major new support package to the health sector, comprising a 30 million USD four-year grant from the World Bank’s Africa Catalytic Growth Fund for Accelerated Child Survival and Development, as well as a £40 million 10-year DFID program for “Scaling Up Basic Services for Sexual, Reproductive and Child Health”. HMN has supported key players in Sierra Leone’s HIS to complete the assessment and draft the 10-year strategic plan (HMN News Vol. 4 2007).

Syria also completed an assessment of its HIS thanks to a HMN grant. In April 2007, country stakeholders met to draft a 10-year strategic plan to strengthen the country’s HIS. This plan was drafted in response to the recent release of a government blueprint to reform Syria’s entire health system: the Syria’s 10th Five Year Strategic Plan for the Health Sector. This blueprint was ratified by President Bashar al-Assad and places great emphasis on HIS strengthening to drive and assess Syria’s comprehensive health sector reforms. The draft plan prioritizes the strengthening of the legal framework, human resources, and information and communication technology, and focuses on all six data sources. Discussions are also underway to use innovative policies and legislation to expand and improve the role of the private sector to provide both health services and information. As well as in Sierra Leone, HMN has provided key stakeholders in this country with financial and technical support to complete the assessment and draft the 10-year strategic plan (HMN News Vol. 3 2006).

Furthermore, in March 2007, HMN—in collaboration with the WHO’s regional offices for the Western Pacific (WPRO) and Europe (EURO)—conducted two inter-
country workshop to support countries in planning HIS reforms. One took place in Vietnam, with participants from Cambodia, China, Lao, Mongolia, and the Philippines. The other one took place in Denmark, and countries participating included countries receiving HMN support under Rounds 1 and 2 -Albania, Armenia, Azerbaijan, Georgia, Hungary, Kyrgyzstan, Republic of Moldova, Tajikistan and Turkey- as well as several that have not received grants but were nonetheless interested -Kazakhstan, Turkmenistan and Uzbekistan- (HMN Monthly update May 2007).

HMN plans to provide selected countries with in-country technical and operations support through the establishment of a HMN office. In order to ramp up assistance to “Wave One” countries, until those offices are established, HMN is exploring several mechanisms including direct technical assistance by HMN partners through visits to countries, small requests for proposals, and channeling of funds and assistance through the WHO (HMN Monthly update April 2007).

At the fifth meeting of the HMN Board, in December 2005, HMN agreed to allocate a significant sum of money on addressing the weakness of vital events monitoring in low income countries through the Monitoring Vital Events (MoVE) initiative. HMN target is that, by 2011, 70% of global deaths will be counted with reliable cause of death data (HMN News Vol. 3 2006).

The HMN Secretariat convened the first working group meeting on February 2006 in Nyon, Switzerland with the objective of developing a plan to spearhead a movement to improve global and country-level vital events monitoring through strong advocacy efforts, coupled with strong technical advances -including data collection in countries, innovative ways of making the best use of incomplete data sets, and verbal autopsy tools-. The second meeting, held on May-June 2006 in Glion, Switzerland, was more technical in nature and focused on: how to improve data quality; coordination of verbal autopsy tools; the strategic road for countries to move towards the ultimate goal of universal coverage of civil registration; and the format and content of a special series of papers. (HMN News Vol. 3 2006). This series of papers on HMN MoVE initiative are scheduled for publication in Lancet towards the end of this year. A high level launch of these papers is planned, designed to draw attention to the neglect of this area by the international health and development community and to the many benefits that can accrue to citizens, societies and to the health sector when births and deaths are counted (HMN News Vol. 5 2007).

In November 2006, HMN hosted a meeting on "Harmonizing Verbal Autopsy Tools" in Geneva, Switzerland in order to review and adopt a harmonized core VA questionnaire, death certification, coding manuals and validation procedures. A number of suggestions were made as to how HMN could contribute to further progress in this important area. (HMN Monthly update December 2006). HMN partners, with leadership from MEASURE/Evaluation, has developed a vital registration "resource kit", including standard forms and manuals (HMN News Vol. 4 2007).

HMN is also developing expertise in health systems performance monitoring. In a meeting organized by HMN in Glion, Switzerland, in September 2006, monitoring of health systems strengthening was discussed by experts from around the world. The meeting report highlights the current issues and priorities for financing, information, human resources, governance, service provision and coverage (HMN 2006).
INDEPTH Network

INDEPTH is an international platform of sentinel demographic sites that provides health and demographic data to developing countries in order to enable them to set health priorities and policies based on longitudinal evidence (INDEPTH website).

INDEPTH's key objectives are (INDEPTH website):

- To initiate and facilitate cross-site, longitudinal health and social studies and impact assessments in severely resource constrained populations.
- To disseminate study findings with all stakeholders to maximize impact on policy and practice.
- To foster and support capacity building and cross-site collaborations among INDEPTH member sites.
- To facilitate the process for donors to fund multi-site health and social research projects in the developing world and especially Africa and Asia.

In order to achieve these objectives, INDEPTH implements the following activities:

- To cultivate cross-site activity through the (INDEPTH website):
  - Capacity building across the network through the development and dissemination of models for survey design, data processing and analysis, and quality control; the promotion of on-site training courses and internships; and the coordination of multi-site research collaborations and workshops.
  - Execution of comparative studies and exchange of experiences on common problems.
  - Creation and sharing of regional health status assessments relevant to global priority setting.
  - Evaluation of interventions in diverse socio-culture and geographic environments through coordinated multi-site research collaborations.

- To generate longitudinal data that can impact on ongoing health reforms and inform health policy and practice, and to share it with governments, NGOs, international agencies, donors, academic institutions, and private sector organizations.

- To broaden the scope of health research by confronting the emerging agenda of non-communicable disease and aging, violence and injury, migration and urbanization and the problems associated with vulnerable population segments.

- To continually improve the methods and technologies used by member sites to ensure all participating groups have access to the best methodologies available.

- To generate visibility and recognition for INDEPTH and member sites among critical constituencies including academic, government and international agencies and donors.

INDEPTH has 37 demographic surveillance sites in 19 different countries. Of these, 26 sites are located in Africa, 9 sites in Asia, 1 in Oceania and 1 in Central America. Profiles of sites are available on their website.
Partnership in Statistics Development in the 21st Century (PARIS21)

The Partnership in Statistics for Development in the 21st Century (PARIS21) was established in November 1999 in response to the UN Economic and Social Council resolution on the goals of the UN Conference on Development. It was launched to promote high-quality statistics and to act as a catalyst for promoting a culture of evidence-based policymaking, especially in developing countries (PARIS21 website).

The PARIS21 partners are: national institutions -such as the Ministry of Finance of South Africa, the Ministry of Planning and National Development of Kenya, and the National Statistical Coordination Board of the Philippines-, UN agencies -such as UNAIDS, UNDP, UNICEF, UNSD, UNFPA, WB, and WHO-, development banks -such as IADB and ADB-, other international organizations -such as OECD, and IMF-, bilateral and multilateral donors -such as AFD, AusAID, BMZ, CIDA, DANIDA, DFID, FINNIDA, JICA, and SIDA, and the EC-, global partnerships -such as HMN-, private foundations -such as the Carter Centre, Gates Foundation, and Rockefeller Foundation-, private sector organizations -such as Odysseus Communication, and Decision Consulting-, and academic institutions -such as Institute of Statistics and Applied Economics of the University of Makarere, the Arab Institute for Training & Research in Statistics, and the London School of Economics- (PARIS21 website).

PARIS21 main objective is to encourage every low-income country to design a National Strategy for the Development of Statistics (NSDS) in order to have national produced and owned data for all MDG indicators by 2010. An NSDS is expected to provide a country with a strategy for strengthening statistical capacity across the entire national statistical system (NSS). It also has to present a framework for mobilizing, harnessing and leveraging resources -both national and international- and a basis for effective and results-oriented strategic management of the NSS. It is supposed to provide a vision for where the NSS should be in five to ten years and a set of milestones for getting there (PARIS21 2004).

To help achieve its goal of fostering well-managed NSS, PARIS21 has put together subject-matter task teams and obtained financial support for their activities. Task Team members comprise experts from international agencies, donor organizations, and developing countries. The teams function in virtual mode and meet roughly once a year as work progresses (PARIS21 website).

The Strategic Statistical Development Plans task team helped define the conceptual framework for the NSDS program. NSDS guidelines, “A guide to designing a national strategy for the development of statistics” -including implementation guidelines-, were published in 2004, and regional workshops to train national statistical representatives are being organized (PARIS21 2004).

Another relevant task team is the so called “satellite programs - International Household Survey Network and Accelerated Data Program”. The objective of the International Household Survey Network (IHSN) is to bring survey producers, sponsors, and users together to improve the use of survey data for monitoring and policy-making. The network intends to identify, promote, and implement solutions to problems of availability, timeliness, reliability, relevance, comparability, dissemination,
and use of household survey data. To achieve these goals, IHSN conducts four main activities (IHSN website):

- **Survey planning:** IHSN advocates better timing and sequencing of household surveys in order to ensure regular provision of data and sustainability of capacity-building. This network has developed an Information System on Planned Surveys and Censuses to foster interagency cooperation in survey planning.

- **Harmonization and development of data collection instruments:** IHSN provides a platform for harmonization of existing survey instruments and coordinated development of new survey instruments.

- **Survey data dissemination tools and guidelines:** IHSN participates in the development of a Microdata Management Toolkit, which aims to assist countries in the improvement of dissemination survey datasets according to international standards.

- **Central survey and census catalogue:** IHSN maintains a catalogue of survey and census metadata, allowing users to locate data and documentation from multiple data depositors.

The Accelerated Data Program (ADP) is a pilot program intended to support selected countries to undertake urgent improvements in monitoring progress in key development indicators, including the MDGs, between now and 2010. This program includes assistance in making better use of existing survey data and in the design and implementation of improved survey programs. The program is designed to be consistent with existing national statistical strategies and to build on existing survey programs in cooperation with development partners. By May 2006, work was underway in six pilot countries in Africa: Democratic Republic of Congo, Ethiopia, Ghana, Madagascar, Mozambique, and Niger (WB 2006). The program will be scaled up to other developing countries once the pilot is proven to be successful (PARIS21 website). This program receives financial support from the WB through the Development Grant Facility (DGF).

The Census task team studied the problems of financing censuses from both developing country and donor perspectives and considered strategies for reducing census costs. Their conclusions were written up in a paper entitled "Population and Housing Censuses: A Funding Crisis?" (PARIS21 2001). The paper recommended the organization of a follow-up meeting, that took place in Pretoria, South Africa, in November 2001, and was organized by the United Nations Population Fund (UNFPA). The Pretoria meeting proposed that UNFPA/PARIS21, in collaboration with other partners, should focus on the following: cross-country reviews, an assessment of existing materials, census advocacy tools, a good practice database, a census bulletin board, south-south co-operation, and donor co-operation. Another follow-up meeting was held in Pretoria, in November 2003. At this meeting, the task team produced an advocacy video entitled "Census dissemination: the African perspective", that can be downloaded from their website.

The Statistical Capacity Building Indicators (SCBI) task team coordinated arrangements to identify indicators on statistical capacity building for countries receiving assistance from multilateral and bilateral donors. The team published a report of the SCB Indicators. The IMF’s Statistics Department chaired the task team and the World Bank’s Development Data Group acted as Secretariat (PARIS21 website).
Furthermore, PARIS21 has developed advocacy materials to show how greater availability and use of good statistics can improve development outcomes. This is necessary to make the case for (1) increased funding of statistics and statistical capacity building in developing countries, and (2) greater use of statistics in policy-making. On their website, managers of national statistical systems can find materials (i.e. videos, brochures, and articles) that they can adapt for their own advocacy efforts (PARIS21 website).

Roll Back Malaria (RBM)

To provide a coordinated global approach to fighting malaria, the Roll Back Malaria (RBM) Partnership was launched in 1998 by numerous global partners. In 2002, the RBM Monitoring and Evaluation Reference Group (MERG) was established to act as an advisory body on all matters pertaining to M&E of RBM initiatives at the national, regional, and international levels (RBM website). In 2004, the Household Survey Task Force of the RBM MERG developed the Malaria Indicator Survey (MIS), a comprehensive package of tools for providing guidance in carrying out household surveys relevant for assessing core malaria indicators. Household surveys are especially relevant in many malaria endemic settings for measuring coverage of interventions that primarily target the household level, such as insecticide-treated nets (ITNs), and for understanding patterns of antimalarial use among target populations, especially in areas where antimalarial treatment and prevention occur outside the formal health sector. The MIS was designed to track the progress of malaria programs in countries where no other surveys are being conducted, or to fill gaps within the 5-year intervals between subsequent DHS or MICS (WHO/SEARO 2005).

In 2006, Zambia completed the first-ever nationally representative MIS, measuring malaria-related burden among children under age five and assessing coverage of the key malaria interventions. This effort, implemented by the MOH through the National Malaria Control Centre (NMCC) with technical assistance from many Zambia RBM partners -such as the Malaria Control and Evaluation Partnership in Africa at PATH-, was designed to provide baseline data against which to measure progress toward achieving the goals and targets set forth in the National Malaria Strategic Plan for 2006-2010. This innovative project, that involved the use of personal digital assistants (PDAs), represents the first time that a stand-alone MIS was carried out focusing on anemia assessment, malaria parasite testing, and intervention coverage using the RBM standard methods (Zambia MOH 2006).

Routine Health Information Network (RHINO)

The Routine Health Information Network (RHINO) was created by the USAID-funded MEASURE Evaluation Project, WB, and John Snow Inc. in order to promote high quality and practical approaches to the collection and use of routine health information in developing countries (RHINO website).

This network comprises developing country governments, donor agencies, technical groups, and NGOs (RHINO website).
RHINO main objective is to strengthen the role of evidence-based decision-making in the health sector in lesser-developed countries, to and improve overall planning and management of health activities. To achieve this goal, RHINO conducts the following activities (RHINO website):

- Workshops and presentations, in order to engage organizations and professionals in the promotion of effective collection and use of routine health information in developing countries.
- On-line Forum and Listserv, in order to promote communication and discussion among professionals interested in routine health information collection and use throughout the world.
- RHINO Register, a Web-based directory of professionals with interest and experience in the health information systems.
- Publications, such as “The Potomac Statement on Investment in Routine Health Information in Developing Countries” (RHINO).

Bill & Melinda Gates Foundation

During the last years, the Bill and Melinda Gates Foundation has provided financial assistance to several organizations to support the implementation of different activities aimed at developing and strengthening HISs in developing countries.

HMN -described above- was launched in 2005 with a seven-years 50 million USD grant from the Gates Foundation. Furthermore, the Gates Foundation has recently announced that it will provide 105 million USD to the University of Washington in order to support the creation of the Institute for Health Metrics and Evaluation (IHME). This research center will focus in three areas: (1) health monitoring -collecting and conduction replicable analysis of data on major diseases and health services-, (2) program evaluation -implementing independent, rigorous evaluations of the results and effectiveness of health programs-, and (3) dissemination -making health information freely available to decision-makers-. The ultimate goal of the new institute is to help guide international policy-making by providing high-quality data and analysis on health, comparable between countries.

Although the activities of the new institute are still being defined, it seems that it will not have a leading role in providing direct assistance to countries in order to strengthen their national HISs. Nevertheless, it is expected that this organization will work in close collaboration with HMN and other partners, and some of its activities will indirectly promote the development of these systems at the country level (IHME website).

Furthermore, the Gates Foundations has provided in the past years several more modest grants to support the development of different national HISs, such as a 243,000 USD grant awarded to Americans for UNFPA to develop of a contraceptive LMIS in Myanmar (Bill & Melinda Gates Foundation website).
Rockefeller Foundation

The Rockefeller Foundation provides financial support to different organizations that work in the development of HISs. For instance, this foundation has provided several grants to the INDEPTH Network -described above- in order to provide general support to its mission and to develop, in collaboration with the University of Witwatersrand, a master's degree scholarship program in population-based field epidemiology for its staff.

Other projects supported by this foundation include a project carried out by the Aga Khan Foundation to implement in seven districts of Coast Province, Kenya, an efficient, standardized, and replicable HMIS that is a potential prototype for the entire country, as well as a pilot study conducted by the University of the Western Cape, South Africa, that will assist the Tanzanian MOH to enhance its HIS by conducting routine waiting-time and quality-of-care surveys in health care facilities (Rockefeller Foundation website).

Association of Public Health Laboratories (APHL)

The Association of Public Health Laboratories (APHL), through its Global Health Program funded primarily by the US Government-, provides technical support to developing countries in order to strengthen their laboratory capacity and build national laboratory networks. In collaboration with the CDC Global Aids Program, this Association has recently launched a Laboratory Information Systems (LIS) Initiative, in order to promote the implementation of this type of HIS in resource limited settings.

APHL is implementing a LIS in Mozambique that will support treatment efforts of HIV/AIDS patients. The LIS will make testing more efficient, accurate and timely by linking instruments for CD4, hematology and biochemistry testing to the laboratory database. This capability will support better quality assurance, availability of historical testing results for patients under treatment, and information to improve planning by the MOH. APHL standardized methodology was applied for the first time through this project, which is expected to provide a viable model for the development of similar LIS in other developing countries (APHL website).

Institute for Healthcare Improvement (IHI)

The aim of The Health Foundation Consortium (THFC) Program is to measurably reduce maternal and neonatal morbidity and mortality in Malawi over a period of five years, beginning in 2006. It is being implemented in three districts of this country: Lilongwe, Kasungu, and Salima. Through the Data Improvement Element of this program, the Institute for Healthcare Improvement (IHI) -one of the partners of the Consortium- provides technical assistance in strengthening the HMIS related to maternal and neonatal care in order to improve the quality of information that drives decision-making at the clinical, hospital, district and national levels.

For instance, IHI collaborates with HMIS users -including nurses, matrons, physicians, and data clerks- in the development of standardized forms for data
collection, such as the Standardized Delivery/Discharge Register. Furthermore, IHI staff provides technical assistance in the application of these forms. Each form is introduced by the Quality Improvement Teams of the respective hospitals as part of a PDSA cycle -Plan, Do, Study, Act-, in which the problem is defined and ideas are first tested at very small scale. These small scale tests grow in size over time as the implementation teams become more confident in the final product (LeCombe 2007).

