REPUBLIC OF TRINIDAD AND TOBAGO

STRATEGIC PLAN FOR STRENGTHENING THE NATIONAL HEALTH INFORMATION SYSTEM, 2012-2016

Prepared for

MINISTRY OF HEALTH

By

Connect-To-Health

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FOREWORD

The strategic planning for Health Information Systems (HIS) was conducted by the Ministry of Health (MOH) in collaboration with national stakeholders. These include the Central Statistical Office, Ministry of Legal Affairs, iGovTT, private sector organisations, and the Pan American Health Organisation (PAHO).

The HIS strategy represents another milestone in the effort to reform the health system and reaffirms the Government's commitment to promoting use of evidence in decision-making. It is aligned with the national health sector strategic plan 2012-2016 and presents a balanced approach to HIS strengthening. The inclusiveness of the process is a distinguishing feature; it comes at a time that the Government of Republic of Trinidad and Tobago is embarking on initiatives (like national health insurance) that foster public/private partnership.

The support of the Minister of Health, Dr. the Honourable Fuad Khan was invaluable to the planning process; the active involvement and contribution of Ms. Antonia Popplewell (Permanent Secretary), Drs. Anton Cumberbatch (Chief Medical Officer) and Andrea Yearwood (Director, Policy, Research & Planning) and Heera Rampaul (Manager, ICT Division) are duly acknowledged. Support was also provided by Drs. Bernadette Theodore-Gandi (PAHO-PWR), Guillermo Troya and Regilio de Souza of PAHO, and technical inputs received from Sergio Freue, Tomas Sandor (MOH), and members of the HIS Core Team. Dr. Ibukun Ogunbekun, Principal Consultant (Connect-To-Health) facilitated the strategy development process.

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ACRONYMS

CRT	-	Complaints Resolution Time
DHS	-	Demographic and Health Survey
DPRP	-	Department of Policy, Research and Planning
EHR	-	Electronic Health Record
GoRTT	-	Government of Republic of Trinidad and Tobago
HDDS	-	Health Demographic Surveillance System
HIMS	-	Health Information Management System
HIT	-	Health Information Technology
HMN	-	Health Metrics Network
HISTT	-	Health Information System of Trinidad and Tobago
ICD	-	International Classification of Diseases
ICT	-	Information and Communication Technology
IDB	-	Inter-American Development Bank
IS/IT	-	Information System/Information Technology
MLA	-	Ministry of Legal Affairs
MOH	-	Ministry of Health
NHA	-	National Health Accounts
NHIS	-	National Health Insurance System
NHISC	-	National Health Information Steering Committee
PAHO	-	Pan American Health Organisation
PHR	-	Personal Health Records
TOR	-	Terms of Reference
UWI	-	University of West Indies
VRS	-	Vital Registration System
VSU	-	Vital Statistics Unit

I. COUNTRY BACKGROUND INFORMATION

Trinidad and Tobago is a stable, democratic Southern Caribbean state with a mixed population estimated in 2010 at 1.32 million people. Approximately 95 percent lives in Trinidad the bigger of the two islands, which seats the capital, Port-of-Spain. Even so, the urban population in 2010 made up approximately 18 percent of the total. Persons of African and Indian ancestry make up 37.5 and 40.0 percent, respectively; 20.5 percent are mixed and the remainder comprises of other racial group. The population is stable growing at just 0.1% per annum.[1] A "Parliamentary" system of government with Prime Minister as head of government has been in place since 1962, although, Tobago home to around 55,000 people convenes a separate House of Assembly.

Economic and financial indices show strong performance with Gross Domestic Product (GDP) growing at an average rate of 7 percent per annum between 1993 and 2008.[2] Growth was powered by the energy sector which accounted for 80 percent of exports and 90 percent of foreign exchange earnings. Robust earnings and good fiscal management combined to lift Trinidad and Tobago into the group of high-income non-OECD countries with per capita Gross National Income (GNI) of US$15,400 in 2010.[3] Development indicators follow a similar trend – Life Expectancy at Birth in 2009 stood at 70 years while the Adult Literacy Rate was 99 percent. The Under-5 Mortality Rate and Maternal Mortality Ratio at 35 per 1,000 live births and 55 per 100,000 live births, respectively, are within range of regional averages (at 18 per 1,000 and 66 per 100,000, respectively).[4]

An unstable global economic climate appears however to be putting strain on the local economy driving down GDP growth rate (at constant 2000 prices) to -1.4% in 2010. It has also been difficult to stabilise domestic prices – on a calendar year-to-date basis, headline inflation declined to 2.7 percent in August 2011 compared with 15.8 percent in first eight months of 2011.[5] As public budgets come under increased scrutiny, interventions to strengthen health systems will need to place stronger emphasis on cost-effectiveness and sustainability. It is against this backdrop that the strategic plan for Health Information Systems (HIS) is set.

II. THE HEALTH SYSTEM IN TRINIDAD AND TOBAGO

The Organisation and delivery of health services reflect public sector dominance. Administratively, the country is split into five (5) Regional Health Authorities (RHAs) each of

[1] Estimates provided by Central Statistical Office, Port-of-Spain, January 2012
[2] Inter-American Development Bank. Trinidad and Tobago Country Strategy 2011-2015. Washington, DC, December 2011; available at http://www.iadb.org/en/countries/trinidad-and-tobago/country-strategy,1077.html
[3] Source: World Bank database, Washington, DC, Dec. 2011
[4] World Health Organisation. World Health Statistics 2011. Geneva, 2011.
[5] Government of the Republic of Trinidad and Tobago. Review of the economy 2011: from Steady Foundation to Economic Transformation. Port-of-Spain.

which is semi-autonomous (Figure 1). The structure evolved from the Health Sector Reform Project (HSRP) initiated in the early 1990s with support from the IADB.[6] The public health network comprises of 95 health centres, 8 district health facilities (DHF) and 8 hospitals.[7] Consistent with the distribution of the population, roughly two-thirds of health centres are located in the Northwest, North-central and South-western parts of Trinidad. However, each RHA is served by at least one DHF and one referral hospital.

Figure 1: Trinidad and Tobago – Health System Administrative Map

Significant private sector activity exists and covers a wide range of clinical and ancillary services but there is very little information on the utilisation, quality and cost of services delivered in this segment of the health sector.