The strengthening of the HMIS is a key component of this program, since its implementation is allowing the program to measure its impact on the health of the targeted population.

IntraHealth International

IntraHealth International leads the USAID-funded Capacity Project. This five-year initiative that was launched in October 2004 was designed to help developing countries build and sustain the health workforce they require to implement and sustain quality health programs. As a component of this project, IntraHealth International and other partners provide technical assistance to developing countries in the process of strengthening their human resource information systems (HRIS). A HRIS is an integrated system for supplying health sector leaders and managers with the information they need to assess HR problems, plan effective interventions and evaluate those interventions.

The HRIS Strengthening Team of the Capacity Project provides training and technical assistance to national officials in different areas: HRIS assessment and analysis, Stakeholder Leadership Group facilitation, information technology infrastructure improvement, software development, data collection and analysis, and effective use of data.

The Capacity Project is developing three HRIS software solutions -iHRIS Qualify, iHRIS Manage, and iHRIS Plan-. This project also provides technical assistance and expertise to countries in order to ensure that the technology is transferred effectively and serves the ability of decision makers to use data to lead and manage.

The Capacity Project is currently providing assistance in strengthening HRIS to eight African countries: Uganda, Rwanda, Swaziland, Namibia, Lesotho, Tanzania, Kenya, and Sudan. In the case of Rwanda, for instance, beginning in 2005, the Capacity Project partnered with the MOH to address human resources for health issues, including the development of an information system to support accurate HR data collection. At that moment, the Rwandan MOH did not have a consolidated electronic or paper information system for managing health personnel distributed across the country. In a year since the beginning of the collaboration, the Capacity Project developed and installed a customized version of the software iHRIS Manage. With support from the Columbia University, this project also upgraded the MOH infrastructure and trained and seconded an HRIS administrator to the Ministry (USAID Capacity Project website).
The USAID-funded DELIVER Project, implemented by John Snow, Inc. - in collaboration with other organizations-, improves essential health commodity supply chains by strengthening logistics management information systems (LMIS), streamlining distribution systems, identifying financial resources for procurement and supply chain operation, and enhancing forecasting and procurement planning. Health programs cannot operate successfully without essential commodities. The project encourages policy-makers and donors to support logistics as a critical element of health systems.

Since 1986, this project designs, strengthens, and, upon request, operates reliable and sustainable supply systems that provide a range of affordable, quality essential health commodities, including drugs, diagnostics, and supplies, to clients in country programs. The project's technical support strengthens all aspects of in-country supply chains, including logistic management information systems (LMIS). Countries that are receiving technical assistance through this project include Kenya, Malawi, Mali, Nigeria, Rwanda, Uganda, Mozambique and Romania (USAID Deliver Project website).

Management Sciences for Health (MSH)

Management Sciences for Health (MSH) -a private, nonprofit educational and scientific organization- provides capacity building activities and technical assistance in the development of HIS through different components of its country programs.

For instance, MHS is collaborating with the MOH of Afghanistan in the development of different HISs in this country, through the USAID-funded project Rural Expansion of Afghanistan's Community-based Healthcare (REACH). The aim of this project is to assist Afghans living in relatively stable areas with their most basic health needs.

As part of this project, the Afghan MOH and MSH created in 2003 a Basic Package of Health Services (BPHS) and an information system -an HMIS- in order to track changes in the health system. The BPHS is the foundation of the Afghan primary health care system and has been the key instrument in its development. The first version of the BPHS was published by the MOH in March 2003 and proposed a rapid expansion of essential health services. The same year, a HMIS Task Force -with professionals from the MOH and MSH- worked to define protocols and policies for the development of an information system to monitor progress of the BPHS implementation. In addition, a computerized system was created, allowing data entry and analysis at the facility / NGO level as well as aggregation and reporting to the provincial and national level. In December 2003, the first national HMIS Training of Trainers (TOT) Workshop was held in Kabul for 71 participants. By 2006, three other formal HMIS TOTs had been organized for a total of 99 participants.

The early implementation was a success. In early 2003, updated information was readily available at the MOH only from 5% of health facilities. In contrast, by late
2005, 70% of all facilities targeted for implementation -about 80% of the total- were submitting timely routine reports to the MOH.

As a complement of the HMIS, MSH developed for the MOH a Sentinel Surveillance System to Detect and Combat Disease Outbreaks in order to facilitate immediate response and immunization campaigns. Building on existing systems, the surveillance system reports on measles, neonatal tetanus, tuberculosis, malaria, pneumonia, severe diarrhea, and maternal deaths. In the summer of 2005, the system’s quick alert on an outbreak of severe diarrhea in Kabul enabled the MOH to mount a successful response that saved thousands of lives (MSH REACH website).

Academic institutions

Several academic institutions are working to improve different aspects of health information in developing countries, often pioneering new approaches that are more feasible and cost-effective in resource-constrained settings.

For instance, the Harvard School of Public Health (HSPH) is implementing the project “Electronic Decision Support to AIDS care in South Africa”, in order to test an innovative approach to accelerating HIV treatment scale-up in low-income countries. HSPH researchers developed a PDA-based system to evaluate AIDS patients in follow-up visits and trained non-physician health workers to use them, with the objective of reducing the workload of physicians. A relevant advantage of this system is that it allows keeping electronic medical records of patients (D-tree website).
5. CASE STUDIES

Case 1: Improvement of cause-specific mortality estimates through Sample Vital Registration in China.

Health information system
Vital registration is the recording of the occurrence of vital events pertaining to the population. Vital statistics are the main source of information in mortality by cause of death. However, since universal recording is very time and resources consuming, some alternative strategies are being developed in resource-constrained countries, such as Sample Vital Registration with Verbal Autopsy (SAVVY).

Geographical area and context
With 1.3 billion, China accounts for one-fifth of the world’s population. Complete registration and medical certification of every single death is logistically and financially unattainable at present. The poor quality of vital registration in some areas and the lack of national representativeness are the two main concerns that led to the establishment of this system.

Intervention
China started in 1978 the development of a sample-based Disease Surveillance Points (DSP) system in order to collect data on births and causes of death. In 1990, the DSP system was reconfigured in order to cover a nationally representative sample of 145 points based on multistage stratified random sampling. At present, the total population that it covers is a little under one percent of the Chinese population.

Main national and international actors involved
The main national actors of the development and reconfiguration of the DSP system have been the MOH, as well as the Chinese Academies of Medical Sciences and of Preventive Medicine. They have benefited from financial assistance provided by the WB and from the development of standardized tools by WHO. The University of Queensland and other academic institutions have provided research assistance.

Impact
Since 1990, annual reports of deaths by causes have been published in China. Much insight has been gained from these data into the levels and patterns of mortality of one-fifth of the world’s population. Statistics on causes of death from the DSP system have been the main data source for estimating burden of disease in China and have informed health policy at national, regional, and global levels.
i. **Health information system.**

Civil registration or vital registration is the continuous, permanent, compulsory and universal recording of the occurrence and characteristics of vital events, pertaining to the population, as provided by decree or regulation, in accordance with the legal requirements of a country. Vital events include births, deaths, and changes in marital status (HMN/WHO 2006). Vital statistics derived from civil registration are the main source of information on mortality by cause of death, which is an essential input for evidence-based policy-making and planning in human development.

The gold standard for vital registration is a system that provides complete record of all births and deaths and that includes medically certified causes of death (HMN 2006). However, the establishment and maintenance of this kind of civil registration takes time and requires considerable resources; it may not be attainable in most developing countries in the foreseeable future. Although most countries have established legislation for civil registration, the vast majority of the world’s population does not participate at present in routine vital registration from which representative and reliable vital statistics can be derived (HMN no. 4 Unedited). WHO estimates that only one third of the estimated 56 million deaths occurring every year are recorded through vital registration systems (WHO 2004). In addition, where information is available, its quality is often doubtful because many deaths occur in the absence of medical attention (HMN no. 4 Unedited). It is therefore imperative to develop alternative short- to medium-term strategies to ensure that resource-constrained countries have accurate data sufficient for calculating population birth and death rates.

A very cost-effective tool that has been proposed is the Sample Vital Registration with Verbal Autopsy (SAVVY). China, India, and the United Republic of Tanzania are examples of countries that use effective sample registration systems (SRS). These systems involve the implementation of vital registration with a high degree of resource input and quality control in a sample of clusters randomly selected from a national sampling frame (HMN no. 4 Unedited).

For populations in which the majority of deaths occur outside health facilities, verbal autopsy techniques are possibly the only systematic way of ascertaining probable cause of death. Briefly, these techniques consist of an interview by trained personnel with the relatives or caregivers of deceased individuals within a specified time period after death, using standard field instruments and interviewing techniques, with the aim of collecting the best available information on the symptoms and events previous to the death. After the interview, the data obtained is reviewed by a panel of physicians, who assign a probable cause of death. The main concern in this approach is the misclassification of cause-of-death. But substantial progress has been made in the development of these procedures to have sufficient confidence in the utility of the cause-of-death data that they produce (HMN no. 4 Unedited). A number of validation studies show that verbal autopsy performs well in accurately estimating the cause structure of mortality at the community level (Datta et al. 1988, Mirza et al. 1990, Chandramohan et al 1994, Mobley et al. 1996, Anker 1997, Chandramohan et al. 1998, Rodríguez et al. 1998, Benaka et al. 1999, Chandramohan 2001, Okosun et al. 2001).
ii. Geographical area and context.

China accounts for roughly one-fifth of the world’s population. With 1.3 billion people, complete registration and medical certification of every single death is logistically and financially unattainable at present (Mooney 2006).

Prior to 1950 civil registration hardly functioned in China, and even then only yielded reports on causes of death for the cities of Beijing and Nanjing (Zheng 1944). The only causes of death reported were tuberculosis, measles, “acute infectious disease”, “infant disease”, “respiratory disease”, “heart disease”, “urinary disease”, “digestive disease”, stroke, and ill-defined causes. Cancer was not listed. In 1957, civil registration was expanded to several other large cities, including Shanghai, Tianjin, Harbin, and Wuhan. Thereafter, the vital registration system was extended to include more cities and counties. In 1987, the Ministry of Health established a vital registration (MOH-VR) system to record the fact and cause of death. At the time of inception of the coding system in 1987, a specially designed Chinese Classification of Diseases List consisting of about 500 diseases or injuries was used (Yang et al. 2005). The MOH-VR system currently reports according to the ICD-10 rules (Mooney 2006).

In brief, the MOH-VR system functions as follows. When a person dies, staff in the vital registration office fill in the death certificate based on available medical records or, alternatively, on information from family members. A copy of the death certificate is sent to the county Centre for Disease Control (CDC), where the cause of death is coded. The county CDC then uses a prescribed summary tabulation format to submit monthly reports of deaths by age, sex, and cause to the Centre of Health Information and Statistics, a department within the MOH. This department prepares annual compilations, which are submitted to WHO and published by this organization.

Quality control measures, including training of staff and development of guidelines and regulations for death registration, vary between areas. Quality of registration is better in urban than in rural areas, and is better in eastern than in western regions, resulting in significant biases in the overall statistics (Yang et al. 2005).

At present, the MOH-VR system covers 41 cities and 85 counties. The total population covered by this vital registration system in 2000 was about 110 million, half of which were living in urban areas and half living in rural counties. Half of the population covered lives in the eastern region, 40% in the central area, and 10% in the western regions (MOHC 2001). As a result, data from this system are not a true reflection of the mortality profile in the country: the coverage of the MOH-VR system is biased towards the more urban and better-off populations of eastern China.

The poor quality of basic public-health data under vital registration in some areas and the lack of national representativeness are the two main concerns that led to the establishment of the Disease Surveillance Points (DSP) system described below (Yang et al. 2005, HMN no. 4 Unedited).
iii. Intervention.

In order to improve the usability of data from civil registration, the Peking Union Medical University / Chinese Academy of Medical Sciences put forward a proposal in 1978 to develop a sample-based Disease Surveillance Points (DSP) system to collect data on births and causes of death. A pilot study was conducted in East Town and Tongxian counties of Beijing in 1978 (Zheng 1987). Subsequently, the MOH set up disease surveillance points under the technical guidance of the Chinese Academy of Preventive Medicine. By 1989, there were 71 DSPs scattered throughout 29 provinces in the country, with a standard working procedure for data collection, management, analysis and dissemination (Yang et al. 2005). The biggest shortcoming of the early DSP system is that it was not representative of the national population (HMN no. 4 Unedited).

In 1990, supported by a loan from the World Bank, the Chinese Academy of Preventive Medicine reconfigured the DSP system and established a nationally representative population sample of 145 points based on multistage stratified random sampling (HMN no. 4 Unedited).

Based on the principle that the characteristics of the population under surveillance should be similar to the Chinese general population, a multistage cluster probability sampling was designed with stratification at three levels. The first level was according to the seven geographical regions (North, North-east, East, South, South-west, North-west, and Central areas) and three municipalities (Beijing, Tianjin, and Shanghai). The second level was based on the urban and rural location of primary sampling units. Within rural areas, a third level of stratification was based on a classification of rural sites into four socio economic strata, based on the 1982 Census (Yang et al. 2005).

The primary cluster unit was the city in urban areas, and the county in rural areas. Probability proportionate to population size sampling (PPS) was used to select a city or county, using the 1982 Census data. In the second stage cluster, the unit of sampling was a “neighborhood” -jiedao- within cities and a “township” -xiang- in rural areas, with populations ranging from 30,000 to 100,000. Both the “jiedao” and the “xiang” represent a community with a primary government. The resultant new DSP system consisted of 145 points, scattered over the 31 provinces or autonomous regions or municipalities of China (Yang et al. 2005).

In each DSP site, there is at least one township hospital. The Disease Prevention Unit of these hospitals is responsible for vital registration. The detailed working procedure is described in the Guidebook of Disease Surveillance (Dai et al. 1993). Causes of death are derived through a mix of medical certification and verbal autopsy procedures, applied according to standard guidelines in all sites. The process of mortality registration within the system varies between the urban and rural areas. In urban areas, almost half of all deaths occur in health facilities, where standard protocols for death registration are closely adhered to. For deaths occurring at home, the attending physician issues a medical certificate of cause of death, in compliance with the registration protocol. In contrast, in rural areas, only about 20% of adult deaths occur in health facilities. For deaths occurring at home, a DSP staff member from the Disease Prevention Unit visits the household, and completes a death certificate using verbal autopsy techniques (Yang et al. 2005).
Data cleaning and compilation is done at the county or provincial level and, after computerization, information is transferred to the Chinese Academy of Medical Science in Beijing. Then, ICD-10 coding of the underlying causes of death and subsequent tabulation and publication of results are done at the central level in Beijing (Yang et al. 2005). Information is also reported to the Statistical information Centre of the MOH (HMN no. 4 Unedited).

During the last two years, the number of sample sites has risen slightly to 160 all over China from the initial 145 (Mooney 2006). At present, the total population covered by the DSP system is about 10 million, a little under one percent of the Chinese population. There is consensus in the literature to assert that the selected DSP sites are representative of the national population (Yang et al. 1992, Yang et al. 2005, Mathers et al. 2005).

Any system that is not based on complete registration and medical certification is of questionable validity for two reasons. Firstly, the undercount of deaths is likely to bias the overall cause of death patterns. Secondly, verbal autopsy cannot be expected to capture the full medical history of the deceased. In the case of China, periodic evaluations for completeness of registration are conducted, with subsequent corrections for under-reporting of deaths. These evaluations are done through independent resurveys, and statistical techniques based on “capture–mark–recapture” methods are used to estimate the completeness of registration (Chandrasekar et al. 1949). These surveys are carried out once every three years, on a sample of 5,000 households in each province. The last completeness evaluation survey, conducted in 1998, suggested that about 15% of deaths were not covered by the system. Nonetheless, there has been no such survey since then (Yang et al. 2005).

When it comes to the reliability of cause-of-death ascertainment through verbal autopsy techniques in rural China, Lopez et al. have recently conducted two validation studies that show that verbal autopsy methods perform well in identifying the leading causes of death. Compensating patterns of misclassification appear to suggest that these techniques yield population-level cause-specific mortality estimates that are reasonably reliable (Setel et al. 2006, Yang et al. 2006).

Some authors suggest that the Chinese Government is planning to merge the MOH-VR and the DSP systems to reduce costs and increase efficiency. Guidelines and software are being developed to envisage this (Mooney 2006).

iv. Main national and international actors involved, and their contribution to the intervention.

The improvement of China’s cause-specific mortality statistics through the development of a sample vital registration system has been possible thanks to the contribution of several organizations, both national and international.

At the national level, the main actors of the development of the DSP system have been the MOH, the Chinese Academy of Medical Sciences, and the Chinese Academy of Preventive Medicine. They have led the design and implementation of this system, as well as its subsequent reconfiguration to make it nationally representative.
The lack of standard definitions hampers data collection and international comparisons. A key contribution from WHO to the development and strengthening of vital registration systems is the continuous updating process of the International Statistical Classification of Diseases and Related Health Problems (ICD).

The development and validation of core verbal autopsy forms and suitable coding and tabulation procedures are an essential first step to extending the benefits of this method (Setel at al. 2006). WHO developed the standardized verbal autopsy reporting forms -based primarily on research carried out in sub-Saharan Africa- that are now being used in China. Furthermore, this organization is supporting the implementation of validation studies to assess the reliability and accuracy of verbal autopsy methods, notably in China and the United Republic of Tanzania (WHO 2005, HMN no. 4 Unedited).

When it comes to validation studies, the School of Population Health of the University of Queensland in Australia and other academic institutions, such as the School of Public Health of the University of North Carolina at Chapel Hill in USA and the London School of Hygiene and Tropical Medicine in UK, have provided valuable research assistance in the assessment of the validity and operational characteristics of the verbal autopsy tools being used in the DSP system (Yang et al. 2005, Setel et al. 2006, Yang et al. 2006).

The revision of the DSP system implemented in 1990 by the Chinese Academy of Preventive Medicine, which resulted in the establishment of a nationally representative population sample of 145 points, received financial support from the World Bank. It was an activity under the “Health I plus” project, supported by a loan from this development institution (Yang et al. 2005).

v. Impact: Success and limitations.

Since 1990, the DSP system has covered natality, mortality, and the incidence of 35 notifiable diseases. Annual reports of deaths by causes, age, and sex have been published in Chinese by the Chinese Academy of Medical Science since that year. Certainly, from a national perspective, much insight has been gained from these data into the levels and patterns of mortality in China over the past decade or so. Statistics on causes of death from the DSP system have been the principal data source for estimating burden of disease in China (Yang et al. 2005). The data from this system have been used, for instance, to monitor the emergence of tobacco-caused mortality in China (Niu et al. 1998). Furthermore, results from the DSP system have been used to inform health policy at national, regional and global levels (Yang et al. 2005).

This SRS is subject to several limitations. First, results from the three completeness evaluation surveys conducted in 1992, 1995, and 1998 suggest that the coverage of infant deaths remains problematic. The extent of the undercount has shown no improvement in these successive surveys (Yang et al. 2005). Complementary information systems might be needed to monitor childhood deaths. Surprisingly, there has been no such survey since 1998. There is an urgent need to assess coverage in recent years, to ascertain levels of completeness (Yang et al. 2005).
Even though evidence suggests that verbal autopsy methods can produce reliable information for broad causes of death that is useful for determining the need for priority health programs (Yang et al. 2005), the DSP system may not be the most appropriate to monitor rare diseases for two reasons. Firstly, the sample base is too small and, as a result, the numbers for rare diseases are not stable, and change every year (Mooney 2006). Secondly, verbal autopsy instruments and procedures tend to recognize better locally common diseases but they may not be as accurate in the diagnosis of rare causes of death (Setel et al. 2006).

In conclusion, experience in China suggests that sample vital registration systems, based on a representative set of surveillance sites, with appropriate controls and reporting procedures, can yield to extremely useful information about levels, patterns, and causes of mortality for large populations (Mathers 2005). The DSP system that operates in this country provides critical information on the vital events of one-fifth of the world’s population, from a sample of less than one percent of the Chinese population. It is a remarkable achievement and, probably, the most cost-effective system of data collection to inform health policies and programs. This sample vital registration system holds much promise as a model for rapidly improving knowledge about levels and causes of mortality in other developing countries (Yang et al. 2005).
Case 2: Development of the Brazilian Disease Surveillance and Control System.

Health information system
Disease surveillance is the ongoing systematic collection and analysis of data, closely integrated with the timely dissemination of information to decision-makers. The origin of disease surveillance was the system of notifiable conditions. However surveillance has increasingly widened its scope to draw upon a broader set of data sources, including vital registration, population-based surveys, and health service records.

Geographical area and context
Brazil is the largest and most populous country in Latin America. It has made great strides in reducing infant mortality and increasing life expectancy over the last decades, although it still under-performs in terms of health equity among regions and racial groups. Since 1998, the government of Brazil has committed to develop a disease surveillance system linked to disease prevention and control, with special focus on indigenous and other vulnerable populations.

Intervention
The Brazil Disease Surveillance and Control Program (VIGISUS), initiated in 1998, was designed to enhance this national system by strengthening the institutional infrastructure and human resource capacity necessary to monitor communicable as well as non-communicable diseases. This program was designed against a backdrop of decentralization of the Brazilian health system.

Main national and international actors involved
Brazilian governmental institutions have led the development of the VIGISUS program and secured an important share of the required funding. This country is receiving financial assistance from the WB, through subsequent adaptable program loans, in order to implement VIGISUS. This is, in fact, the first WB-financed program entirely dedicated to the development of a disease surveillance system. Technical support is being provided by CDC, PAHO, UNDP and UNESCO.

Impact
The first phase of the program, VIGISUS I, had a clear impact on improving infrastructure, fostering more efficient processes through improved communication and information technology, and building capacity. Despite the fact that an impact on health outcomes was not expected by the end of VIGISUS I, in fact, there was a reduction in morbidity and mortality in Brazil during this time period.
i. **Health information system.**

Disease surveillance is the ongoing systematic collection and analysis of data, closely integrated with the timely dissemination of information to those responsible for preventing and controlling disease and injury (Thacker and Berkelman 1988). The reason for gathering and disseminating information on a disease is to control it (Foeg et al. 1976). Increasingly, managers in ministries of health and finance in developing countries and donor agencies are recognizing the importance of generating data through effective disease surveillance systems in order to target resources and directly measure the effects of interventions. The fundamental principle of disease surveillance is that it should be designed and implemented to provide valid information to decision makers in a timely manner at the lowest possible cost (Jamison et al. 2006).

The origin of disease surveillance was the system of notifiable conditions: diseases or health events of such public health significance that they required an immediate public health response. The classic notifiable conditions included smallpox, cholera, yellow fever and plague, whose appearance threatened to precipitate a community outbreak. In this sense of the term, disease surveillance represents a type of data source. However, over the past decades, surveillance has increasingly widened its scope to draw upon a broader set of data sources, including vital registration, population-based surveys, health and disease records—such as reporting of notifiable conditions—and health service records.

The nature of conditions, as well as the type of actions that can be taken, determine the design and implementation of surveillance systems. Their development always requires a detection and reporting system, backed up by quality laboratory services. These systems include different sub-systems that generate diverse types of information, depending on the objectives. For instance, a sound surveillance system for acute communicable diseases needs to be able to detect events rapidly, manage outbreaks, and support public health response. Whereas disease surveillance of chronic conditions—including HIV/AIDS, tuberculosis, and cardiovascular diseases—has to focus on ongoing surveillance of health status as well as behavioral risk factors monitoring.

Frequently, vertical systems are implemented for one or more diseases, and they are often extremely successful and generate very valuable information, that is then fed back into a specific disease-control program. This proves that when there is strong commitment and sufficient provision of resources, epidemiological surveillance programs can achieve their targets. This situation is often influenced by donors, who provide funding for specific conditions and their respective disease-specific surveillance systems in order to document reductions in the diseases of their interest. However, this approach is a source of inefficiency. The reality is that, at sub-national

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2 Apart from this, surveillance has even come to include the monitoring of rumors or lay reports of unusual patterns of illness in electronic media and health research outcomes (HMN/WHO 2006).

3 Different kinds of diseases are included, such as epidemic-prone diseases (i.e. cholera, hemorrhagic fevers, bacillary dysentery, plague, measles, yellow fever, meningitis, and rabies), diseases targeted for elimination or eradication (i.e. poliomyelitis and neonatal tetanus), and diseases of public health importance (i.e. diarrhea and pneumonia in children, malaria, typhoid) (HMN/WHO 2006).

4 For instance, the tuberculosis surveillance system is frequently based on case notification at facility level and quarterly summary reporting of facilities to the district level. At the national level, annual reports are prepared and case-notification trends are a major source of the estimation of national incidence trends.
levels, it is often the same overwhelmed individual who responds to multiple vertical systems (HMN no. 6 Unedited). In contrast, from the perspective of the functional concept of integrated disease surveillance, there are advantages which can be derived from combining different types of information sub-systems using similar structures, personnel and processes to gather information about multiple diseases or behaviors of interest to several intervention programs (Jamison et al. 2006). This avoids duplication and helps to promote the analysis of summary information assimilated from multiple data sources, with the goal of achieving a clearer, composite perspective that contributes to public health action (HMN/WHO 2006).

ii. Geographical area and context.

Demographics, epidemiological transition and disease burden in Brazil

Brazil is the largest and most populous country in Latin America, the fifth largest in the world in terms of geographical area and population size. It is a federation consisting of 26 states and the federal district, each of which is divided into municipalities. There are 5,000-6,000 municipalities in Brazil, which vary in size from several thousand persons to the major population centers of Rio de Janeiro and Sao Paulo. They also vary greatly in their capacity for data collection, disease investigation, outbreak response capacity and trained personnel.

Brazil has made great strides in improving health outcomes over the last decades, reducing infant mortality -from 95 per 1,000 births in 1970 to 30 in 2000- and increasing life expectancy -from 61 to 67 years from 1970 to 1993-. Despite these achievements, Brazil under-performs relative to other countries with similar income levels. This is reflected by the fact that there are large and persistent health status disparities among regions and racial groups. With infant mortality rates of 34 and 44 per 1,000 births, the North and Northeast significantly trail the South and Southeast regions; the latter registering rates of 17 and 21 per 1,000 births respectively. Infant mortality rates for indigenous and Afro-descendent populations, particularly those residing in rural and isolated areas, are 3-5 times the national average.

Following improvements in health outcomes, Brazil has undergone a remarkable demographic transition, which has encompassed epidemiological changes. Reductions in mortality have been followed by reductions in birth rates, leading to population growth, increased life expectancy and population aging. As a result, in addition to long-standing public health problems related to communicable diseases -especially diarrhea, malaria, tuberculosis and other endemic diseases-, which disproportionately affect the poor and indigenous populations, non-communicable diseases have become the leading cause of death. Specifically, cardiovascular diseases, injuries and cancer account for nearly two thirds of all deaths. Closing the equity gap while addressing the increased burden of degenerative diseases, with high care demands, is the principal challenge currently faced by the Brazilian health system.

The Brazilian epidemiological surveillance system

The first objective of the Brazil Disease Surveillance and Control Program (VIGISUS) was to develop a national disease surveillance and control system.

The first project of the VIGISUS Program, was negotiated and signed in 1998, in the context of the consolidation of the Unified Health System (Sistema Unico de Saúde or SUS), which was created in 1989. The Brazilian epidemiological surveillance system, created in 1975\(^6\), was more than 20 years old at the initial moment of the VIGISUS Program. In May 1976\(^7\) the Superintendence of Public Health Campaigns (SUCAM) was created as a semi-autonomous agency, in charge of disease surveillance and control. In August 1976\(^8\) the operating principles of the epidemiological surveillance and control system were established, and they defined four hierarchical levels: federal, regional, state level; and health unit level. The federal role involves: (i) establishing norms; (ii) supervising execution by lower levels; (iii) analyzing and disseminating epidemiological surveillance data for the purpose of disease control; and (iv) providing technical assistance to lower levels. As one goes down from the federal to the local level, the function of execution increases, while that of supervision decreases. However, over the years SUCAM -and later its successor, FUNASA- increasingly took on an executive function which would have better been left to the local levels\(^9\).

In April 1991, the National Health Foundation (Fundação Nacional da Saúde or FUNASA) was created\(^10\) as a public foundation linked to the MOH that took over SUCAM's functions. Within FUNASA, several agencies were created: disease surveillance was performed by the National Center for Epidemiology (Centro Nacional de Epidemiología or CENEPI)\(^11\) and disease control was conducted by the Operations Department (DEOPE)\(^12\), while indigenous health activities were carried out by the Department of Indigenous Health (Departamento de Saúde Indígena or DESAI). FUNASA had offices in each of the states, which were responsible for the implementation of surveillance and control activities at the state and municipal levels.

FUNASA, like its predecessor SUCAM, had a positive track record. It created and implemented a disease surveillance and control system and had significant success in the prevention and control of disease transmission. In addition, it was successful in implementing two WB financed projects: (1) the Amazon Basin Malaria Control Project\(^13\); and (2) the Northeast Endemic Disease Control Project\(^14\). These two

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\(^6\) It was created by law 6,259 of October 1975, which gave the power to the MOH to organize an epidemiological surveillance system, and establish norms relating to compulsory notification of diseases.

\(^7\) Through ministerial resolution 161.

\(^8\) Through decree 78,23.

\(^9\) This was partly due to the fact that there is no mention of the role of municipalities in the 1975 law and in the 1976 decree. That would only come twelve years later in the 1988 Constitution, which states that all public health services are to be provided by the municipalities with the technical and financial help of the federal government and the states.

\(^10\) Decree 100 of April 16, 1991.

\(^11\) CENEPI included a unit that coordinated the national epidemiological surveillance system, and one that was in charge of the national system of public health laboratories (COLAB).

\(^12\) The DEOPE comprised several units responsible for the control of vector-borne diseases such as malaria, leishmaniasis, and others; for the provision of health care to Indian communities; and for sanitation.

\(^13\) Loan 3072-BR, April 21, 1989.
projects, which provided basic infrastructure, equipment and training to technicians and managers at the state and municipal levels, left behind a significant project management capacity.

The plan for the reform of FUNASA, laid out in an October 1997 MOH\textsuperscript{15}, was part of the restructuring of the MOH, which in turn was itself part of a broader reform whereby the government, through the Ministry of Administration and State Reform (MARE), undertook the decentralization of public institutions in order to make them more efficient\textsuperscript{16}. The legal instruments to implement FUNASA decentralization consisted of agreements (\textit{Termos de Convenio}) between FUNASA and municipalities in order to decentralize:

1. Staff: FUNASA staff working in the Coordenacões Regionais started to be transferred to municipalities and states through agreements between the FUNASA and the respective municipality or state.
2. Facilities: FUNASA transferred most of the 823 facilities it owned to municipalities, retaining facilities in less than 5% of all municipalities in Brazil.
3. Financing: the federal government designed a financial transfer system under the Basic Operational Norm (\textit{Norma Operativa Basica}) Nº 96, in order to create a table of prices to be paid to municipalities for each surveillance or control procedure undertaken.

Training was considered a high priority by FUNASA. A number of excellent programs were created at the state and federal level to attempt to meet the need for training in disease surveillance and case investigation. Nevertheless, these programs were generally limited in size or duration. In addition, there was a high staff turnover: many of the individuals trained left the public health system.

FUNASA developed five major data management systems, in use at each of the federal, state and municipal levels:

1. Live birth certificates and natality reporting (\textit{Sistema de Informação sobre Nascidos Vivos} or SINASC).
2. Notifiable diseases reporting (SINAN).
3. Death certificates and mortality reporting (\textit{Sistema de Informações sobre Mortalidade} or SIM).
4. Hospital discharges (SIH-SUS).
5. Ambulatory care data (SIA-SUS).

Each system had standardized forms - birth certificates, death certificates, and disease notification forms- which were incorporated into computer-based systems. SINASC and SIM data were submitted to DATASUS in Rio de Janeiro, whereas SINAN data went to CENEPI in Brasilia. Very few jurisdictions were able to transmit data electronically. Municipalities sent data by paper forms or on computer disks to the state or regional health department, which in turn sent data to the national agencies on computer disks. DATASUS produced CD-ROMs of birth data and mortality, and made simplified data sets available on the Internet. The National Health Information Network

\textsuperscript{14} Loan 2931-BR, January 19, 1988.
\textsuperscript{15} Document entitled “FUNASA - The Ministry of Health in transformation” (“FUNASA - Ministerio da Saúde em movimento de transformado”).
\textsuperscript{16} The fundamental principles of FUNASA decentralization process were instituted by the Constitution - article 198- and by law 8080 of September 19, 1990.
Development Assistance to Health Information Systems Strengthening

(Rede Nacional de Informações de Saúde or RNIS), supported under the WB-financed Health Sector Reform Project (REFORSUS Project), assisted the five systems listed earlier by providing Internet service to all municipal health departments and public health laboratories.

In 1997, there was no national system for recording laboratory findings similar to the role of SINAN in disease reporting. The laboratories at the various layers of government either had developed their own computer systems, or they continued to record results by hand.

Other organizations within FUNASA had created additional disease-specific systems, such as those for leprosy, malaria, and tuberculosis. As a result, the centralized disease surveillance system, largely limited to communicable diseases, consisted of a series of parallel vertical disease-specific surveillance programs that were independent of each other. These systems differed from the main five listed above in that they were used to follow patients longitudinally rather than to report individual events. This led to duplicative work.

In 2003, the newly elected government of President Lula restructured the MOH and created a new Secretariat for Health Surveillance (Secretaria de Vigilância de Saúde or SVS) -apart from FUNASA- responsible for disease surveillance and control, taking over CENESIP's functions. This reflected the MOH's commitment to link surveillance to disease prevention and control. Since 2003, most of these activities - previously fragmented and located in various MOH secretariats and agencies- are integrated within SVS. They include all communicable diseases control programs such as EPI, tuberculosis, leprosy, hepatitis, HIV/AIDS and STIs, malaria and other vector-borne diseases, rabies and other zoonotic diseases. In addition, SVS is developing new areas of surveillance of non-communicable diseases and injuries, exposure to risk factors, as well as maternal and infant mortality. The creation of SVS practically ensures political, financial and institutional sustainability of disease surveillance and control. The new government's commitment to continued improvement in diseases surveillance at the state and municipal levels is also strong.

Indigenous population health

The second objective of the VIGISUS Program was to improve health services for indigenous people.

According to the 2000 census, Brazil's indigenous population is estimated at 702,000 people, consisting of 210 ethnic groups speaking 170 languages. They reside in all but two states -Piaui and Rio Grande do Norte-, mainly in 579 indigenous reservations that occupy about 12% of Brazil's territory. An estimated 3,370 indigenous communities exist. Approximately 70% of indigenous people live in the states comprising the Amazonian Region. Moreover, an estimated 50,000 Indians

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17 Through Decree Nº 4726 of June 9, 2003
18 This new structure is placed in the context of constitutional amendment Nº 29, which has contributed to stability of health financing resulting in an estimated 26% increase in financing between 2001 and 2004. Also, the MOH has demonstrated strong budgetary commitment to health surveillance and indigenous health, registering real increases of 27 and 24% respectively between 2000 and 2003.
19 Acre, Amapa, Amazonas, Goias, Maranhao, Mato Grosso, Para, Rondonia, Roraima, and Tocantins.
reside in Brazil’s largest urban areas\textsuperscript{20}. Changes in the health profile of indigenous groups have occurred over a relatively short period of time. Medical anthropologists hypothesize that Amazonian Indians suffered a reversal of the epidemiological transition with the arrival of Europeans. Prior to colonization, Indians’ health problems resulted mainly from chronic diseases. With colonization came the arrival of transmissible diseases such as tuberculosis, smallpox, malaria and yellow fever. Currently, Indian populations suffer from all phases of the epidemiological transition: much of the burden of disease results from communicable diseases, but they are combined with degenerative illnesses, as well as alcoholism and suicide. Infant mortality is decreasing and may relate to improved access to basic care. However, the magnitude of the decrease is unknown due to data limitations.