In terms of financing, spending on health grew as national wealth increased. Per capita health expenditures rose, in absolute terms, from $225 per annum in 1990 to $1,079 in 2009 but total health expenditure (THE) as percent of GDP has averaged roughly 5 percent over the last ten years. While the absence of national health accounts (NHA) makes it difficult to break down expenditures by category, there has been a noticeable shift in the proportions financed from public and private sources. Between 2000 and 2009 for instance, the public share of THE increased from 34 percent to 54 percent but fell in 2010 to 48 percent presumably due to the

[6] Each Regional Health Authority administers services independently but funding still comes through the MOH
[7] Data source: MOH website, Dec. 2011 – available at www.health.gov.tt

contraction in the economy.[8] Private financing, which now stands above 50 percent, comes largely in the form of out-of-pocket payments but coverage by private health insurance has doubled since 2006. External financing typically accounts for less that 1.0 percent of THE. The Pan American Health Organisation (PAHO) and Inter-American Development Bank (IADB) are key partners in the health sector.

Decentralisation has contributed to shaping a more responsive and equitable health system but there have been some unintended consequences. In particular, the human resource and institutional capacity building needed to mould strong, independent RHAs have not kept pace with devolution of authority. Communication problems between the MOH and RHAs (and within RHAs) also hinder coordination of services, as well as standardisation of processes and technologies. These are some of the challenges confronting the health system at present.

III. TRANSFORMING THE HEALTH INFORMATION SYSTEM

The modernisation of the HIS from manual to electronic system is a sub-theme of the HSRP. The reform programme encompassed five sub-strategies, namely[9]:

- Strategy for **Information** – person-based, integrated, operation-centred systems, secure and confidential
- Strategy for **Systems** – aligned with business strategy
- Strategy for **People** – attracting the right skill sets
- Strategy for **Management** – managing the IS strategy (rationale and structure)
- Strategy for **Investment** – rationale and economic consideration of investment

Enhanced business management systems would help the MOH achieve better control of costs and provide stronger base for investment decisions while clinical and preventive health systems would aid the delivery of quality care and disease control programmes among others. Essentially, the information system (sub)component of the HSRP focused on institution-based health information but the Government has since adopted the Health Metric Network (HMN) framework which espouses a broader concept of HIS than is provided for under the HSRP. Specifically, population-based health information (much of which is outside the direct control of the MOH) is now seen as an integral part of a national HIS that is developed through multi-stakeholder input.

Figure 2 below illustrates the building blocks for the national HIS in Trinidad and Tobago. The pillars comprise:

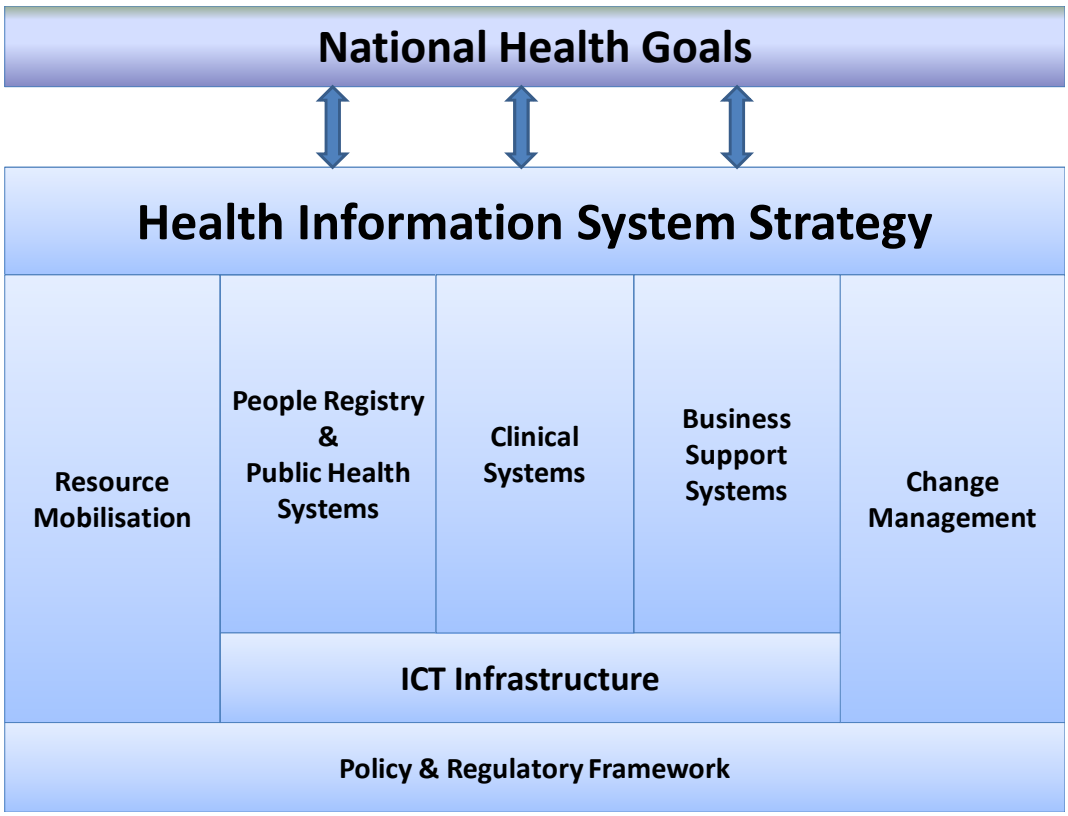
- Population-based information – People Registry and Public Health Systems (Census, Civil Registration and Demographic Surveillance)

[8] World Bank (2011) op. cit.
[9] Information supplied by the ICT Division of the MOH, Nov. 2011

- Institution-based information – Clinical and Ancillary Services
- Business Management System – Finance, Accounting, Operations

Supporting these systems are resource mobilisation and change management activities both of which involve continuing advocacy and effective communication with HIS stakeholders.

Figure 2: Building Blocks for Integrated National Health Information System



(Adapted from Ministry of Health ICT Strategy, December 2010)

Population-based Information

Census

The first official census in the country was conducted in 1844 and another one in 1851. Since then, Population and Housing Censuses have been conducted at ten-year intervals up to 2011. The Central Statistical Office (CSO), which has the responsibility for this activity was created on in 1952. The agency collects, processes and publishes vital statistics (births, deaths, marriages and divorces), as well as health and other socio-economic data. It codes "Cause of Death" statistics obtained from the Ministry of Legal Affairs (MLA) but there is no electronic interface linking the two Organisations at present.