According to the Constitutional Law, the federal government has the mandate to protect indigenous population, safeguard their cultural and social organization, and guarantee their access to land and productive assets. Since 1991, FUNASA and the National Indian Foundation (Fundação Nacional do Indio or FUNAI) share the responsibility for providing health care to the indigenous peoples. In principle, FUNASA focuses on prevention and control of diseases, and FUNAI focuses on primary care and treatment.

In 1999, the legal framework for an Indigenous Health Subsystem (SIS) was created\textsuperscript{21}, and it mandated the federal government to directly finance all public health, preventive and medical interventions for indigenous groups. It also mandated indigenous participation in the development and implementation of the subsystem, as well as a system design that is sensitive to social and political organization, customs, languages, beliefs and traditions. The same year, the SIS institutional framework was created\textsuperscript{22}, and it delegated to FUNASA responsibility for creating surveillance systems, expanding access to preventive, promotional and curative care, and establishing an organizational and governance framework. In 2002 the MOH approved the National Indigenous Health Policy\textsuperscript{23}, which recognizes a differential model of health service organization and delivery through the creation of the SIS\textsuperscript{24}, to supplement the SUS service system.

\textbf{iii. Intervention}\textsuperscript{25}.

The Brazil Disease Surveillance and Control Program (VIGISUS), initiated in 1998, is a 600 USD million Adaptable Program Loan (APL), designed to strengthen the national disease surveillance and control system to contribute to the reduction of disease burden resulting from communicable as well as non-communicable diseases and risk factors in this country. This is the first WB-financed program entirely dedicated to the development of a disease surveillance and control system. It supports the objectives of the Brazilian Country Assistance Strategy (CAS) by assisting the

\textsuperscript{20} Particularly in Manaus, Manacapuru, Campo Grande, Dourados and Aguas Belas.
\textsuperscript{21} Through Law 9836.
\textsuperscript{22} Through Decree 3,156.
\textsuperscript{23} through Regulation Nº 254.
\textsuperscript{24} The implementation of the SIS involved the creation of 34 Special Indigenous Health Districts (DSEIs), with their respective district councils designed to ensure effective social control.
\textsuperscript{25} Information cited in this section is sourced from the following WB documents: WB PAD VIGISUS 1998, WB PAD VIGISUS II 2004, WB ICR VIGISUS I 2004.
government in improving the quality of the public health care system that serves the poor -by strengthening the disease surveillance system and by improving health services for indigenous people and Quilombo communities-. Furthermore, this program objectives are closely aligned with priorities related to the achievement of the Millennium Development Goals (MDGs) in Brazil. It directly contributes to the achievement of goals for reducing infant mortality, combating communicable diseases, improving maternal health and empowering women.

The VIGISUS Program complements a group of government actions to: (i) improve the detection, notification and response to specific diseases and health events, (ii) evaluate public health practices, and (iii) apply information and analysis to prevention and control interventions. This program consists of three projects phased in over more than ten years, in order to assist the government of Brazil in: (1) the improvement of the data management telecommunications system; (2) the rehabilitation of the public health laboratory network; and (3) the training of disease surveillance staff at the federal, state and municipal levels. Appropriately, the program does not focus on vertical disease-specific systems, but rather aims at strengthening the institutional infrastructure and human resource capacity necessary to address priority diseases. In addition, the program supports disease prevention and control in the Amazon Region and for indigenous populations.

The activities proposed under this program are the constitutional obligation of the federal government, which consistently transfers part of the funds to states and municipalities to allow its implementation without increasing the financial burden at the peripheral level. The first project of the program, VIGISUS I, was negotiated and signed in 1998. However, it was not until 1999 that the decentralization process in Brazil moved into full implementation and the transfer of resources from the federal government to the states -called Fund to Fund (Fondo a Fondo)- began.

The objective of the VIGISUS I Project was to develop and test a viable framework for the new national surveillance system (NSS). It was considered that once the system was strengthened, its activities would lead to reductions in the incidence and prevalence of communicable diseases. The VIGISUS I Project consisted of three components:

1. Strengthening the national diseases surveillance system through: (i) improvement of the data management telecommunications system, particularly at the municipal level -states, municipalities and other institutions would present subproject proposals-; (ii) rehabilitation and equipping of the laboratory network; (iii) training of municipal, state and federal staff in epidemiology; (iv) support for studies and operational research in epidemiological surveillance; and (v) provision of technical assistance to help municipalities and states in subproject preparation, appraisal, supervision, and procurement. The surveillance component accounted for 71.5% of project costs.

2. Strengthening disease control in selected areas through: (i) enhancement of disease surveillance and control in the Amazon Region -through rehabilitation and equipping of public health laboratories and other facilities, training of community health agents and health officials, and provision of technical assistance-; and (ii) improvement of indigenous health in all states with a significant indigenous population -through rehabilitation and equipping of health centers and posts adapted to the indigenous culture, training of indigenous health agents, and provision of technical assistance-. Regarding
subcomponent (i), the government targeted six endemic diseases with a high epidemic potential, case-fatality rate, and available cost-effective control measures: malaria, tuberculosis, leprosy, leishmaniasis, hepatitis B, and dengue. This component accounted for 22% of project costs.

(3) Project administration, including the administrative and operating costs of the Project Coordination Unit (PCU), which coordinated project implementation and provided support to sub-national levels for the implementation of subproject activities. This component accounted for 7.5% of project costs.

As mentioned, Component 1 included a demand-driven fund-like subcomponent, designed to enable the states, municipalities and other institutions to prepare projects for organizing their health surveillance areas. The projects were to provide for the procurement of equipment and vehicles, construction and renovation of physical structures, staff training and hiring of consultants. The funds were transferred through agreements (convenios) concluded between FUNASA and the requesting party.

Since low technical and managerial capacity in some of the states or municipalities was an issue - ranging from limited experience in analyzing local health problems to knowledge of WB procurement and contractual procedures - State Implementation Units (Unidades Apoio Técnico or UATs) were created within the State Secretariats of Health in order to provide assistance to municipalities.

The provision of resources and assistance to the states and municipalities under VIGISUS I was less successful than expected, mainly due to two problems. First, the use of convenios as financial instruments to transfer resources from the federal government to state and municipal governments was extremely inflexible, in part due to the lengthy time required to develop and sign them, WB procurement rules that were different from Brazilian rules and not understood by the states or municipalities, and weak management capacity at the state and municipal level resulting in the slow execution of resources. Often, by the time a convenio was approved, the state had decided to purchase the agreed items using resources from Fondo a Fondo. Second, the investments financed by the convenios happened to be fragmented and not placed in the context of a coherent plan to develop surveillance and disease control at the state and municipal levels, but rather used the financing in an unsystematic way to make large purchases and fund training. Furthermore, the lack of an effective M&E system for this activity seriously limited the ability to evaluate the investments made and to assess the impact that they may have had on state and municipal strengthening.

Over 1,700 proposals and 284 convenios were received and analyzed by the FUNASA/PCU team during the project period. Given this demand and the need for additional support to the sub-national entities, a team of experienced consultants (monitores) was hired to provide assistance to the UATs. The monitores played a significant role in accelerating the analysis and processing of convenios. By June 30, 2004, sub-project agreements with states and municipalities totaled approximately 54.1 million USD.

Given the satisfactory achievement of outcomes under VIGISUS I, the second phase of this program, VIGISUS II, was approved in May 2004. The approval of the second phase was based on the achievement of the trigger indicators as follows:
(1) Four of the seven trigger indicators for passage to Phase II were fully achieved or surpassed: 138 candidates were trained under the “Basic Principles of Outbreak Investigation”, 1,576 superior-level and 1,632 mid-level staff were trained in laboratory bio-safety, 2,730 indigenous community health agents were trained, and data and coding standards for the NSS were properly defined and applied in all states.

(2) One indicator was revised and fully achieved: laboratory module associated with a new Disease Notification System (Sistema de Informação de Agravos de Notificação or SINAN) was implemented for two diseases -acute flaccid paralysis (AFP) and yellow fever- in 24 state laboratories.

(3) One was partially achieved: as of July 2004, seven BSL3 laboratories were fully completed, two had blueprints completed and awaited construction, and two were being designed.

(4) One was not achieved: while some states met or surpassed the target of increasing by at least 10% the number of cases of tuberculosis cured in the Amazon Region, the overall percentage of cases cured did not increase.

In addition, nine out of ten process indicators were achieved or surpassed -with two having been revised-, concerning different areas:

(1) Strengthened policy and strategic planning: all states had key personnel trained in: (i) Field Epidemiology Training -21-, (ii) Data for Decision Making -23-, (iii) Public Health Fellowships -27-, (iv) Management Training -60-.

(2) Financial resources and support services to states and municipalities in place in order to sustain and improve NSS: all states and 87% of municipalities were certified to receive direct transfers of funds for disease surveillance under the SUS, and all states and one third of municipalities were equipped with computers and printers to use NSS information systems.

(3) Public health laboratories network under rehabilitation and construction: 12 border laboratories were constructed and equipped.

(4) A coordination mechanism to ensure the participation of private doctors: the following committees were officially formed with private and public sector representation: Technical Committee on Immunizations; Permanent Commission on Environmental Health; Technical Committee on Prevention and Control of Malaria; Technical Committee on Control of Dengue; and National Coordinating and Implementing Committee to Mobilize against Dengue.

(5) Disease control strengthened in the Amazon Region: 25 professionals were trained in health vigilance, 238 municipal managers were trained in control of epidemics, 503 professionals were trained to act as local trainers for control of leishmaniasis, 16,478 community health agents were trained in disease control.

The VIGISUS program was designed against a backdrop of decentralization of the Brazilian health system, from the federal level to states and municipalities, as a result of the adoption and implementation of the constitutional guidelines for the SUS. The program was formulated with the aim of structuring the disease surveillance system in the central level and in the states and municipalities, to enable them to meet the information demands imposed by the decentralization process. This first phase of the VIGISUS Program succeeded in strengthening institutional infrastructure and technical and managerial capacity, particularly at the federal level, thus positioning it well for its second phase, which puts a much greater emphasis on strengthening state and municipal capacity.
The second phase of the program, the VIGISUS II Project, is a continuation of the first phase with minor adjustments in the program concept. The project objectives are:

1. To continue to strengthen the national public health surveillance and disease control system for communicable diseases and environmental health, particularly in states and municipalities.
2. To improve and broaden the scope of public health surveillance and disease control, to include non-communicable diseases, risk factors, injuries and maternal/child health.
3. To expand access to and utilization of health services to indigenous populations.
4. To improve the effectiveness of indigenous health care through institutional development, quality enhancement and cultural appropriateness.
5. To expand water and sanitation services to rural Quilombo communities.

The VIGISUS II Project consists of three components:

1. Public health surveillance and disease control, divided into four subcomponents:
   a. Surveillance and control of communicable diseases: strengthening of the National Public Health Surveillance and Disease Control System through: (i) strengthening of the public health laboratory network, (ii) improvement of the quality and utilization of information obtained through the mandatory disease notification system (SINAN) to control communicable disease, (iii) improvement of capacity in communicable disease surveillance and control through training and research, (iv) expansion of hospital-based communicable disease surveillance with a focus on emerging and reemerging infections, (v) guarantee of the cold chain to ensure the quality of vaccines, (vi) expansion of activities to control vector-borne disease, (vii) improvement of management capacity of SUS institutions responsible for disease surveillance including ability to respond to emergencies, (viii) improvement of dissemination of communicable disease surveillance information and capacity in social communication, and (ix) improvement of social participation in disease prevention and control.
   b. Environmental Health Surveillance: strengthening of the implementation of the National Environmental Health Surveillance System (SINVAS) through: (i) strengthening of the National Environmental Health Surveillance subsystems for water, air and soil quality, (ii) structuring of national subsystems related to hazardous substances, biological and physical factors, chemical accidents and natural disasters, (iii) creation of a National Environmental Health Laboratory Network, (iv) development of an information system for environmental health surveillance and indicators to evaluate control activities, (v) increase of scientific and technological capacity, (vi) support to national policy development for environmental health, (vii) development of activities within primary care that help create healthy environments, (viii) promotion of social mobilization and community education in high risk areas, and (ix) improvement of mechanisms that promote intra- and inter-sectoral activities.
   c. Health situation analysis: strengthening of operational and technical capacity to carry out health situation analysis, monitoring, prevention
and control of non-communicable diseases through: (i) improvement of coverage, quality and utilization of vital statistics with a focus on maternal and infant mortality, (ii) improvement of capacity to carry out health situation analyses, including GIS, vital statistics, health program evaluation, and analysis of inequities in health, (iii) strengthening of the nascent non-communicable disease and risk factor surveillance system, (iv) development of an injury surveillance system, and (v) improvement of dissemination and social communication related to health promotion and risk factor prevention.

d. Strengthening institutional capacity in states and municipalities: financing of approximately 200 subprojects in order to strengthen: (i) state capacity to organize, manage and monitor surveillance and disease control systems, and provide systematic support to all municipalities, and (ii) municipal capacity to perform the essential functions of surveillance, including data collection, analysis and dissemination.

(2) Indigenous health, divided into four subcomponents:

a. Institutional capacity strengthening through: (i) extension of basic care coverage to underserved indigenous communities; (ii) improvement of the technical quality of public and private providers serving indigenous communities; (iii) development and implementation of a performance-based management system; (iv) strengthening of governance mechanisms at the sub-regional level in order to decentralize decision-making authority, and (v) strengthening of health surveillance systems while introducing M&E methodologies to systematically assess the structure, processes and impact of the Indigenous Health System (SIS).

b. Special health needs of indigenous populations: development and implementation of research, strategies, and targeted interventions in order to understand and reduce the causes of malnutrition, alcoholism and suicide among indigenous populations, while integrating traditional and modern medical practices appropriately.

c. Fund for Indigenous Community Initiatives (FUNCOMIN): promotion of indigenous communities driven health activities by providing financial support -thought grants- to 150 small subprojects led by indigenous organizations. Eligible activities include community kitchens, promotion of traditional healing practices, training and equipping of midwives, breastfeeding promotion, women support and mutual help groups.

d. Water and sanitation for Quilombo communities: installation, expansion and upgrading of water supply and sanitation systems for dispersed rural hamlets and individual residences to ensure basic access to appropriate water supplies and sanitation facilities for approximately 3,750 families residing in 150 localities in 52 municipalities.

(3) Project management: two implementing units were created, one in SVS (PIU/SVS) in charge of the implementation of Component 1 -health surveillance-, and one in FUNASA (PIU/FUNASA) in charge of the implementation of Component 2 -indigenous health-. The main responsibilities of these units include: (i) overseeing and monitoring project implementation; (ii) providing technical and administrative assistance to the participating municipalities; (iii) administering project activities, including procurement, agreements, contracts and transfer of funds to implementing agencies.
Based on the experience gained concerning the subproject of Component 1 of the VIGISUS I Project, the government and WB teams opted to develop a special pooled funding instrument, the *Teto Financeiro de Epidemiologia e Controle de Doenças* (TFECD), in order to finance health surveillance subprojects under subcomponent D of Component 1 of the VIGISUS II Project. TFECD funds are transferred from FUNASA to common bank accounts -known as State and Municipal Health Funds (*Fondo Estatal de Saúde* and *Fondo Municipal de Saúde*)- in each participating state and municipality. Based on Surveillance Development Plans (PLANVIGI) submitted by the states and municipalities, a pool of financing is dimensioned in state and municipal Health Funds consisting of both WB and government financing. Moreover, a performance-based financing feature was introduced into this subcomponent, in which a proportion of loan proceeds is tied to achievement of benchmarks by participating states and municipalities, in order to introduce a new results-oriented accountability into the public system. Subprojects consist of activities in one or more of the following activity areas: institutional development, epidemiological surveillance and disease control, environmental surveillance, situation analysis, upgrading of technical skills.

The trigger indicators selected to move from phase II to III are:

1. 70% of cases notified through SINAN, except dengue, are investigated and files closed within time frame established in SVS guidelines.
2. 50% of municipalities prioritized by the tuberculosis control program are providing DOTS in at least 50% of health care units.
3. 60% of states and capital cities are disseminating bi-annual, consolidated reports of water quality surveillance that include responses to problems encountered.
4. 70% of capital cities have carried out a school-based adolescent behavioral risk factor survey.
5. Formal evaluation of every state surveillance system and institutional capacity has been completed and results have been disseminated.
6. 50% of NGO and municipal indigenous health providers are operating under performance-based contracting scheme.
7. 60% of indigenous population is covered with complete vaccination regimen.

In addition, the VIGISUS II Project defined a set of intermediate indicators, which includes:

1. 40% of cases of bacterial meningitis are confirmed by laboratory analysis.
2. 90% of deaths are notified to vital statistics.
3. 50% of states calculate a valid infant mortality rate using vital statistics.
4. Environmental health surveillance subsystems for water, air and soil are fully developed at the national level.
5. 70% of states have prepared career plans for health surveillance professionals.

The third and final phase of the program, expected to commence in 2008, will support the consolidation of the NSS and the SIS. Expected results include:

1. States submit regular weekly reports for mandatory disease notification and are carrying out timely investigations and control activities of key communicable diseases.
2. A national reference laboratory is constructed, and the public health laboratory network is effectively linked to the disease reporting system.

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(3) 70% of states have developed a system for surveillance of non-communicable diseases and their risk factors, as well as injuries, and are carrying activities to prevent them.

(4) 90% of deaths are registered in the vital statistics system.

(5) Municipalities have adequate capacity to carry out disease surveillance and control activities.

iv. Main national and international actors involved, and their contribution to the intervention.

The main actors in the design and implementation of the Brazilian national disease surveillance system (NSS) are this country’s governmental organizations. The federal government, working in close collaboration with a WB team, took the lead in project identification, preparation and appraisal. States and municipalities were consulted through their representatives in the National Health Council (CNS), the National Health Council of State Health Secretaries (CONASS), and the National Health Council of Municipal Health Secretaries (CONASEMS). The VIGISUS Program was even included as a government priority in the 1998 President’s Message to Congress. Consultation workshops also included academic institutions, NGOs and leaders from indigenous communities.

Until 2003, the organization in charge of the coordination of the implementation of the NSS was the National Center for Epidemiology (Centro Nacional de Epidemiologia or CENEPI), and agency within FUNASA. In addition, FUNASA had offices in each of the states, responsible for the implementation of surveillance activities at the state and municipal levels. That year, the newly elected government of President Lula created the Secretariat for Health Surveillance (Secretaría de Vigilancia de Saúde or SVS), that took over CENEPI's functions. Currently, SVS is the central agency in charge of most disease surveillance activities.