Civil Registration

The MLA does online registration of births and deaths that occur in major hospitals. Online registration is also done at some District Registrar offices in Trinidad and Tobago. Four (4) of these are situated in major hospitals (in Port-of-Spain, San Fernando, Mount Hope and Sangre Grande) while 8 District Registrar offices (Tobago, Point Fortin, Penal, Arima, Siparia, Rio Claro, Diego Martin and Chaguanas) use wireless technology (WiMax) for electronic registration of births and deaths. Together, these offices capture an estimated 80 percent of births and 50% of deaths in the country.

The Ministry maintains an electronic database that has unique identifiers assigned to each person born from 1932 onwards. The database is updated with those persons born before 1932 that are still living once the person applies for an electronic birth certificate (that is, on demand). The MLA does automatic issuance of a Personal Identification Number (PIN) to persons at birth and to the existing population with a birth record.

Births and deaths that occur in private health facilities or at home are registered in paper format at District Registrar offices and the records sent to the MLA on quarterly basis or on demand. Plans are underway to establish more online registration centres in the districts that have low reporting capability so that online registration of births and deaths approaches the target of 100%.

The MLA has the capacity to provide the CSO with statistical data on births, deaths and marriages electronically. All the data that the CSO normally collects on statistical return forms from the district registrars are now available in **comma-separated value (CSV)** file format. However, the MLA does not code cause of death statistics as this function is outside its area of competence.

Demographic Surveillance

The National Surveillance Unit (NSU) monitors, investigates and co-ordinates activities related to communicable diseases. This is achieved through passive, active, sentinel, syndromic and special surveillance (for example, mass gathering, outbreak and disaster surveillance). The NSU performs ongoing systematic collection, collation, analysis and interpretation of health data from the County Medical Offices of Health (CMOsH), RHAs, health centres, hospitals, and sentinel private physicians and private hospitals.

The NSU co-ordinates the response to all communicable disease outbreaks by alerting the Chief Medical Officer, Director of Trinidad Public Health Laboratory, CMOsH and other relevant entities, while also providing guidance and technical support. The unit also coordinates International Health Regulations (IHR) compliance activities. It collaborates with the Caribbean Epidemiology Centre (CAREC), Pan American Health Organisation (PAHO)/World Health

Organisation (WHO) and other key stakeholders in ensuring that national response is consistent with regional and global guidelines.
Among the challenges that confront the surveillance system are human resource and IT infrastructure weaknesses. These limit the capability to prevent and control communicable diseases. Also, there is no representative health demographic surveillance system (HDDS) in place at present and the last Demographic and Health Survey (DHS) was conducted in 1987.

Health Service Data

The Department of Policy, Research and Planning (DPRP) in the MOH collates, analyses and reports data on health service utilisation. Public health facilities and vertical programmes send data directly to the MOH on monthly basis. RHAs have limited capacity to undertake analytical work and data from the private sector is scanty. The MOH strives to be current on publications but feedback to lower levels and stakeholders outside the public sector is infrequent.

An Information, Communication and Technology (ICT) Division manages technology services for the Ministry and provides hardware, software and network support services to all public sector health facilities and administrative units (including higher-level support services to IT units at RHA level). Significant achievement has been made by way of IT rollout:

- Computer hardware and software have been supplied to all 187 public health sites in the country
- Broad band internet connectivity has been extended to public sector sites – a total of 87 sites (47%) currently have wide area connectivity; of these, 33 use the Government's Communication Backbone (GovNeTT) as the provider
- A website for the MOH is published and updated frequently
- A (draft) ICT strategy was produced in December 2010

The Division however faces a number of challenges of which inadequate human resource supply is the most critical. Consequently, it has been difficult to provide timely customer support services – for instance, Complaints Resolution Time (CRT) in the first nine months of 2011 averaged 81 hours.

IV. THE STRATEGIC PLANNING PROCESS

(a) Leadership and Ownership

The MOH led the strategy development process building on experiences gained from the HIS Assessment. The preparatory phase involved Consultant recruitment and constitution of the HIS Core Team. Composition of the Core Team is broad-based with membership drawn from

the public and private sectors. Organisations represented include the MOH, MLA, CSO, iGovTT[10] and RHAs. These are major producers and users of health information. The Core Team is thus knowledgeable about local constraints to evolving an integrated HIS as well as opportunities for service improvement.

The Core Team functions in both advisory and facilitatory capacity. It facilitated a two-day stakeholder workshop organised in September 2011 as part of the strategic planning process – Core Team members led group discussions on select themes for HIS strengthening. They also provided additional input to the recommendations that emerged from group discussions as well as post-workshop meetings convened to refine strategic objectives and priority activities. An extended role for the Core Team is envisioned in the governance framework proposed under this strategy (see Annex III).

Ownership of the strategic plan is reflected in the active involvement of the Senior Management at every stage of the planning process. Inclusiveness is evident in the size and diversity of participants at the national stakeholder workshop and key informant interviews conducted. The strategic interventions proposed are thus home-grown solutions which have great potential to significantly improve health systems development in Trinidad and Tobago.