This program is largely a reflection of the commitment and vision of the Brazilian government, who secured a 300 million USD investment in order to ensure the sustainability of the NSS. In addition, Brazil receives financial support to implement this program from the WB, through a 300 million USD loan disbursed in three phases. In fact, VIGISUS is the first WB-financed program entirely dedicated to public health surveillance.

During VIGISUS I, a WB task team worked closely with CENEPI, providing valuable inputs into the project and harmonizing country activities with global health standards. Since disease surveillance and control involves sophisticated technical issues, the WB successfully partnered with PAHO and CDC. Technical experts from these two institutions participated in project preparation and supervisory missions.

During the first phase of this program, FUNASA also received support from UNDP and UNESCO, who assisted in administrative and procurement processes to facilitate the hiring of consultants and contracting of services for training of professionals, studies and operative research.

Collaboration with CDC and with Brazilian training centers -including the Federal University of Bahia and the Oswaldo Cruz Foundation of Rio de Janeiro- is
enabling the implementation of major training efforts, such as: Training Program in Applied Epidemiology for SUS staff (EPI-SUS) and Data for Decision-Making (DDM).

v. Impact: Success and limitations\(^\text{26}\).

Successes of VIGISUS I

The first phase of the VIGISUS Program, completed in 2004, focused on improvements in the processes involved in disease surveillance and control, rather than on the actual health outcomes. Despite the fact that an impact on health outcomes was not expected by the end of VIGISUS I, in fact, there was a reduction in morbidity and mortality in Brazil during this time period, including a profound reduction in incidence of malaria, measles and rabies, and an increase in the number of leishmaniasis cases reported -an important first step in bringing this disease under control-.

VIGISUS I had a clear impact on improving infrastructure, fostering more efficient processes through improved communication and information technology, and building capacity. This first phase of the VIGISUS Program succeeded in strengthening infrastructure and capacity, particularly at the federal level, thus positioning it well for its second phase, which was approved in May 2004, where there is a much greater emphasis on strengthening state and municipal capacity.

As previously mentioned, both trigger and process indicators were mainly satisfactorily achieved, particularly those related to training of staff, which was a very important element of VIGISUS I. Large numbers of staff, at many different levels of professional development, were trained in a variety of aspects of epidemiology and management. VIGISUS I also financed a very successful collaboration with CDC that included training in applied epidemiology and data for decision-making.

Concerning Component 1 -Strengthening of National Surveillance System-, the data management telecommunications system was upgraded and modernized and, by the end of the project, all states and 4,950 out of the 5,000 municipalities were providing surveillance information -disease occurrence, investigation, confirmation, and control activities- for conditions on the mandatory disease notification list on a monthly basis. All states and 1,300 municipalities were using a SINAN Windows-based system and reporting by e-mail, others were mailing in diskettes. These upgrades have produced timely information and have increased the likelihood of timely disease control interventions.

The public health laboratory network was also modernized. By the end of the project, a laboratory information system for reporting two notifiable diseases -AFP and yellow fever- was piloted, 11 border laboratories were built and equipped, 23 state laboratories were upgraded to BSL2, and 7 laboratories were upgraded to BSL3.

Another major achievement was the establishment of an environmental health surveillance system, which had not previously existed in Brazil. The system began by

developing water quality surveillance (SISAGUA) that was fully implemented in all states and many municipalities by the end of the project. Reporting is now taking place and work is being carried out to ensure that information collected is utilized to improve water quality and prevent water-related diseases. Air and soil quality surveillance also begun to be established in several key areas.

When it comes to Component 2 -Strengthening of Disease Control in Selected Areas-, the project surpassed all expected outputs and was essential in the development of a participatory indigenous health system.

Timeliness of health data improved by reducing the sub-notifications of mortality and live births in the following regions: North\textsuperscript{27}, Northeast\textsuperscript{28} and Center-West\textsuperscript{29}, these being the regions in which there were the greatest notification problems. The SINASC coverage increases were smaller, probably because that system was already more efficient in 1999. Furthermore, the lag in publication of the data from the SIM and SINASC databanks got reduced from 24 months to 12 months, and a location was developed within the system site in order to publish technical data for professionals and the general public, as well as the SUS Epidemiological Report - financed for two years with VIGISUS funds-.

Malaria activities, expected to be financed under VIGISUS I, were instead primarily financed by the government, which launched a massive malaria control effort during this time period. This effort was highly successful with a reduction in malaria incidence of nearly 50% by 2002. Since the government invested heavily in this effort, the results cannot be attributed to VIGISUS I. However, the project did contribute to the positive outcome by providing resources for training and computer technology. The leishmaniasis program also showed an initial increase in the number of cases identified and treated after training activities. In the case of American tegumentary leishmaniasis 10,000 cases were notified in 2000 and 37,000 in 2002. Hepatitis B vaccination made good progress, and by 2003 coverage for infants in the nine Amazon states had increased. All but one state had coverage levels of 85% or better. Furthermore, VIGISUS I contributed to the eradication of polio and plague (in 2001) and cholera (in 2002), and to the elimination of chagas disease in 10 out of 12 states where infection was prevalent.

The improvement of indigenous health subcomponent was one of the most successful activities of the project and contributed to defining the institutional framework for the management and oversight of an expanded service delivery system and public health surveillance in indigenous areas.

During the project, the SIS was developed, organized, and implemented with remarkable success, thereby creating a sustainable foundation for continued improvements to indigenous health. Supported by VIGISUS I investments, many communities currently benefit from regular access to basic care. Furthermore, the project established an indigenous health information system -including data on

\textsuperscript{27} Increase of 24% in the capturing of total deaths from 1999 to 2002 by the SIM, and of 11.8% in the capturing of live births by the SINASC in the same period.

\textsuperscript{28} Increase of 18.4% in the capturing of total deaths from 1999 to 2002 by the SIM, and of 3.1% in the capturing of live births by the SINASC.

\textsuperscript{29} Increase of 12.1% in the capturing of total deaths from 1999 to 2002 by the SIM, and of 3.9% in the capturing of live births by the SINASC.
Development Assistance to Health Information Systems Strengthening

demographics, births, mortality, observed morbidity, sanitary practices, garbage disposal, access to potable water, housing, and immunization coverage - registering nearly all of the indigenous population.

There are suggestions that project investments translated into improvements in indigenous health with declines in malaria, tuberculosis, and immune-preventable diseases. However, the magnitude of improvements in indigenous health status was impossible to gauge because the information systems did not become operational until after 2000 and, therefore, baseline intervention data are non-existent.

The VIGISUS I Project had also a substantial impact in institutional development in both the areas of public health surveillance and indigenous health. In 2003, the newly-elected government restructured the MOH and created the Secretariat for Health Surveillance (Secretaría de Vigilancia de Saúde or SVS) responsible for disease surveillance and control, in part due to CENEPI's achievements - with support from VIGISUS I-. The VIGISUS I Project contributed to the MOH's understanding of the importance of surveillance as a source of health intelligence and to its current strategic placement closer to health policy-making. Moreover, it helped the government in its transition from health care provider to health care regulator by strengthening health system management capacity in the area of surveillance and disease control. Currently, the municipalities and the 27 states are responsible for the performance of disease surveillance and control actions, while the central authorities have responsibility for policy formulation and establishment of rules and standards, but only serve as executing agencies when so needed to complement the states' limited resources.

During this time, the government invested heavily in these activities and, therefore, the result cannot be attributed solely to the project. However, the project contributed to these positive outcomes by providing resources for training, laboratories, and communication.

The VIGISUS Program is considered by all stakeholders, including the WB, as a successful case of national disease surveillance system development. It has generated considerable knowledge and experience at the WB, which can be applied to other projects in this important field. In fact, the public health surveillance system project in Argentina is benefiting from Brazil's experience.

Limitations of VIGISUS I

Although the implementation of all components of the VIGISUS I project was considered to be successful, it was also faced with several challenges and constraints regarding the upgrade of laboratories, tuberculosis control, WB procurement rules, enhancement of public academic institutions, and retention of qualified staff in the system.

The difficulty in achieving the laboratory bio-safety level trigger indicator - upgrade of nine laboratories to BSL3 - suggested that this objective was too ambitious. However, given that there was very little WB experience in this area, it would have

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31 Loan 4516-AR, approved in November 2000.
been difficult to predict the technical and operational complexities encountered in the rehabilitation of these laboratories. Despite this challenging learning process, Brazil succeeded in upgrading seven of these labs to BSL3, and the lessons learned from this experience are currently being applied in Argentina where a WB-financed project is also supporting laboratory upgrades to BSL3.

The tuberculosis trigger indicator was not met either. It was hampered by the fact that shortly after VIGISUS I was launched, the tuberculosis program was unexpectedly moved out of CENEPI and into the MOH / Primary Care Department. This clearly contributed to difficulties in the implementation of tuberculosis monitoring activities and to the achievement of the trigger calling for a reduction of 10% in the number of tuberculosis cases in the Amazon Region.

The use of convenios for the provision of resources and assistance to the states and municipalities for the development of subprojects was very dysfunctional. It required that 26 states and the federal district, as well as multiple participating municipalities, sign agreements with the national level. In some cases this formality took up to a year. Furthermore, once the convenios were signed, the participating states and municipalities were required to learn an entirely new set of WB procurement rules. This contributed to an extremely slow start in disbursing to the subprojects. Furthermore, the absence of a system for monitoring the implementation of the project at the state and municipality levels made it very difficult to ascertain the outputs achieved by the implementing agencies. The other lesson learned was the importance of a coherent public health surveillance development plan at the state level to prioritize investments and avoid fragmented purchasing.

Enhancing disease surveillance requires strengthening of public academic institutions, which have developed expertise in particular areas of public health. In the case of Brazil, the original procurement arrangements failed to define the exact participative role of the many institutions that are developing technologies and studies to enhance disease prevention and control. As a result, the project did not sufficiently take this into account, and several activities related to development of networks and operational research were never executed. When investing in disease surveillance, it is important to ensure that there is adequate flexibility in the legal agreement to permit subsidies to a variety of public institutions.

The PCU’s performance was affected by high turnover of qualified staff and the constant need to recruit and train new staff, due to the on-going competition with similar PCUs in other externally-funded projects, which offered better salaries. The project did not have an incentive scheme in place to retain project-trained health professionals. The high turnover was particularly severe in the Amazon Region where the municipalities had difficulty retaining health professionals partly because of difficult living conditions in these areas, and/or because these professionals were often not from the area and sought better employment opportunities in their place of origin or in more desirable larger urban centers. To prevent the continuous dismembering of the PCU and Units within FUNASA, the salary issue was discussed several times with FUNASA authorities during WB supervision missions, and was attenuated after the mid-term review with the hiring of the monitores, and FUNASA’s effort to marginally improve the salary scale of the PCU staff.
In addition to the high turnover as mentioned above, during the project period, there were elections at the federal and sub-national levels leading to changes of the health minister, the head of FUNASA, and state and municipal health secretaries. While none of these transitions affected the basic project design, they often resulted in changes in key staff working on the project, with the concomitant need to train new staff, deceleration in project execution, and even changes in project implementation strategy.

Project implementation was affected by the substantial fluctuation of the Brazilian currency. This fluctuation required substantial flexibility from the project’s financial team, which had to adjust to a strengthening dollar by re-programming project investments and spending more to ensure adequate disbursements, and then adjusting as the dollar weakened. The significant depreciation of the local currency resulted in the government needing substantially higher levels of counterpart funding than originally estimated during appraisal. In addition, Brazil’s monetary policy - negotiated and agreed with the IMF- established tight budget controls that limited the amount of resources allocated to government expenditures, including transfers to FUNASA and the project. Furthermore, legislation establishing limits in expenditures for externally-funded projects was passed. This situation led to a government request for cancellation of 25 million USD -25% of the loan- in January 2003 and another 8 million USD -8% of the loan- in December 2003, as well as non disbursement of 8.8 million USD at the end of the project.

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32 Between project appraisal in March 1998 and closing in June 2004, the Real to US Dollar exchange rate increased from R$ 0.91 to R$ 3.11, reaching a peak of R$ 4.03 in October 2002.
Case 3: Development of second generation surveillance system for HIV/AIDS in Indonesia.

Health information system
At the early stages of the pandemic, it was assumed that the epidemic would follow roughly the same course in all countries. But national HIV/AIDS epidemics are dynamic and too complex to fit into neat categories. UNAIDS/WHO developed in 2000 the Second Generation HIV/AIDS Surveillance system, aimed at producing essential data to inform decision-making about HIV prevention and care.

Geographical area and context
With over 220 million inhabitants of many different ethnic groups, Indonesia is the world's largest archipelagic state. It has a concentrated HIV/AIDS epidemic, as diverse as the nation itself. Early estimates of HIV prevalence, developed by a handful of epidemiologists within the MOH, produced numbers that ranged wildly from several thousand to a few million and were often criticized by Indonesians in other sectors.

Intervention
The government of Indonesia endorsed the principles of second generation surveillance in May 2001. In 2002, its MOH began an interdisciplinary process at the national level to develop a pioneer second generation surveillance system. The most relevant achievement of the described process was the consensus-based establishment of most at risk populations (MAPs) and methods for estimating the size of these groups.

Main national and international actors involved
This was a very participatory process led by the Directorate General for Communicable Disease Control and Environmental Health, and involved the contribution of many other government departments and NGOs. International experts such as from WHO/SEARO, UNAIDS and the Ease-West Centre Hawaii University provided technical assistance at the final stages. This process was financially supported through the USAID-funded Aksi Stop AIDS program.

Impact
Indonesia's experience demonstrates that it is possible to make HIV estimates in a huge geographically, culturally and epidemiologically diverse country. This system, which currently covers most of the major MAPs, has led to a more robust understanding of the Indonesian epidemic. Furthermore, this process brought together diverse actors who had not been in contact previously.
i. Health information system.

National HIV/AIDS epidemics are dynamic: what is true in one region is not necessarily true in another, and what was true two years ago may no longer be true this year. At the early stages of the pandemic, it was assumed that the epidemic would follow roughly the same course in all countries. Later, epidemics were described in two general patterns: driven by homosexual men and/or injecting drug users (IDUs), and largely heterosexual epidemics. But HIV is too complex to fit into these neat categories. In some countries, the virus has remained contained in small, well-defined subpopulations. In others, it has spread from those sub-populations to a larger population of sexually active adults. In still others, there are several simultaneous patterns (UNAIDS/WHO 2000).

In the early years of HIV/AIDS surveillance, systems tracking the epidemic focused largely on monitoring the spread of the virus through sentinel surveillance - mainly covering pregnant women and blood donors-, or relied on AIDS case report. In generalized epidemics, the prevalence of HIV among pregnant women attending antenatal clinics can be, after some adjustments for age, sex and urban and rural distribution of the population, applied to all adults in the country (UNAIDS/WHO 2004). But when it comes to concentrated epidemics, unless a specific effort is made to search out sub-populations at high risk of infection -such as sex workers and their clients, IDUs, men who have sex with men (MSM), and STI patients-, the epidemic may spread significantly before it is detected.

In response to the weaknesses of the existing HIV/AIDS surveillance systems, the UNAIDS/WHO Working Group on Global HIV/AIDS and STI Surveillance developed in 2000 a new methodology to monitor HIV infection called the Second Generation HIV Surveillance. The new system aims to build on and strengthen existing surveillance systems. The main objective of second generation surveillance is to monitor HIV trends over time in order to provide essential data for the better understanding of epidemics, the development of interventions and the evaluation of their impact (UNAIDS/WHO 2000).

Recognizing the heterogeneity of HIV epidemics around the world, the most important recommendation for second generation surveillance is that HIV surveillance systems should be tailored to the national epidemic profile in order to meet the information needs in the different countries. In concentrated epidemics, as it is the case in Indonesia, this means that surveillance systems should focus resources on tracking infection in sub-populations whose members are at high risk of contracting or passing on HIV infection. Behavioral data collection is a central part of second generation surveillance systems for HIV. Behavioral data should be used to identify which sub-populations are at risk of HIV infection and should also help explain trends observed in biological surveillance. Estimating the number of people living with HIV/AIDS in a country involves as well determining the size of those groups of people engaging in each of those high risk behaviors.

Another principle of second generation surveillance is that the process of strengthening HIV surveillance systems should involve consensus-building among the main stakeholders -including national AIDS programs, NGOs, academic institutions, and donors-, and should promote the integration in the system of as many reliable
data sources as possible -including surveillance for STIs and tuberculosis, as well as death registration systems- (UNAIDS/WHO 2002).

ii. Geographical area and context.

The Republic of Indonesia, the world’s largest archipelagic state, is composed of around 17,000 islands that stretch for around 5,000 kilometers -three time zones-, along the equator. With over 220 million inhabitants of many different cultures and ethnic groups, Indonesia is also the world’s fourth most populous country. Since sexual and drug-taking behaviors are influenced by culture, economy, religion and geography, the HIV epidemic in Indonesia is as diverse as the nation itself.

Moreover, this country is undergoing very rapid political, economic, and social change. Recent changes in population mobility and behavior have probably contributed to the spread of HIV, whereas changes in administrative structures have created challenges as well as opportunities in tracking risky behaviors and patterns of infection (UNAIDS/WHO 2004).

The Indonesian epidemic is still very new. Although the epidemic of HIV/AIDS in Indonesia reported its first case of AIDS two decades ago -in 1987-, in the late 1980s and through most of the 1990s, all HIV sero-survey data in Indonesia indicated that the country might be spared of the HIV epidemics that had begun to make important inroads into some other South-East Asian nations, such as Cambodia and Thailand. A cumulative total of 550 HIV-positive individuals -136 living with AIDS- had been reported to the MOH as of June 30, 1997 (UNAIDS/WHO 2004). But, at the very end of the 1990s, the sentinel surveillance and AIDS case reporting systems began to register significant rises in infection in some high risk population groups. For instance, sentinel surveillance in Jakarta, that included IDUs showed a rapid increase in HIV prevalence in the late 1990s; by 2001, one IDU in two was infected with the virus (Riono et al. 2004).

Early efforts to estimate the prevalence of HIV in Indonesia produced numbers that ranged wildly from several thousand to a few million, with little information about the distribution of infection across the country or among different groups of people. These estimates were based on very limited data and developed by a small handful of epidemiologists and other experts within the MOH, usually with the guidance of a specialist on a short visit from overseas. As a consequence, the resulting estimates were often criticized by Indonesians in other sectors -in particular, people living with HIV/AIDS, members of communities at risk of infection, and NGOs-.

After 32 years dominated by a military dictatorship, the democratic transition started very recently, in 1998. As part of these changes, the country is in the process of decentralizing decision-making and budget-management from the central level to the district and provincial authorities in the public health system. The decentralization of the response to the HIV/AIDS epidemic is also an ongoing process with increasing responsibilities shared among different levels of government (UNAIDS/WHO 2004).
iii. Intervention.

Recognizing the importance of improving the availability and quality of data to inform decision-making about HIV prevention and care, the Indonesian government endorsed the principles of second generation surveillance in May 2001.

In 2002, the MOH began a multi-step interdisciplinary process at the national level to develop a second generation surveillance system in Indonesia. At that time, there were few examples to follow from other large countries with concentrated epidemics: Indonesia was a pioneer country in the implementation of this process.

This process was led by the HIV/AIDS Sub-directorate within the Directorate General for Communicable Disease Control and Environmental Health -known locally by the acronym P2M-. Following the recommendations proposed by the second generation surveillance, they decided to include a wide range of partners. It was recognized that many government departments other than the MOH may have important insights and information to contribute. For instance, the National AIDS Commission is actively involved with populations engaging in risky behavior, and the Department of Social Affairs deals actively with sex workers, transvestites and drug users, and collects data on each of these populations. Since prevalence of HIV among prisoners has been increasing in these last years, it was felt that the prison service might have knowledge not usually accessible to public health officials. In addition, the police, the military and the drug enforcement agencies have the possibility to collect information that can be useful in the estimation of the size of populations at risk of infection. Organizations of people living with HIV or transvestite sex-worker organizations deal with HIV as a routine part of their work and lives, and often have a very good idea of the dynamics and the distribution of risky behaviors. Professionals from the ministry’s own research institute, universities, and prevention and care programs were also invited to participate in the process.

Several meetings were organized during the months of August and September 2002. In the first one, on 19 August 2002, participants were the working group of Surveillance of the P2M. A second meeting was conducted on 27-28 August 2002 and was attended not only by government officials but also by a broad spectrum of other national partners. Participants were divided into some groups that discussed the right methods to determine the prevalence of HIV in vulnerable subpopulations. A third national meeting was conducted on 11-14 September 2002. Attendants included participants from the previous meetings, as well as international experts such as from WHO/SEARO, UNAIDS, UNICEF, UNFPA, USAID, AusAID, and the East-West Centre Hawaii University.

One of the most relevant achievements of these meetings was the consensus-based establishment of the subpopulations that the second generation surveillance system should focus resources on. In lively discussion with a large variety of agencies, it was recognized that Indonesia hosts a great variety of subpopulations exposed to HIV through their behavior or that of their sex partners. The list of exposure categories finally was as follows: IDUs, regular partners of IDUs, female sex workers, clients of female sex workers, regular partners of clients of female sex workers, male sex workers, clients of male sex workers, regular partners of male sex workers, transvestite sex workers -waria-, clients of transvestite sex workers, regular partners of transvestite sex workers, MSM, prisoners, and street children. The discussion included
a debate about whether to include migrants as an exposure category. While it is
known that people away from home are more likely to engage in risky behavior, it was
ultimately recognized that it was virtually impossible to define that category in the
Indonesian context, where mobility within and between islands is the norm.
Furthermore, it was also felt that this population was adequately represented within the
listed groups. Migrants were not, therefore, included as a separate exposure category.

Previously, only some of the mentioned groups were taken into consideration
in the HIV sentinel surveillance. It was hoped that by specifying all possible exposure
groups, policymakers at the provincial and national level would become more aware
that the epidemic was not only confined to some highly marginalized populations.
Subsequently, the HIV surveillance activities started to include new stigmatized
population groups at risk of infection, such as MSM.

The second step in the agreed method concerned the estimation of the size of
population groups at risk or, otherwise said, the denominators of the equation. Since
Indonesia had little experience in this field, the country hosted earlier in the year a
meeting with other Asian countries to discuss methods and share experiences in this
area. A summary of this meeting, describing methods usually applied-including
census and survey methods, multiplier methods using existing data sources,
nomination methods and capture-recapture methods- was presented to the Jakarta
meetings by a senior P2M official. An official from the Central Bureau of Statistics also
summarized the data-collection methods commonly used in Indonesia. After
discussion, it was decided that multiplier methods using existing data sources would
be used wherever possible.

In conformity with the rapid process of decentralization undergone by the public
health system and in recognition of the big variations in the prevalence of HIV and
risky behaviors throughout the country, it was decided at these meetings that the goal
over time was to shift implementation of HIV surveillance and estimation of number of
HIV/AIDS cases to the provincial and district levels, where decision-making about HIV
programming was increasingly taking place. In order to prepare the heads of the
provincial health offices and of the provincial AIDS control boards for this eventual
shift, they were also invited to participate in the meetings. Many provincial public
health authorities were enthusiastic about the process, and looked forward to more
active involvement in it. In addition, a spreadsheet was developed with separate
estimates sheets for each province and one national estimates sheet (UNAIDS/WHO
2004).

iv. Main national and international actors involved, and their
contribution to the intervention.

A very important characteristic of the process of developing a second
generation HIV surveillance and estimation system in Indonesia is its significant
national ownership. This process was led by the Directorate General for
Communicable Disease Control and Environmental Health, and involved the
participation of many other government departments, as well as NGOs. These
institutions included: the National AIDS Commission, the ministry's own research
institute, the Central Bureau of Statistics, the Department of Social Affairs, the prison
service, the police, the military and the drug enforcement agencies, the provincial
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health offices and AIDS control boards, prevention and care programs, organizations of people living with HIV, associations of transvestite sex-worker, and universities. Participants from all these organizations attended the meetings organized by the MOH in 2002, and provided very valuable and diverse inputs to the process.

International experts such as from WHO/SEARO, UNAIDS, UNICEF, UNFPA, USAID, AusAID, and the Ease-West Centre Hawaii University participated at the final review meeting, and they presented modeling and short-term projection methods that helped improve the national capacity to produce better estimates.

This process was financially supported through the Aksi Stop AIDS program -a USAID-funded HIV/AIDS prevention effort undertaken by the MOH with technical assistance from FHI-, with contributions from UNAIDS and WHO (UNAIDS/WHO 2004).

v. Impact: Success and limitations.

The meetings conducted in 2002 built a strong foundation for the process of developing the second generation surveillance system for HIV in Indonesia. This system has led to a vastly more robust and informative determination of the number of people at risk of contracting HIV and the number of people infected in Indonesia. This represents a huge step forward in Indonesia’s understanding of its epidemic (UNAIDS/WHO 2004).

A final report of the 2002 meetings in Indonesia presented the agreements and recommendations approved by attendants. This document includes as well detailed estimates for that year of the number of people potentially exposed to HIV and the number of people already infected, by risky behavior and by province (MOH of Indonesia 2004). Those provincial-level estimates were subsequently presented to local policy-makers. They were widely discussed in several provinces and, in some cases, they led to a complete rethink of HIV prevention and care activities.

Currently, Indonesia’s HIV infection and behavioral surveillance system is relatively strong and improving annually. It covers most of the major population groups at risk of HIV in Indonesia, including IDUs, female, male and transvestite sex workers, MSM, and men in occupational cohorts likely to be clients of sex workers. However, some of these groups are covered only inconsistently, and some geographic areas produce virtually no data. Continued improvements of the national surveillance system, especially in terms of consistency of coverage of main risk population groups in key sites of all provinces, should be implemented in order to produce better inputs for the understanding of the HIV epidemic pattern in this country (UNAIDS/WHO 2004).

In estimating the size of exposure groups, different kind of population registers -including the 2000 national census- are combined with information from behavioral surveillance to arrive at estimates. Weaknesses have been identified on both sides of the equation. First, it is not clear if the population registers being used are sufficiently up to date -an important consideration in Indonesia’s rapidly changing socio-economic landscape-. Secondly, the information available from behavioral surveillance can not always be used effectively to provide multipliers for population-based registers. For
example, early behavioral surveillance survey (BSS) questionnaires asked IDUs whether they had ever been in treatment, but they did not specified a time period, such as the previous year. This specific limitation has been fixed later, in order to gather more accurate information through the behavioral surveillance.

Another relevant benefit of the national meeting is that it brought together widely diverse actors who had not been so much in contact previously and promoted discussion between institutions that had even been suspicious of one another previously, such as government authorities and NGOs. These renewed cooperative relationships led subsequently to an improved HIV surveillance, prevention and care programming, and advocacy.

Regarding the process of decentralization, it has many advantages, but it also creates challenges for administrative systems. Previous national HIV estimates in Indonesia had always been made at the national level. Nevertheless, in a country with 30 provinces and over 340 districts, a decentralized HIV surveillance and estimation system is probably more suitable to meet the information needs at the provincial and district level, where decisions are increasingly being made. The main limitation for implementing such a decentralized system in Indonesia is that data-collection systems have been centrally mandated and implemented for a long time and, as result, human resources at the peripheral level are still scarce. Furthermore, it does not exist yet in many provinces a strong culture of data-collection, which is often seen as non-essential. It is also important to make sure that methods used locally are consistent and comparable across provinces, and that local political pressure does not influence the outcomes. Strong national oversight and guidance in maintaining data standards will be necessary as the decentralization of estimates evolves (UNAIDS/WHO 2004).

Indonesia’s experience demonstrates that it is possible to make HIV estimates in a huge, geographically, culturally and epidemiologically diverse country. The Indonesian process was also well received internationally, and it is hoped that other nations will be able to learn from it. As the Indonesian example illustrates, the strength of second generation surveillance systems for HIV depends largely on tailoring the surveillance and estimation activities to the national epidemic pattern and health system structure, and on comprehensively involving key stakeholders in the process.
Case 4: Design and implementation of the National HIV/AIDS Monitoring and Evaluation System in Malawi.

Health information system
With the increasing spread of HIV/AIDS, it has been important to develop strong national HIV/AIDS Plans to respond to this pandemic, as well as country-level monitoring and evaluation (M&E) systems in order to guide the process of collecting, analysing and presenting specific data. These systems are essential to quantify the level of success of national plans and to guide future interventions.

Geographical area and context
The HIV/AIDS epidemic in Malawi is among the most severe in the Africa region. It is estimated that 14.1% of adults are infected, which translates to about 1,000,000 PLWHA. Malawi is implementing a rapidly expanding multisectoral HIV/AIDS Plan. The government of Malawi is committed to develop and strengthen a national M&E system in order to evaluate the national response to HIV/AIDS.

Intervention
In 2003, the Malawi National AIDS Commission (NAC) faced the challenge of creating a comprehensive national M&E system rather than the existing epidemiological surveillance system. It produced an HIV/AIDS M&E Plan, which included a description of goals, indicators, data sources and information products. Existing data sources were fully evaluated and integrated in the system whenever possible and new sources were developed. This plan is at an early stage of implementation.

Main national and international actors involved
The HIV/AIDS M&E system was designed by the Malawi NAC, with technical assistance from the Global HIV/AIDS Monitoring and Evaluation Team (GAMET) of the WB. This system is being implemented by public, private, and civil society organizations -at the national and sub-national levels- under NAC’s coordination. Several development partners, including the WB, GFATM, AfDB and USAID, contribute financially to the implementation of this system, mainly through budget support.

Impact
Malawi has one of the most acclaimed HIV/AIDS M&E plans. Great expertise has gone into its design and, consequently, it conforms well to international recognized standards. Even though the system’s implementation is meeting with great challenges which are not yet fully resolved, the attainment of real-time data flow and the penetration of information into the public domain are considered important achievements.
i. Health information system.

With the increasing spread of HIV/AIDS and of ART scale-up, it has been important to develop strong national responses to this pandemic. On April 25th 2004, representatives of many developing countries and major development partners adopted three principles for the response to the HIV/AIDS epidemic, in order to achieve the most effective and efficient use of resources and to ensure rapid action and results-based management. The so-called “Three Ones” include (GFATM 2006):

1. ONE agreed HIV/AIDS action framework that provides the basis for coordinating the work of all partners.
2. ONE national AIDS coordinating authority, with a broad-based multi-sector mandate.
3. ONE agreed country-level monitoring and evaluation system.

The third one highlights the importance of developing unified national HIV/AIDS M&E systems in order to measure the achievements of all services included in national HIV/AIDS plans, such as: (i) HIV prevention activities -i.e. voluntary counselling and testing, information campaigns or peer education sessions-; (ii) HIV/AIDS treatment, care and support programs -i.e. provision of ART and treatment for opportunistic infections-; and (iii) HIV/AIDS impact mitigation services -i.e. income generating activities and psychosocial support for persons affected by HIV-.

A M&E system can be defined as a structure designed to guide the process of collecting, analysing and presenting specific data, based on pre-defined indicators, with the purpose of quantifying the level of success of a defined strategy and guiding future interventions (Malawi NAC 2003). The two main goals of such a system are (GFATB 2006):

1. To ensure that accurate, relevant and timely data are made available to national program leaders and managers at each level of the health care system.
2. To guarantee that national programs are able to meet donor and international reporting requirements under a unified global effort to contain the HIV/AIDS pandemic.

According to the Global AIDS Monitoring and Evaluation Team (GAMET) of the WB, functioning national HIV/AIDS M&E systems are made up of eleven components (Gorgens-Albino et al. 2006):

1. HIV/AIDS M&E human resources at the national, decentralized and implementer levels: M&E workforce is required at the NAC, the MOH, regional/district government authorities, health facilities and other HIV/AIDS implementers.
2. Strong partnerships to coordinate implementation of the M&E system: partnerships are important because they ensure that all partners subscribe to common goals and complementary approaches, and because they promote sharing of knowledge and experience. Establishing an M&E technical group (TWG) -with representatives from all organizations responsible for activities included in the national M&E work plan- has proved to be successful for helping create and maintain M&E partnerships.
3. A national M&E framework with which to measure outcomes: this framework is a comprehensive planning document for the national M&E system, which documents the key M&E questions to be addressed, namely: indicators, data...
sources -including surveys and routine data collection on medical and non-medical HIV/AIDS services-, information products, information dissemination to decision-makers, and management of the M&E system.

4. An integrated and costed M&E Road Map: The Road Map is a joint national-level action plan and budget for all HIV/AIDS M&E activities that the different sectors would need to undertake in order to operationalize a national M&E framework. The costs of implementing the M&E plan should be included in the government’s budgeting processes.

5. A strategic flow of information: the implementation of these systems involves the development not only of specific M&E structures but also of a flow chart of information channels.

6. A national HIV/AIDS database with key information: the creation and maintenance of such a database requires the existence of an infrastructure, software and skilled workers to capture and analyze data. Furthermore, a web interface should be developed in order to provide information from this database to the general public.

7. Supportive supervision and data auditing procedures: supportive supervision is the overseeing of activities performance with the aim of transmitting knowledge and attitudes that are essential for successful M&E, whereas data auditing is the process of verifying the completeness and accuracy of data from a selection of HIV/AIDS interventions. Both functions are essential for data credibility and, therefore, for data use.

8. Harmonized M&E capacity building: the implementation of national HIV/AIDS M&E systems requires not only the availability of dedicated human resources but, more specifically, the training of skilled human resources.

9. An evaluation and learning agenda: this agenda is essential to ensure that the HIV/AIDS response focuses on evidence-based program improvement.

10. Advocacy and communication for HIV/AIDS M&E: this type of systems foster transparency, but they also require a transparent environment to function. Therefore, it is essential that a communication strategy focus on ensuring political support for transparency and accountability about the HIV response.

11. Strategies for data dissemination and use: since the main objective of these systems is to inform program planning and policy-making, a strategy is required to disseminate information among decision-makers and other stakeholders.

ii. Geographical area and context.

Demographic profile of Malawi.

Malawi is a densely populated country located in southeastern Africa, with a population estimated to be approximately 13 million people and an annual population growth rate of 2.25%. The population is predominantly young. Geographically, the country is divided into three main regions, namely: the Northern, Central and Southern regions. The vast majority of Malawi’s population resides in the rural areas. The official languages in Malawi are English and Chichewa, but there are six major language groups used in this country (WB Malawi PAD 2003).

33 43.6% and 46.7% are in the age groups 0 to 14 years and 15 to 49 years, respectively.
HIV/AIDS national epidemic.

The HIV/AIDS epidemic in Malawi is among the most severe in the region. It is estimated that 14.1% of adults aged 15-49 are infected, which translates to about 1,000,000 adults and children living with HIV. Most transmission in Malawi is believed to be via heterosexual contact, with mother-to-child transmission a distant second. Women are contracting AIDS younger than men and at higher prevalence rates (UNAIDS 2006).

The medium and long term impacts are also sobering. An estimated 550,000 children under 17 were orphans due to AIDS in 2005. The sharp rise in adult mortality rates is driving down life expectancy at birth -now estimated at less than 42 years-, and national productivity is declining, undermining efforts to reduce poverty (WB Malawi PAD 2003).

Malawi is implementing one of the most rapidly expanding ART programs in the Africa region. The number of eligible individuals on ART increased from under 5,000 in 2003 to over 85,000 in 2006 (UNAIDS 2006).

Evolution of institutions coordinating the national HIV/AIDS response.

Following the emergence of the HIV/AIDS pandemic in the mid 80s, the government of Malawi instituted strategies aimed at controlling its spread. This included the establishment of the National AIDS Control Programme (NACP) within the MOH in 1989. The Cabinet Committee on HIV/AIDS was also formed to provide policy and political guidance to the MOH.