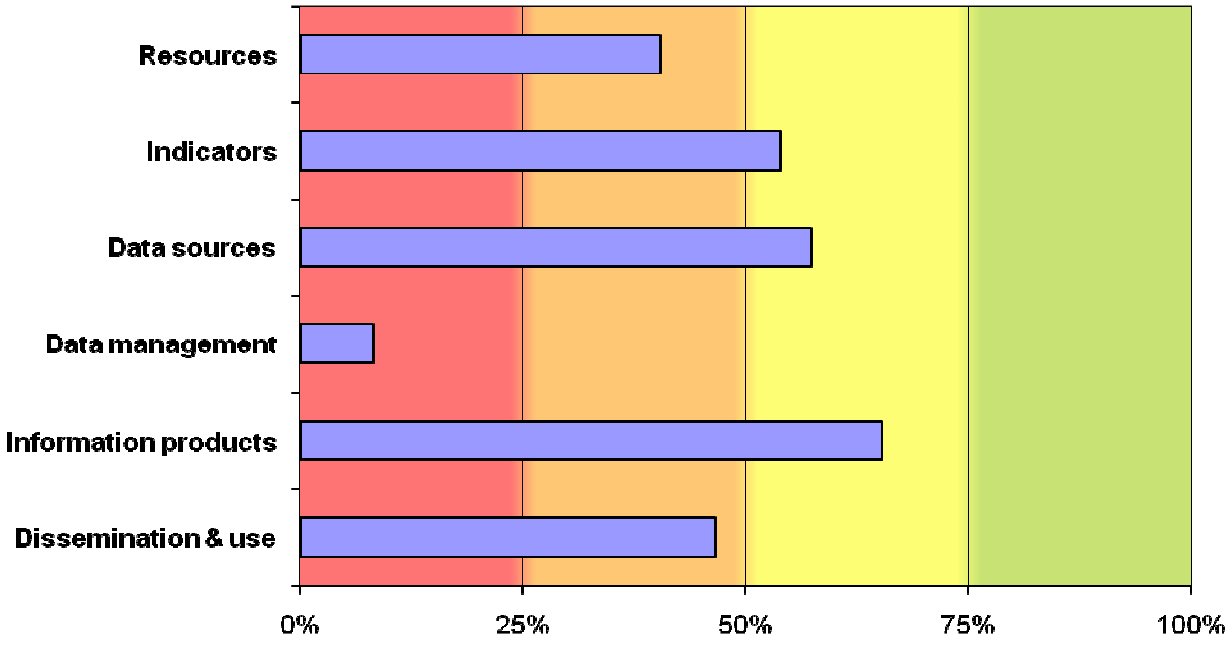
(b) Findings from the HIS Assessment

In June 2010, the MOH completed an assessment of the HIS using the framework proposed by the HMN. The exercise was conducted by a multidisciplinary team drawn from the public and private sectors as well as international organisations (PAHO and IADB). Led by the MOH, the assessment reviewed both population-based and health service-based information.

Findings from the assessment are summarised in Figure 3 below. Of the six components of the HIS that were reviewed, two were rated as being “adequate” (mean score of 50-75 percent). These are Data Sources (57 percent) and Information Products (65 percent). Three components, namely Resources (39%), Indicators (44%) and Dissemination and Use (47%) were considered “present but not adequate” with mean score between 25 and 50 percent. The final component, Data Management, coming in at 10 percent was rated “not adequate at all” (mean score below 25 percent).

[10] iGovTT is a government agency that provides champions and advances the development of ICT and its use by key stakeholders for socio-economic development in Trinidad and Tobago and the Caribbean region

Figure 3: Overall Results from His Assessment, 2010



In-depth review of the results revealed wide variation in scores reported for different sub-components of the HIS (Table 1). Under Data Sources for instance, Vital Statistics and Census scored 75 percent and 67 percent, respectively while Health Service Records posted just 39 percent. Indeed, Vital Statistics was the only subcomponent that hit the 75 percent mark. Overall, "Information Products" emerged the strongest component with an average score of 65 percent. This attests to the commitment of the MOH to provide timely information for the benefit of stakeholders. The Ministry's annual report card for instance is current for 2011 although indicators reported date back to 2006.[11]

In particular, weaknesses in data collection and analysis (data management issues) plague the system and delay the publication of current information. A time lag of 3-4 years in publishing processed data ultimately diminishes the value of the information supplied for purposes of policy and planning, and in predicting future use of health services.

[11] Ministry of Health. Health report card for Trinidad and Tobago, 2011 Port-of-Spain, 2011

Table 1: HIS Assessment Score by Component

Resources	**41%**
Policy and planning	24%
Institutions, human resources & financing	37%
Infrastructure	62%
Indicators	**44%**
Data sources	**56%**
Census	67%
Vital statistics	75%
Population-based surveys	57%
Health & diseases records	60%
Health service records	39%
Resource records	40%
Data management	**10%**
Information products	**62%**
Dissemination & use	**46%**
Analysis and use of information	49%
Policy & advocacy	47%
Planning & priority setting	48%
Resource allocation	29%
Implementation & action	52%

Note that while the HMN tool provides a structured framework for assessing health information systems, ratings are highly subjective and the potential exists for scores to be over or underestimated. For example, it would be difficult to assess the adequacy of HIS human resources where "norms" or benchmarks for IS/IT staffing have not been established or where updated information on staffing levels is not available to assessors. Likewise, the adequacy of HIS financing would be difficult to verify in the absence of national health accounts, hence, the claim that HIS financing is "adequate" (as per the HIS assessment report) can be difficult to uphold.

(c) Cross-cutting Issues

i. Human Resources

The availability of personnel with good data entry skills, analytical ability and strong IT capability (hardware, software and network management) significantly impact the ability of the HIS to deliver quality information. The weaknesses identified by HIS stakeholders (see SWOT analysis below) are to a large extent attributable to shortage of staff in key areas of HIS development. This manifests in various ways including long lead times from data collection to publication of reports. For instance, the latest edition of the Population and Vital Statistics Report (published by the CSO) is dated 2006.

A rapid assessment of HIS human resource needs was conducted in October 2011 as part of the strategic planning exercise. The study found that:

- RHAs were unaware of the existence of staffing structure approved in 2009 for ICT Divisions; consequently
- Each RHA formulated its own standards for IS/IT staffing
- Incremental staffing needs were often inadequately addressed when initiatives involving health IT were adopted
- Career paths for IS/IT staff were ill-defined

Using as "norm" the approved staffing standards [see Annexes 1(a) and (b)], it was observed that:

- Vacancy rate for IS/IT staff at MOH and RHA levels was as high as 50 percent – these are positions that are considered critical to sustaining current levels of health service delivery[12]
- Medical transcriptionists, health records clerks and IT technicians were some of the positions often not filled
- Shortages were present at MOH level but more pronounced at RHA level
- There were regional disparities in vacancy rates – for unspecified reasons rates were considerably higher in the SWRHA than in any other region

In addition, there were the following concerns:

- A growing private health care subsector that offers more attractive remuneration for skilled IT personnel would make it increasingly difficult for the MOH and RHAs to attract and retain qualified IS/IT staff for both development and support functions
- Expansion of public sector health information network and installation of EHRs could exacerbate existing skills shortage thus diluting expected gains from the investment in health IT

The upside is that existing health workers can be easily trained in basic computer use and data entry functions given the high adult literacy rate. Indeed, local training institutions are believed to have the capacity to meet future needs for entry-level and intermediate level IT personnel. Even so, budget constraints and delays encountered in the public sector recruitment process often result in unfilled positions even at lower levels. In the past, the MOH had engaged contract staff (nationals and expatriates) to fill key IS/IT positions. An explicit (medium-to-long term) strategy for recruitment and retention is now required as the contracts are set to expire.