The Malawian government participated in the UN General Assembly Special Session on HIV/AIDS (UNGASS), which took place in June 2001, and signed the Declaration of Commitment on HIV/AIDS. This commitment calls for each country to develop and implement a multisectoral national strategy and financing plan for combating HIV/AIDS, and to report biennially on 13 HIV/AIDS indicators, according to specific international HIV/AIDS M&E standards. In July 2001, in recognition of the need to shift the national response from a health focus to a multisectoral focus, the government of Malawi established the National AIDS Commission (NAC) -replacing the NACP- as an independent trust under the auspices of the Office of President and Cabinet (OPC). Initially, the NAC reported to the OPC -through the minister for Presidential Affairs- and to the Cabinet Committee on HIV/AIDS. However, a Minister for HIV/AIDS Programs was appointed in April 2003 within the OPC, and the NAC currently reports to OPC through this Minister.

District AIDS Coordinating Committees (DACCs) were formed in the mid 90s -prior to the Decentralization law- in Malawi’s rural and urban districts to coordinate and monitor local HIV/AIDS initiatives. These committees, which were composed of government officers, civil society representatives and community representatives, developed District HIV/AIDS Plans for implementation by community-based groups and public-private partnerships. District Health Officers coordinated DACCs activities, as part of their regular work program. Following Malawi’s first district level elections in November 2000 and establishment of district local governments in 2001, the DACCs were not included in the District Assembly (DA) committee structures (WB Malawi PAD 2003).
HIV/AIDS strategic plans.

In 1989, the MOH developed a five-year Medium Term Plan (MTP-I) to guide the implementation of HIV/AIDS activities from 1989 to 1994. It mainly focused on blood screening, HIV/AIDS prevention through public awareness and epidemiological surveillance. In 1993, a review of the MTP-I showed that a lot of progress had been made especially with regard to implementation of HIV blood screening and HIV/AIDS awareness, but also that the Plan lacked of emphasis on care and treatment of AIDS patients.

The second Medium Term Plan (MTP-II), for the period 1994-1998, addressed some of the weaknesses in the MTP-I. However, in 1996, a subsequent evaluation of the national HIV/AIDS response found that the country needed to develop a more comprehensive five-year plan to guide HIV/AIDS prevention, treatment and impact mitigation (WB Malawi PAD 2003).

In response to the recommendations of this evaluation, in 1999, the National Strategic Framework (NSF) was developed through a highly participatory process involving a wide range of stakeholders in HIV/AIDS activities -including the private sector and teaching institutions-. In October 1999, Bakili Muluzi, the former President of Malawi, launched the NSF -which covered the period 2000 to 2004- and declared HIV/AIDS a national emergency. The main themes in the NSF were: (1) prevention, advocacy, and behaviour change; (2) treatment, care, and support; (3) multisectoral mainstreaming; (4) impact mitigation; and (5) surveillance and monitoring. In 2003, the NAC developed an implementation plan for the NSF and the follow on National Action Framework -which covers the period 2005 to 2009-. This implementation plan is called the Strategic Management Plan (SMP), and it covers the fiscal years 2003-04 to 2007-08. The SMP is composed of seven major subprograms, one of which focuses on "Monitoring, evaluation and research" (Malawi OPC 2005).

In 2003, the NAC realized that it had inherited an exclusively epidemiological M&E system, while UNGASS and the new multisectoral orientation called for a broader approach. Biological surveillance had been conducted consistently at 19 antenatal clinic sites since 1985, and three rounds of behavioural surveillance had been completed by 2000. A number of disjointed M&E efforts were in effect in Malawi, but they were far from a uniform multisectoral national system (Gorgens-Albino et al. 2005).

The HIV/AIDS policy.

Throughout the 80s and 90s, Malawi did not have a clear national HIV/AIDS policy guiding the implementation of HIV/AIDS activities. However, after the development of the NSF, the process of developing the National AIDS Policy started in 2000 in order to guide its implementation. A Multisectoral Policy Advisory Committee (MPAC) was formed to guide the process of developing the policy. The initial draft policy was presented to various community groups to build consensus, including: parliamentarians, government ministries, civil society organizations, traditional leaders, healers and birth attendants. The National HIV/AIDS policy was finalized and launched by the former president of Malawi in November 2004 (WB Malawi PAD 2003).
iii. Intervention.

Malawi has adopted the UNAIDS global principle of the “Three Ones” in the response to HIV/AIDS: one Action Framework, one Coordinating Authority and one M&E Plan. In 2003, the Malawi NAC faced the challenge of creating an integrated and multisectoral national M&E system rather than a health sector oriented epidemiological surveillance system (Gorgens-Albino et al. 2006). With technical support from the Global AIDS Monitoring and Evaluation Team (GAMET) of the WB, as well as USAID, the NAC produced an HIV/AIDS M&E Plan, which is divided into two parts (WB Malawi PAD 2003):

- Part A: the Conceptual Framework, lays the conceptual foundation for the M&E system, by providing a logical framework for organizing and prioritizing national efforts. It provides a description of goals, illustrative activities, and measurable indicators by program area.
- Part B: the Operational Plan, provides detailed descriptions of data sources and information products that will be the result of the national M&E system.

As a first step in the conceptualization and design of the HIV/AIDS M&E system, the NAC developed an inventory of national HIV/AIDS stakeholders, including information on the type of intervention area each agency was engaged in. They consulted a wide variety of implementers of HIV/AIDS interventions -in the public sector, private sector and civil society-, and made an assessment of existing data sources and information needs among HIV/AIDS stakeholders (Gorgens-Albino et al. 2005).

The HIV/AIDS M&E Plan was designed around the principle of utilization-focused evaluation. It intended to create a solid platform for data generation and use. It rests on four linked cornerstones: indicators, data sources, information products, and stakeholders (Gorgens-Albino et al. 2005).

- Indicators: the framework includes a national set of 59 HIV/AIDS indicators to assess achievements at program input, output, outcome, and impact level. The 47 output level indicators were grouped into six programmatic areas, which were used to organize the NAC annual work plan.
- Data sources: The system collects data from 20 sources, in 10 different institutions. The framework includes a description for each source and clearly specifies who is responsible for collecting the data, the frequency, and a data source flow chart.
- Information products: The framework defines the M&E reports that have to be generated.
- Stakeholders: the framework defines the public of information products, and when and how they are to be disseminated.

As a result of the mentioned initial assessment, the NAC realized that Malawi had over 600 implementers of HIV/AIDS services, and that grassroots implementing organizations were often small groups without the necessary skills to collect, analyse and report data. Consequently, the NAC recognised the need to provide capacity-building activities in order to ensure that all data sources were up to the same level of maturity and were able to deliver the same quality of results on a consistent basis. In

34 Appendix 1 displays the structure of the National HIV/AIDS M&E System.
April 2004, more than 200 people attended an M&E workshop, and a first research conference was held in May 2004. Both the workshop and the conference were repeated in April 2005, and over 500 people attended this second year (Gorgens-Albino et al. 2005).

Existing data sources were fully evaluated and integrated in the system whenever possible and, in some cases, new data sources were developed to fill informational gaps (Gorgens-Albino et al. 2005). The 20 data sources that were created or strengthened through the implementation of the new HIV/AIDS M&E Plan are (Malawi NAC 2003):

2. Behavioural Surveillance Survey (BSS).
3. Condom Distribution Data from Social Marketing Agencies.
5. Demographic and Health Survey (DHS).
8. Health Facility Survey.
11. NAC database.
15. NAC Activity Reporting System (NACARS).
16. Score from National Composite Policy Index (NCPI) Questionnaire.
20. Workplace survey.

The NAC Activity Reporting System (NACARS) is one of the data sources that collect information on monthly basis to inform 38 output-level indicators of the M&E system. It is a paper-based recurrent data-gathering tool for collecting data from all implementers of HIV/AIDS interventions in Malawi. Upon completion, the NACARS form is sent to the NAC, with copies sent to District and City Assemblies. The data generated through NACARS is used to compile the Quarterly Service Coverage Reports (QSCR). Data collected through NACARS is vital since it provides a useful platform to link programme outputs to outcomes on regular basis (Malawi OPC 2005).

In October 2005, a comprehensive Activities Reporting System (NACARDS) had been piloted and launched. Around 150 implementers of HIV/AIDS interventions in the public and private sectors as well as in the civil society had been trained in the system, and more than half of them had started to submit forms in conformity with NAC standards (Gorgens-Albino et al. 2005).

Operationalization of the HIV/AIDS M&E framework took just over 18 months. During that time, meetings were held with representatives from the 20 data sources,

35 Appendix 2 displays the overall dataflow chart for the NAC Activity Reporting System (Malawi NAC 2003).
whose feedback led to many adjustments of the framework. Simultaneously, the new HMIS was developed and installed. The M&E system was launched with two major information products: a Quarterly Service Coverage Report (QSCR) and an annual HIV/AIDS M&E report. The annual report follows the calendar year, so that it provides timely data to inform the Malawi planning process, which starts in March (Gorgens-Albino et al. 2005).

The Malawi HIV/AIDS M&E system is at an early stage of implementation and, therefore, it is not fully functional yet. For instance, not all information from the 20 data sources are currently being incorporated into these information products. However, since 2005, reports have been produced and disseminated nationally and at district-level workshops (Gorgens-Albino et al. 2005). These information products include the imperative UNGASS reports on a set of internationally agreed HIV/AIDS related indicators.

At the district level, new policies and strategies are being developed in order to respond to HIV/AIDS. With more community-level involvement and better planning, a much greater share of responsibility for reporting on activities might be delegated to the district level. The initial extent and quality of involvement of districts in the HIV/AIDS response and in the national HIV/AIDS activities monitoring system were hampered mainly by the fact that there were no full-time staff members in place to manage or coordinate HIV/AIDS activities. Coordination of HIV/AIDS activities was done in a part-time capacity by a person within the district health office. The M&E staff was frequently assigned to tasks other than working on the system. In December 2004, full-time District AIDS Coordinators were appointed to work within local government structures. But, this retrospective solution came at a higher time and resources cost. If it had been possible to have full participation from the districts since the beginning, utilization of information generated would have been much broader (Gorgens-Albino et al. 2005).

iv. Main national and international actors involved, and their contribution to the intervention.

Key stakeholders are participating in the development of the national HIV/AIDS response and the design and implementation of the HIV/AIDS M&E system in a number of ways. During the preparation of the overall National Strategic Framework (NSF), governmental organizations, civil society, private companies, and academic institutions were actively involved.

The HIV/AIDS M&E system is being implemented by public, private, and civil society organizations - at the national and sub-national levels - coordinated by the National AIDS Commission (NAC). These organizations include: (i) central ministries and line ministries of Health and Population; Education; Gender and Community Services; Youth, Sports, and Culture; Local Government Development; Medical services of Ministry of Defense; Ministry of Information; and others; (ii) civil society organizations including PLWA associations, NGOs, FBOs, and community groups; (iii) private firms, business associations, labor organizations; and (iv) the National Statistical Office, university departments, social research groups, and other firms and organizations specialized in data collection (WB Malawi PAD 2003).
In line with the NAC’s overall mandate to orchestrate the national HIV/AIDS response, the NAC is responsible for annual work program planning and coordination, and it plays a leadership role through its Planning, Monitoring and Evaluation Unit to ensure that the National HIV/AIDS M&E system is implemented as intended. Operations of the NAC are overseen by a Board of Commissioners, consisting of representatives from government, civil society and the private sector (WB Malawi PAD 2003).

The estimated cost of the implementation of the five year Strategic Management Plan (SMP) is estimated at 274.7 million USD. In addition to the government of Malawi itself, the external development partners who contribute financially to the implementation of the joint program of work are: the WB, GFATM, UNDP, AfDB, CDC, USAID, CIDA, DFID, NORAD, and SIDA. The NAC invited its external development partners to provide their financial assistance in support of the SMP, on the basis of a joint annual work plan, using joint financial, procurement, and reporting mechanisms, rather than funding multiple HIV/AIDS projects each requiring parallel systems for tracking and reporting on individual donor's funds. "Rules of engagement" between NAC and the development partners were discussed extensively and captured in a multi-donor Memorandum of Understanding (MOU). One of the financing modalities included in the MOU is the pooling of funds in a common basket (WB Malawi PAD 2003). This is the first-ever “basket fund” for HIV/AIDS in Africa (Gorgens-Albino et al. 2005).

The WB is providing both financial and technical support to the development of the national HIV/AIDS M&E system in Malawi. Funding is being provided through the Malawi Multi-sectoral AIDS Project (MAP)\(^{36}\), a 25.4 million USD specific investment loan that includes a component on “Monitoring, Evaluation and Research”. Currency is being disbursed into the mentioned common basket, in order to fund those elements of the SMP which are not being funded by ear-marked contributions from other donor agencies\(^{37}\) (WB Malawi PAD 2003).

The WB technical assistance was provided through the Global HIV/AIDS Monitoring and Evaluation Team (GAMET). GAMET was formed in July 2002 as a unit of the Bank’s Global HIV/AIDS Program. Its aim is to work with national M&E teams to strengthen their capacity to monitor and evaluate national programs and policy on HIV/AIDS. GAMET was created as a partnership between the WB, UNAIDS, other UN agencies, GFATM, and several technical agencies including the MEASURE Evaluation project. GAMET aligns itself with efforts of the international community to improve data collection, data flow and data utilization (Watkins 2004).

v. Impact: Success and limitations.

Malawi has one of the most acclaimed HIV/AIDS M&E plans, a limited number of enthusiastic and committed M&E professionals throughout the system, and an active M&E Unit within the NAC to oversee its application. Great care and expertise have gone into the conceptualization and design of the HIV/AIDS M&E system.

\(^{37}\) For basket fund allocations, please see the table in Section D.2. and in Annex 11 of the Project Appraisal Document of the Malawi Multisectoral AIDS Project (MAP) of the WB.
Consequently, the national HIV/AIDS M&E Plan conforms well to international recognized standards, systems, and best practices (Carlson et al. 2006).

On paper, the HIV/AIDS M&E Plan is well-formulated and sound. However, the system’s implementation meets with great challenges that have not yet been fully resolved. After a long and systematic planning process, which produced a lengthy and detailed HIV/AIDS M&E Plan, practical limitations have necessitated revisions in the HIV/AIDS M&E system as it has been implemented (Malawi OPC 2005).

The main impediments to develop a functioning national HIV/AIDS M&E system in Malawi at the local, district and national level are: the limited number of trained staff, an insufficient decentralized approach, the lack of a legal framework to require that all intervention implementers report data -regardless of their financial sources-, the lack of data verification mechanisms, the weak communication and coordination between the different stakeholders, and the lack of a culture of using data.

Malawi recently initiated a decentralization reform process. At the early stages of the implementation of the HIV/AIDS M&E Plan, the system failed to include an appropriate decentralized approach. As mentioned before, following Malawi’s establishment of district local governments in 2001, the District AIDS Coordinating Committees (DACCs) were not even included in the District Assembly (DA) committee structures. However, efforts are underway to decentralise the system and to create M&E units and to place District AIDS Coordinators (DACs) in all DAs, so that the districts can collect, collate, analyze and use data and submit the report to NAC for compilation of national level indicators (Carlson et al. 2006).

Reliability of data being reported is one area that has raised concern. Much of the data being collected is incomplete, not very accurate, and too late to be of use. These problems are particularly pronounced in the NACARS and the HMIS, based within the MOH. There are several factors that may be influencing the lack of reliability of data: underreporting, inaccuracy, and the lack of a disaggregated analysis of data. Language has also been a factor. For this reason, the forms have recently been translated from English into several of the primary languages (Carlson et al. 2006).

NACARS is characterized by underreporting. The NAC provides direct grants to many but not all implementers of HIV/AIDS interventions. Many public sector ministries and NAC funded organizations do not adequately comply with their data commitments, despite the signed contracts. Uneven data quality from key providers significantly limits the M&E system capacity to produce the highest-quality information products. The situation is even worse for non-NAC grantees, since they have to prepare the information for their bilateral or private donors, and then reformat it to fit the NACARS standards. Besides, since intervention implementers who are receiving independent financial support from other funding agencies are not contractually obligated to provide data to the NACARDS, they are clearly less compelled to report information, resulting in significant gaps in the overall database. However, good efforts have been made lately to involve funding partners, especially USAID, in order to have such players participate in the system (Malawi OPC 2005).

Many questions exist regarding the accuracy of data collected in the HIV/AIDS M&E system. Data verification mechanisms are seriously lacking at all levels due to the limited number of staff. In addition, the data available is not always representative
of the assumed population due to missing data and reporting bias. Double counting also takes place in the system. For instance, condom distribution in the country was once overestimated because condoms were counted in some cases by both the seller and the distributor (Carlson et al. 2006).

Moreover, from national to district level, data is rarely being analysed through disaggregation by sex and rural/urban location, even though information is collected that would allow disaggregation to occur, at least by sex and geographical location. Methods for assessing differences by education level and/or socioeconomic status are nearly non-existent. This means that prioritization of interventions in order to target the most vulnerable is being done more through guess work rather than by virtue of hard empirical evidence (Carlson et al. 2006).

Perhaps the greatest impediment to develop a comprehensive and unified M&E system in Malawi is the lack of communication and coordination between the different stakeholders -line ministries, NAC, district governments, donor agencies, civil society, implementers of HIV/AIDS interventions, and various technical working groups-. As a result, although major attempts have been made to coordinate the main actors involved, one national HIV/AIDS M&E system -with one set of indicators, one set of targets, and one reporting system- that is linked with other subsystems of the national HIS is still a distant reality. For instance, clinicians must prepare currently two completely separate documents in order to report ART to the MOH and to the NAC. With such severe lack of coordination among actors, it is difficult to create an effective multisectoral response (Carlson et al. 2006).

Throughout every level of the M&E system, from national to district-level, data is severely underused. Basic understanding of how M&E is essential to build evidence-based interventions is lacking at many levels of leadership and, as a result, utilisation of data is the exception rather than the norm. In nearly all ministries, little importance is being placed on analyzing data in order to direct efforts and improve the efficacy of interventions. Within DACCs, few individuals understand the significance of data analysis and use. Most DACs are not trained to analyse data. In some districts, M&E officers are not yet in place.

In conclusion, a thorough national HIV/AIDS M&E Plan has been designed specifically to fit Malawi and to conform to international standards. Its appropriate implementation poses relevant challenges that have not yet been completely resolved. Nevertheless, the attainment of real-time data flow -even though it is still partial- and the increasing penetration of information into the public domain are considered important achievements (Gorgens-Albino et al. 2005). Furthermore, this process has promoted the cross-country exchange of relevant knowledge between program coordinators and implementers in the Malawi NAC and national AIDS programs in neighbouring countries -i.e. Uganda and Kenya- (WB Malawi PAD 2003).