[12] Ministry of Health. Report on rapid human resource needs assessment to support the health information system. Port-of Spain, Nov. 2011

ii. Policy vs. Practice

Some degree of contradiction is apparent between health policy and priorities previously selected for HIS improvement. Until now, the emphasis has been on information systems and technologies that support care in hospitals whereas the health policy emphasised primary care. Coding of health services was also restricted to in-patient care although, outpatient visits constituted up to 70 percent of patient encounters with the health system in Trinidad (75 percent in Tobago).[13] This contradiction is likewise seen in the draft ICT strategy cited above.

iii. Communication and Change Management

Poor communication impedes HIS development at different points in the system. This was apparent from site visits and interviews conducted as part of the strategic planning exercise. Poor communication increased the likelihood of duplication of HIS-related tasks by different units and uncoordinated investment in HIS. Inadequate information on the progress of the Health Information Management System (HIMS) project was, indeed, cited as one reason why RHAs were opting for alternative IT solutions with little consideration for interoperability in the future.[14] Also, the RHAs did not appear to have clear guidelines from the MOH regarding ICT infrastructure development, hence, technology acquisition was sometimes based on incomplete assessment of benefits and costs (investment and operating) while insufficient effort was made to obtain buy-in from end users.

(d) SWOT Analysis

The strengths and weaknesses of the HIS along with opportunities and threats are presented in Table 2. These complement information provided in the HIS assessment report. Overall, the commitment to building an integrated HIS remains strong. The evidence points to a dynamic system that is eagerly pursuing reform via multiple IS/IT initiatives but one in which insufficient planning and weak coordination threaten gains from proposed investments.

[13] Calculated from data in Annual Statistical Report 2004-2005, Ministry of Health, Port-of-Spain

[14] HIMS project refers to an enterprise Electronic Health Records system which the MOH proposes to install nationwide

Table 2: SWOT Analysis

Strengths	Weaknesses
• Top management buy-in to the concept of integrated HIS strategy • Core group of enthusiastic and competent personnel within the MOH and stakeholder institutions to drive HIS improvement process • Availability of some standards, tools and guidelines for data collection in health facilities • Small and compact population – facilitates coverage by EHRs • M&E unit within MOH • Existence of an e-government policy • Personal Identifier Number and electronic database for registration of births and deaths • Draft ICT strategy and technical specifications for EHR developed	• Long list of indicators and numerous reporting formats • Wide gaps in human resource supply; high staff turnover • Inadequate financing of M&E activities; failure to budget sufficiently for M&E activities under national programs • Limited capacity for data analysis especially at RHA level and below • Data analysis and reporting lag behind by several years • Limited capacity of IT units, especially, at RHA level • Poor communication among agencies leads to duplication of work • Private sector data is not captured • Data quality assessment is infrequently done • Resistance from (older) clinicians and managers regarding adoption of EHRs • Limited use information for decision-making • No standards or guidelines for health IT – poses barrier to interoperability and data sharing • Absence of legislation to support EHRs
Opportunities	**Threats**
• Existence of central body (iGovTT) to guide investment in ICT • eGovernment Strategy under preparation – will provide unified framework for information sharing • IT support capability in the private sector – potential to contract-out user support services in outlying areas • Adoption of performance contracts by RHAs – likely to increase demand for timely and accurate information • Public sector dominance in health care – could facilitate adoption of standards and rationalisation of ICT • Availability of open-source software for EHRs	• Competition from private sector for IT staff • Political pressure to "deliver" – can fuel adoption of short-term IT solutions with long-term consequences for costs and sustainability • Decline in central government revenues from contraction in national/global economy • Cyber attacks – a continuing threat to web-based systems (like the proposed HIMS)

V. MISSION, VISION, GUIDING PRINCIPLES

MISSION

The HIS collects, analyses and reports data and information which support policy and resource allocation; facilitate delivery of coordinated, appropriate and safe health care; and ensure timely reporting of trends in health status, health care and availability of resources at all levels of the health system.

VISION

Trinidad and Tobago will have a fully integrated, technology-driven health information system that ensures validity and reliability, and facilitates access to information to promote, protect and improve the health status of its people.

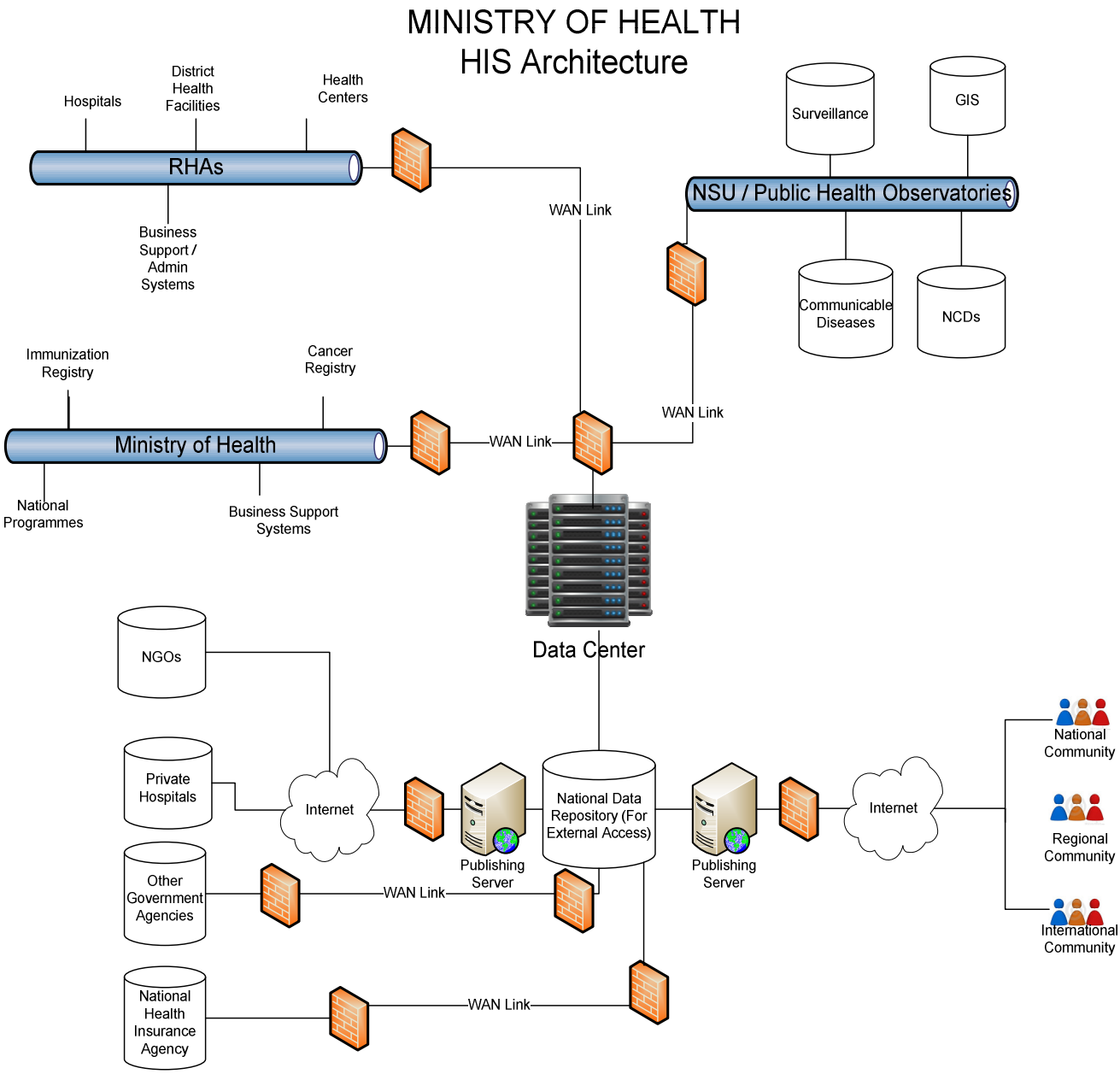
GUIDING PRINCIPLES

- **Privacy and Confidentiality** – the data and information entrusted to us will be secured using procedures and technologies that prevent unauthorised access and disclosure of information stored in manual or electronic format
- **Portability** – individuals and health care providers will have ready access to personal health records anywhere in the country and at any time via secure electronic portals
- **Partnership** – we will reach beyond traditional boundaries to understand and respond to the information needs of diverse stakeholders within the public, private and non-profit sectors
- **Responsiveness** – we commit to maintaining system integrity, to minimise downtime and ensure prompt resolution of complaints
- **Continuous Improvement** – through learning and innovation, we shall continue explore new ways and tools to deliver value to stakeholders

VI. SRATEGIC OBJECTIVES, ACTIVITIES AND PERFORMANCE INDICATORS

This strategic plan presents a targeted and balanced approach towards strengthening the national HIS; interventions described below emerged from the group work done at the stakeholder workshop. Implicit in the plan is the recognition that even if the financing required to improve the HIS were available at the start of implementation, building the human resource and institutional capacity to manage a robust system would necessarily take several years. In essence, the strategic objectives and activities chosen represent the best mix of interventions to strengthen population and service-based information in ways that better serve national health goals. The proposed HIS is illustrated in Figure 4 below:

Figure 4: National Health Information System Architecture



HIS strengthening activities were further refined by the Core Team and categorised into the following strategic objectives:

OBJECTIVE #1: INTENSIFY ADVOCACY AND REINFORCE POLICY AND REGULATORY FRAMEWORK

(Key elements: Advocacy, Policy, Research)

Policies and regulations that guide the collection, reporting and use of health information will be reviewed to ensure alignment with national development goals and ICT strategy. A multi-disciplinary team drawn from the MOH, CSO, MLA and iGovTT will undertake the review. Measures to enhance privacy and confidentiality of health information including release of personal health records (PHRs) will be revised to ensure relevance to an evolving system that is built on an electronic platform. The reporting responsibilities of stakeholders in the public, non-profit and the private sectors will also be addressed. The findings will inform revision of existing statutes or drafting of a HIS policy.

Advocacy will be intensified so that there is buy-in at the highest levels on the concept of musltisectoral, integrated HIS. Funding will be provided to support the implementation of a new governance structure as proposed in Section VIII (below).

The strategic plan recognizes the vital role that information plays in health research while also acknowledging the role of research in strengthening the HIS. Consequently, studies will be conducted to show the effectiveness of HIS strengthening activities on operational performance of health facilities and outcome of clinical care. This presents yet another opportunity to foster collaboration with local/regional academic institutions as part of a coordinated approach towards health systems strengthening.

Proposed Activities

1.1 Undertake comprehensive review of existing HIS policies and legislation
1.2 Draft a national HIS policy and submit for approval by Parliament
1.3 Implement governance structure
1.4 Disseminate HIS Policy to stakeholders – conduct stakeholder workshop; develop and distribute brochures/flyers on key aspects of HIS policy
1.5 Undertake research to document changes in clinic workflow and efficiency following introduction of HIS improvement
1.6 Undertake research to document change in clinical outcomes following adoption of Chronic Disease Electronic Management System (CDEMS)

Key Performance Indices

i) Dissemination of updated HIS legislation to key stakeholders in public, non-profit and private sectors

ii) Percent of central government health expenditures allocated to HIS – an increasing trend is expected within the period covered by the plan

OBJECTIVE #2: EXPAND ICT INFRASTRUCTURE AND FUNCTIONALITY

(Key elements: Electronic Health Records (the HIMS), Web Portal, ICT Standards and Guidelines)

The ICT strategy developed by the MOH provides the platform upon which this strategic objective is built but with modifications to ensure alignment with the (broader) concept of HIS as advanced in this document. Thus, the modernisation and expansion of ICT infrastructure is the thrust of this objective that seeks to interconnect the health network via electronic technology. Consistent with the national health policy, emphasis will be placed on primary care services in the implementation of this strategic objective.

The expansion of the eHealth card project is a pivotal activity under this objective and is aimed at capturing patient demographics in electronic format so that duplication of patient records is almost completely eliminated. This will substantially reduce administrative/filing costs as well as wait times in health facilities. The expansion will cover health centres, hospital outpatient clinics and Accident and Emergency departments.