38 Those who send data are often good performers in other respects, as well.
6. CONCLUSIONS AND RECOMMENDATIONS

A. There is an important gap in basic national health information in poor countries.

The evidence-based medicine revolution of the last 30 years has had a substantial influence on public health, at the same time that the disciplines of epidemiology, demography and economics have gained prominence. Nevertheless, many developing countries still lack basic components of HISs. Deaths are not counted in the vast majority of the world’s poorest nations, which are, paradoxically, the countries where the disease burden is greatest. In Sub-Saharan Africa fewer than ten countries have vital registration systems that produce usable data. At present, stakeholders can only expect occasional incomplete snapshots of countries progress towards health goals, with much of the progress assessment heavily dependent on modeling rather than on empirical evidence (HNM 2004).

B. HISs are widely considered and essential component of health systems.

Just as much as accurate medical treatment depends on a correct diagnosis, results-based health systems management requires reliable information. Health information is widely considered an essential function of every health system (WB 2001). Therefore, interventions that aim at strengthening health systems must necessarily include efforts to enhance national HISs.

C. Strengthening of HISs is a prerequisite for evidence-based program planning and policy-making.

Data collection is not an end in itself. The ultimate objective of collecting data is to inform health program planning as well as policy-making and, ultimately, global health outcomes and equity. Well functioning HISs empower decision-makers to manage and lead more effectively by providing useful evidence at the lowest possible cost.

Health information is not a luxury in developing countries (Narasimhan et al 2004). The lack of resources in these countries is the main reason why they need comprehensive and integrated HISs, to detect problems, set priorities, allocate resources, design solutions, improve quality for health services, and track progress toward established goals. In fact, many countries find themselves caught in a vicious cycle: the lack of resources leads to an under-investment in national statistical systems, which in turn do not generate sufficient data to support effective progress.
D. National HISs should include mechanisms to measure health outcomes distribution in order to enhance equity across different population groups.

Reformers of health systems and HISs should not only be concerned about improving average health status, but also about enhancing equity across regional, sex, income and ethnic groups. This consideration should be taken into account when designing national HISs, so as to include tools and mechanisms that allow the measurement of the distribution of health outcomes.

In order to get a national picture of health status and to identify priority disadvantaged collectives as well as possible misdistribution of health resources, HISs reform processes should involve the development of GISs as well as a disaggregated analysis by regional, sex and ethnic groups in all data sources.

E. HISs development provides stakeholders with a framework to build consensus.

Another crucial benefit of HISs development -never sufficiently highlighted- is that this process provides the main stakeholders with a framework to discuss and select the national health priorities, goals and indicators to be tracked by the system. Therefore, HISs strengthening facilitates decision-making, not only through the generation of valuable information but also through the debate that surrounds the process itself.

F. Successful HIS reforms need to be aligned with broader management changes.

Surveillance and response can be described in terms of a data generation hemisphere and a data use hemisphere (Nsubuga et al. 2006). A common mistake made in implementing HIS change is failing to recognize the associated need for change in management processes and organizational culture in order to ensure data use.

Information alone does not transform outcomes. Failure to adjust management roles with HIS changes can constraint reform effectiveness, such as when health system managers and decision-makers are not given the necessary increased authority -also referred to as decision space- to demand reports and trigger counteractive actions (Gladwin et al 2003, Bossert 2000). In addition, an adequate environment of incentives and disincentives needs to be developed in order to promote the appropriate management changes, encouraging decision-makers to take advantage of the wider decision space to make more informed choices.

G. For HISs to be of real value, they have to provide timely data to decision-makers.

For HISs to be of real value, the HIS implementation cycle must be synchronized with the health services planning cycle. This ensures that information is
reported to managers and policy-makers in a timely manner, so that they can make the most appropriate use of it for decision-making.

The utility of information can be viewed as immediate and archival, on the basis of the public health actions that can be taken (Thacker and Stroup 1998). Since managers are unlikely to be able to create interventions to address small problems, sacrificing precision makes sense to improve timeliness and save resources that can be used for public health interventions.

H. Decentralization of decision-making poses a critical challenge to HIS and management reforms.

In order to bring decision-making closer to the ground level of health systems with the aim of improving performance, many developing countries have engaged in decentralization processes (Gottret and Schieber 2006). Deconcentration, devolution and delegation processes have evident implications in the development of national HISs. They shift much of the growing burden of these systems to the periphery, requiring regional, provincial and municipal levels to actively participate in the collection, analysis and report of data. An important benefit of this is that the generation and ownership of health information at those levels can provide local evidence as a basis for decisions, enhancing individual patient care, as well as facility and program management. However, decentralization also creates administrative challenges for this type of systems; overall given that, at the peripheral level, resources for health information are usually scarce and workload is high.

I. To avoid overlapping or disjointed lines of authority, responsibilities should be well defined at each level of the system.

In decentralized HISs, there are frequently overlapping or disjointed lines of authority and communication through the different levels of the system. The main cause is the inadequate distribution of responsibilities between and within the different levels of the system.

As one goes up from the local to the central level, the function of execution decreases, while that of supervision increases. The central role should be: to establish norms, to supervise execution by lower levels, to analyze and disseminate information and to provide technical assistance to lower levels.

J. It is critical to ensure transparency and to make data available to all stakeholders in order to hold governments accountable for their decisions.

Decisions are most often driven by theoretical and political considerations, rather than by empirical evidence. This is frequently due to a lack of health data, but availability of reliable information and decision space do not guarantee the appropriate use of evidence for improved policy-making. If information is not available to stakeholders outside the health ministry, policy-makers are more likely to use
information that contributes to a preferred government direction, and to neglect not supportive evidence (De et al. 2003).

Therefore, it is critical to develop a culture of transparency in the management of health information. Data has to be disseminated and made publicly available to all stakeholders, including not only government officials, but also opposition parties, development organizations, civil society, private sector companies, researchers, the media, and citizens in general. This helps hold governments accountable to citizens and to the international community. However, this would also highlight both successes and failures, and might require that both the political class and the citizenry adapt to a higher level of transparency (Kusek et al. 2007).

K. More than ever before, donor organizations are interested in strengthening HISs in developing countries.

The current development agenda is largely focused on the internationally agreed Millennium Development Goals (MDGs), and statistics have a prominent role in monitoring and achieving progress towards these goals. In addition, donor organizations and alliances -including GFATM, GAVI, and several bilateral agencies- increasingly demand performance measures and detailed evidence to justify new requests for support. Effective HISs are needed to permit adequate monitoring of progress towards the MDGs and other challenges presented by the PRSPs and performance-based financial support.

Furthermore, public health challenges confronted at the global level such as HIV, the severe acute respiratory syndrome (SARS) and avian influenza, illustrate the critical role of surveillance in protecting not only individual nations but also the global community by delivering real-time early warnings for devastating outbreaks. Therefore, more than ever before, it is in the mutual interest of the developing and industrial countries to invest in developing systems and networks for generating health information (Stansfield 2005).

L. Comprehensive HISs reforms need to be nationally driven, in order to reflect national priorities, reduce redundancy and be sustained.

Most developing countries have no comprehensive strategy for information management, reflecting the fractal nature of donor and national investments in these systems. Interventions to improve national HISs have often focused only on specific subsystems, and have neglected the need of an overarching architecture that promotes comparison and integration of data elements from a variety of subsystems.

Reform of HISs needs to be based on a nationally developed plan, with a policy framework -through legislation and regulation-, core indicators and a timelined strategy for data collection, verification, analysis and dissemination. Nationally owned and led strategic plans have to specify how the different methods need to be applied and complement each other to meet information needs at the sub-national, national and global levels, as well as what kind of resources and investments are needed. Such a comprehensive reform design and implementation enables phased system
development, reduces redundancy, increases efficiency, and improves interoperability (O’Carroll 2003).

**M. Efforts need to be made to harmonize donors’ data requirements in order to avoid fragmentation in national HIS.**

In order to obtain data to target and evaluate their investments, many donors create parallel nongovernmental information systems, although each system involves similar functions, processes and personnel. These parallel systems invariably pay workers more than government jobs do and, as a result, many competent people in the public system leave to work for them. As a result, these multiple and incoherent data demands promote fragmentation in health information mechanisms, overwhelm available human and infrastructural resources, and weaken the national information systems that they are meant to help.

In order to guarantee that countries are able to meet local, national and international reporting requirements through one only HIS, further efforts need to be made at the global level to establish international standards and frameworks for health data. Greater coordination and harmonization of requirements between donors would greatly assist in solidifying more sustainable national HISs. Parallel systems should be used only as a last resort.

**N. The first step of national HISs reforms is the assessment of country health information mechanisms.**

Undertaking an assessment of existing subsystems allows the identification of available mechanisms and baseline information gaps. Optimally, this assessment results in the mobilisation of joint technical and financial support for the design and implementation of a plan of action tailored to national epidemic patterns and health system structure. Since resources are always constraint, existing data sources are usually integrated in the system whenever possible and, in some cases, new data sources are developed to fill informational needs.

**O. National HISs development should involve comprehensively all relevant stakeholders, including private sector organizations.**

The complexity of the health information field requires a collaborative and inclusive response. Ideally, the development of a national HIS strategic plan should involve comprehensively all relevant national and sub-national stakeholders, including public organisms -such as national and local governments, as well as the National Statistical Office-, public health facilities, private sector health providers and insurers, civil society organizations -such as NGOs, FBOs, and community groups-, academic institutions and international organizations.

The private sector is an important potential source of health information that is usually underused. Incorporating private organizations into the system is essential, and establishing incentives or regulatory schemes that make their participation in the national HIS rewarding -or even mandatory- should be considered.
P. The development of partnerships ensures that all partners subscribe to common goals and it promotes sharing of HIS knowledge and resources.

It is key to develop partnerships between the different health information actors in order to coordinate the implementation of national HISs because alliances ensure that all partners subscribe to common goals and complementary approaches. It also promotes sharing of knowledge, experience and resources.

In fact, currently, international assistance is most usually being provided simultaneously by several development organisations through partnerships—either through well-established and recognised partnerships, such as the GFATM, or through ad hoc alliances.

Q. Development of national HIS is a long process that requires a long-term commitment from development organisations.

Capacity-building as well as infrastructural and institutional development at the national and sub-national levels are long processes. Strengthening country HIS requires time; more accurate and detailed information is usually not available in the early stages of the reform. The effects of evidenced-based decision-making on health outcomes are frequently detectable only after years. As a consequence, enhancing HIS requires a long-term and sustained commitment from development organisations, even in the absence of quick results.

R. In order to ensure the appropriate operationalization of national HIS plans, government have to secure the required funding.

For a country HIS to be fully operational, a national strategic plan of action is not enough. The steps involved in strengthening a national HIS also include estimating the costs of all activities that the different sectors need to undertake in order to operationalize the system, and securing national funding to carry out the HIS reform. If financial resources are not secured, there is a high risk that planned surveys and other activities will not be done. The costs of implementing the national HIS should be included in the government’s budgeting processes.

S. More analysis on the cost-effectiveness of developing HISs is needed in order to facilitate decision-making in this field.

Health information is not free. However, data concerning the cost-effectiveness of designing, implementing and maintaining national HISs in developing countries is still very limited. This analysis is essential in order to facilitate decision-making and resource allocation in the development of the different data sources and other aspects of national HISs.
T. Some innovative financial tools, such as budget funding and performance-based financial support, are being useful in the development of HIS.

Some changes in the behaviour of donors are proving to be useful in strengthening national HISs. In order to promote the development of country driven HIS, and to avoid fragmentation and duplication of work, some donors are aligning their financial assistance to country’s own budget processes and health priorities through “basket” funding. Budget support for national HISs development comes through both MOHs and national statistics offices in most countries.

Some major donors and international initiatives, such as GAVI and GFATM, are imposing strict performance requirements in order to maintain their financial support, relying upon governments and their partners to set goals and monitor progress. As a result of the increasing attention paid to performance, a larger portion of funds is being spent in improving the generation of quality data.

“Basket” funding and performance-based financial support place further responsibilities on countries to define their own priorities and work plans, and to measure their progress in health outcomes.

U. Developing and retaining a skilled and motivated workforce is a key challenge in the development of HISs.

Human resources are one of the most important inputs of HIS. In order to design and implement a well functioning HIS, many different types of professionals are required at the different levels of the system: from epidemiologists and statisticians to managers and political leaders - with ability to engage other key stakeholders across different sectors -.

This necessary workforce is limited in many countries. Capacity-building, not only in epidemiology but also in results-based management and data use, is necessary to develop a culture of information and is usually insufficient in developing countries. Once staff are trained, retention of them at the national HIS is often difficult because of limited career paths and poor incentives. Such issues highlight the need for strategies to improve recruitment, training, motivation and retention of the appropriate human resources, in order to ensure a pool of skilled and motivated personnel to carry out the system activities.

Furthermore, for those health professionals that work in other fields but have a role in information generation, data collecting and reporting responsibilities should be clearly spelled out in their work plans.

V. Strengthening other HISs inputs, such as information technology and laboratory services, is essential to improved information systems.

Although the limiting factor to improved information systems is a skilled workforce, developing other relevant inputs is essential in order to create a fully
functional national HIS. Staff training must be complemented with other substantial investments to develop the necessary information infrastructure.

Ideally, at national and sub-national levels, health professionals should have access to computers, e-mail and Internet access. The rapidly evolving field of public health informatics, which deals with collection, storage, retrieval, analysis, and presentation of large amounts of health data, offers the potential for truly integrated HISs based on data standardization, a communications infrastructure, and policies on data access and sharing.

A network of quality laboratory services should also be developed and their role in health information should be spelled out, in order to take advantage of the information generated in individual patient care and outbreak management.

W. Since health services coverage is far from universal, it is a priority of HIS reforms to develop population-based data sources.

Since health services coverage is usually far from a hundred percent and deaths usually occur outside of health facilities in developing countries, health-service-based data on morbidity and mortality are rarely sufficient to evaluate the impact of health interventions and to make estimates of population burden of disease. Therefore, it is a priority of HIS reforms to create and strengthen population-based data sources. More specifically, capacity-building in vital registration should be developed urgently in all countries. This information subsystem is essential for health monitoring and, unlike other data sources such as surveys and census, does not seem to be receiving the deserved attention from major development organizations.

However, health-service-based data sources provide useful information on trends over time and in space, and taking into account some of the biases of such data may further enhance its utility.

X. Increase of research capacity is imperative in order to develop innovative HISs tools that are more cost-effective.

An effective HIS delivers routine information that not only enables informed policy-making but also serves as a research platform. In addition, the HIS tools themselves should also be a subject of research. The instruments and methods of HISs must be continually refined to improve their effectiveness and reduce their costs. The increase of scientific capacity is imperative in order to develop innovative short- to medium-term strategies to ensure that resource-constrained countries have accurate data sufficient for decision-making. An example of this kind of strategies that is currently being investigated is Sample Vital Registration with Verbal Autopsy (SAVVY).
Y. Main sources of financial and technical assistance are bilateral organizations, UN agencies and development banks; although partnerships and private organizations are acquiring increasing importance.

As for most public goods, the production of health information is mostly financed by government appropriation. Nevertheless, the very first origin of financial resources allocated in the development and strengthening of HISs varies between countries. In Africa, it has been estimated that grants and loans from donors account for 20-70% of the financing for statistical systems overall. Revenue generated by selling statistical products and services accounts for 10-20% of the financing for national statistical systems (Economic Commission for Africa 2003).

Development assistance for health has been rising steadily since 1990 from about 2 million USD to more than 10 million USD in 2003. Much of the increase that has taken place since 2000 can be credited to an increasing number of global health partnerships (GHP) -such as GFATM and GAVI- and a rise in funding coming from private philanthropic organizations -notably the Gates Foundation- (Gottret and Schieber 2006). However, the main financial sources of external financial assistance for health -including health information- remain: bilateral agencies, UN agencies, development banks -notably the WB-, and other multilateral agencies -such as the European Union-.

Donor organizations often provide technical support linked to financial assistance. The activities provided by the WB in order to enhance national statistical systems are a clear example of this. However, in other cases, financial sources fund other organizations or subcontract other agencies in order to provide technical support to countries. This is, for instance, the case of bilateral agencies, who usually hire their national statistical offices (NSO) to assist developing countries in statistical capacity-building.

Z. The World Bank should partner with other development organizations -especially with HMN-, ensure that health monitoring activities in WB-funded projects make part of national HIS, and advocate for the collection and use of basic health information in all client countries.

The WB is in a privileged situation to provide technical assistance to client countries in order to strengthen their national HIS systems. The recommendations previously mentioned also apply to the support that the WB is expected to provide to countries during next decade.

This organisation should increase its own capacity in disease surveillance and performance monitoring in order to develop its comparative advantage. This involves hiring professionals with broad experience in this field and partnering with those agencies that have developed expertise in different areas of health information, such WHO and CDC in disease surveillance. Since the Health Metrics Network (HMN) was specially created in order to provide assistance to countries in strengthening national HIS, the PMS Team should specially ally with HMN in order to build upon existing efforts. Work in this direction is on the way, since the HNP Unit is building up the Performance Monitoring and Statistics Team (PMS Team).
The WB should also closely collaborate with other development organizations in order to harmonize data requirements and provide coherent international support to developing countries. This organization should also ensure that governments take a central role in health monitoring and development of national HISs. At a minimum, this team should be able to ensure that health monitoring activities included in all WB-funded HNP projects make part of comprehensive and inclusive national HIS.

Therefore, the assistance provided by the PMS Team should be demand driven and ought to be adapted to national health information needs and institutional structures. Nevertheless, the WB and its partners should advocate for the development of a national overarching structure as well as the collection and use of basic health information in client countries, including at least vital statistics. It is also suggested that this team conducts cost-effectiveness analysis of these activities.
### 7. ACKNOWLEDGMENTS

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Appendix 1: Structure of National HIV/AIDS M&E System.

(Source: Malawi NAC 2003)
Appendix 2: Overall Data Flow for NAC Activity Reporting System.

(Source: Malawi NAC 2003)