The installation of an enterprise EHR (the HIMS) to relay clinical and management information via secure channels is another core intervention. Procurement activities in this regard have already commenced; its implementation is expected to span 5 or more years in the bid to achieve nationwide connectivity. As at November 2011, computer hardware had been supplied to all 187 public health sector sites and broad band connectivity established via Local Area Networks (LAN) in 33 sites (representing 18 percent coverage). Also, technical specifications for the HIMS have been approved by the government. In effect, activities under this objective are a continuation of the health sector reform agenda to inter-connect all public health institutions.

The web-based application will capture patient encounters in outpatient and inpatient settings in real time. Secure provider and patient access portals will afford portability of health information and reduce health care transaction costs while empowering individuals to have greater control of their health. The architecture will also support the national health insurance scheme (NHIS) to be piloted from 2012-2014.

Considering the size of proposed investment in ICT infrastructure and network expansion, interoperability of systems has become a central issue. Towards this end, health IT initiatives that are proposed from 2012 will be subject to review by a central committee (ostensibly the HIS Core Team) to ensure that core modules are compatible with the enterprise software that will ultimately be installed by the MOH. National standards and guidelines for ICT will be developed and widely communicated for adoption by the MOH and RHAs. Legacy systems which cannot be interfaced with the enterprise software may be discontinued. An ICT infrastructure acquisition and maintenance plan along with business continuity plans will also be developed.

Proposed Activities

2.1 Procure, install and configure ICT equipment, and establish connectivity to create a national health network
2.2 Deploy electronic health records (HIMS software)
2.3 Upgrade ICT infrastructure at RHA level
2.4 Deploy LAN & ICT equipment to public health sector sites
2.5 Implement common Network Architecture across public health sector
2.6 Upgrade PABX voice communication for Ministry of Health, Head Office and Vertical Services, National and Special Programmes
2.7 Upgrade voice communication facilities in all RHAs
2.8 Implement health IT Helpdesk Network
2.9 Rollout of National HIV/AIDS Surveillance System
2.10 Establish Medical Library Services Network for medical professionals
2.11 Configure and install ICT systems and support for National Health Insurance Scheme (NHIS)
2.12 Expand eHealth card program - computerise out-patient registration and medical records system
2.13 Install Injury Surveillance Application
2.14 Roll-out Chronic Disease Electronic Management System (CDEMS) in all RHAs
2.15 Provide ICT Support for Vertical Services and other MoH departments
2.16 Develop and implement ICT infrastructure acquisition and maintenance plan (inclusive of standards, guidelines, and business continuity plans)

Key Performance Indices

i) Percent of public health sector sites with secure broad-band connectivity
ii) Percent of eligible users accessing the virtual library network via secure connections
iii) Complaint Resolution Time for health IT services (in hours)

OBJECTIVE #3: ENHANCE INTEGRATION OF DATA SOURCES

(Key elements: Unique identifiers, National Data Repository)

Integration of HIS is facilitated where data elements are well-defined and reporting formats are uniform. Consistency of data makes for easier analysis and comparability from one geographic region to another and from one time period to another. Towards achieving this objective, protocols and standards for data exchange will be developed so that databases in multiple silos are able to communicate. A web-based national data repository will be created. It will facilitate use of data for research purposes as well as enhance access to vital information for national health development.

The GoRTT will strengthen population-based health information under the plan so that the goal of capturing 100% of births and deaths in the country is achieved. In this regard, the major stakeholders (the MOH, CSO and MLA) have initiated dialogue with intent to adopt unique identifier codes for every citizen or legal resident that uses services provided by the institutions from 2012. This is another low-cost intervention that will reduce duplication of personal (health) records. As inter-agency collaboration is strengthened, it will be possible to link MLA database with the CSO's so that coding of cause of death is facilitated. The CSO already employs trained personnel who are familiar with medical terminologies. These will be trained further on use of ICD-10 codes (see 4.6 below).

The MLA plans in the future to interface its database with other vital sources of information such as the Department of Immigration so that changes in population attributes brought about by movement of people within and across international boundaries are captured in near real time. It will be easier to also study how population migration affects disease outbreak and distribution patterns.

Proposed Activities

3.1 Identify data sources for unique codes applicable to data sets
3.2 Adopt existing personal identification numbers (PIN) for patient records
3.3 Develop protocols and standards for data capture, storage, and exchange
3.4 Introduce electronic transfer of vital statistics between MLA and CSO
3.5 Expand number of civil registration sites with electronic data management capability
3.6 Create national data repository
3.7 Conduct national health survey and health needs assessment
3.8 Conduct GIS mapping of health resources, disease patterns and social determinants of diseases
3.9 Establish a Health Demographic Surveillance System across the country

Key Performance Indices

i) Percent of communities mapped for health resources, disease patterns and social determinants of disease
ii) Lead time from collation to publication of Population and Vital Statistics Report (in months)

OBJECTIVE #4: IMPROVE DATA MANAGEMENT

(Key elements: Indicators, Metadata Dictionary, Data Quality Self-assessment)

To enhance the performance of the HIS, the list of indicators will be streamlined. In particular, the indicators reported by vertical programmes will be aligned with the revised list of core indicators. Emphasis will be placed on indicators that enable managers and departmental heads to monitor operational performance within their units. These will include measures of quality of care and patient satisfaction. National benchmarks will be established so that performance can

be compared across health facilities and across RHAs. Proposals for performance-based resource allocation will undoubtedly require such detailed information.

Streamlining indicators, for instance, will reduce the amount of resources that go into the collection, analysis and reporting of information of doubtful relevance to policy and operational management. A national data repository that is updated regularly will likewise improve stakeholders' access to timely information, and enhance the quality of health intelligence that guides the design of community and service-based interventions to improve population health.

Measures to assure the quality of data input into the HIS will be institutionalised. A metadata dictionary will be created. Preliminary work has begun in this area and will be concluded early in the implementation of the strategy. Data entry clerks will be trained to use ICD-10 codes and to conduct data quality self-assessments (DQS). These are low cost, low visibility interventions with potentially huge impact in terms of the quality and reliability of health information.

Proposed Activities

4.1 Define list of core (national) indicators to be reported at health facility, regional and national levels
4.2 Develop metadata dictionary
4.3 Develop manuals of procedures and standards for data collection, storage, analysis, reporting and quality control
4.4 Provide training in Data Quality Self-assessment (DQS)
4.5 Conduct DQS
4.6 Train data entry clerks in the use of ICD-10 codes
4.7 Procure analytical software (SPSS, STATA, Epi Info, other)
4.8 Train staff in the use of analytical tools (SPSS, STATA, Epi Info, other)

Key Performance Indices

i) Percent of health facilities reporting at least 80% of agreed indicators sets within 15 days of end of period
ii) Accuracy Rate (for data entry)

OBJECTIVE #5: BUILD HIS HUMAN RESOURCE CAPACITY

(Key elements: Comprehensive Needs Assessment, Out-sourcing, Management Capacity-building)

Human resource challenges are addressed on multiple fronts. A comprehensive IS/IT human resource needs assessment will be conducted in the first year of strategy implementation. Beyond planning and recruitment, the study will review human resource management issues including compensation, communication, training and career development – issues that impact employee retention in the public sector.

Additionally, short and medium-term measures to bridge capacity gaps are proposed under the plan. In the short-term, the emphasis will be on supplying the critical skills needed to raise standards of IS/IT services to the "norm" specified by the government for current levels of service delivery. Engaging critical IT personnel on 6-12 month (renewable) contracts will enable the MOH and RHAs to rapidly acquire additional capacity with minimal administrative delay.

As part of the effort to beef up management capacity in the health sector, the MOH will invest in training health service managers who are skilled in operational and financial management, and are trained to use evidence for decision-making. Sponsoring employees for graduate level courses in Epidemiology, Biostatistics and Healthcare Management will enhance central and regional capacity for analytical work and bolster efforts to build a strong health intelligence network in the country.

Proposed Activities

5.1 Conduct comprehensive HIS Human Resources needs assessment (competency review, job description, career path, compensation)
5.2 Recruit Epidemiologists, Biostatisticians and IT specialists at MOH and RHA levels
5.3 Provide in-service training in Epidemiology, Biostatistics, Public Health Informatics
5.4 Provide/update training on use of office suites
5.5 Provide IT support for regional and district health facilities
5.6 Train staff at MOH and RHA levels in data analyses and reporting

Key Performance Indices

iii) IS/IT staff vacancy rate
iv) Staff turnover rate (percent)

OBJECTIVE #6: ENHANCE DISSEMINATION AND USE OF HEALTH INFORMATION

(Key elements: Dashboard, Feedback, Public Health Observatory)

Improving the ability of stakeholders to use information in ways that improve health is the ultimate goal of this strategic plan. The value of the HIS will be partly reflected in the extent to which its products drive policy and resource allocation decisions at county, regional and national levels; the extent to which they impact quality of care; and the degree to which they influence behaviour change at individual and community level. Providing (quarterly) feedback from national to sub-national levels (including the private sector) is one way by which use of information can be encouraged.

Consistent with this objective, health intelligence capability will be strengthened at central and regional levels taking care to avoid overlap with other entities (like county health offices and disease surveillance units) that perform similar functions. A study tour of PHOs in a country with well-established system will be instructive. The insight gained will guide review of the PHO in the ERHA and inform on policy options for enhanced performance.

To improve quality and efficiency in patient care and to promote rational use of resources, clinical and management dashboards will be developed. Appropriate levels of staff will be trained to use these tools. It should be emphasised though, that while dashboards can be effective tools of management, they are no substitute for sound clinical and management training combined with hands-on experience.

Proposed Activities

6.1 Develop clinical and management dashboards
6.2 Train physicians/clinical service providers in the use of dashboards for patient care
6.3 Train MOH senior managers in the use of dashboards for decision-making
6.4 Train MOH managers, regional and hospital managers on use of dashboards for performance improvement
6.5 Undertake study tour of Public Health Observatories (PHOs)
6.6 Evaluate, restructure and expand/create additional PHO
6.7 Provide feedback to stakeholders at different levels of health service delivery

Key Performance Indices

i) Percent of trained MOH senior managers and RMT members who use management dashboards at least twice per week
ii) Percent of public health facilities that received quarterly feedback on health statistics

OBJECTIVE #7: PROMOTE INTERSECTORAL COLLABORATION

(Key elements: Regional Collaboration, Electronic Reporting, Private Sector)

Enhanced collaboration with internal and external partners is one of the strengths of the medium-term strategy for HIS development as it marks a major shift from the tradition of keeping it all in the public sector. This plan will promote interaction among public, NGO and private sector stakeholders. On her part, the MOH will identify and include information that is relevant to private sector Organisations in the monthly bulletin published.

Data sharing between public and private sector entities will be promoted principally via incentives. These might include invitation to private sector providers to participate in telemedicine sessions and distance learning activities sponsored by the MOH. Such collaboration will help to build trust and encourage bi-directional flow of information between the public and private sectors. Financial incentives as obtain in a health insurance scheme can provide even greater incentive for private sector Organisations to share information on health services utilization and costs. These are in addition to regulatory measures aimed at improving compliance in reporting by private sector entities.

To enhance voluntary and mandatory notification as in (suspected) cases of rape, domestic violence, child abuse and infectious disease, the use of electronic interface between private sector health facilities and specific agencies such as law enforcement and Ministry of Youth and Social Development will be explored. This will enable the appropriate authorities to initiate timely action. An arrangement that fosters collaboration between public and private sector Organisations will be good for stakeholders in the long run.

Proposed Activities

7.1 Promote exchange of professional opinion and information through exclusive communication server
7.2 Pilot telemedicine initiative to support patient care and continuing professional development
7.3 Produce inter-disciplinary reports/bulletins reflecting trends in health status and health care
7.4 Strengthen Regional (LAC) collaboration on HIS development

Key Performance Indices

i) Number of times interdisciplinary reports are disseminated to stakeholders (including private sector)
ii) Number of regional (LAC) conferences/meetings attended HIS staff

VII. IMPLEMENTATION – Operational Strategy and Financing

The implementation of the HIS strategy will follow "programme" rather than "project" approach. Execution of activities will fall on each department, Organisation or agency in line with current mandate. A Work Plan detailing activities to be implemented and the time frame is provided as a separate attachment to the strategic plan.

The phasing of activities takes due recognition of the need to build capacity in many departments and implementing units. Hence, priority is given in Years 1 and 2 to low-cost, high impact interventions that can be implemented fairly quickly with minimal additional human resource input. These include activities to improve the integrity of data, adoption of personal identifier numbers, and roll-out of the eHealth card project. These measures will reduce the cost of filing index cards and waiting times for primary care services in hospitals, health centres and other clinics across the country.

The implementation of Objective #2 will require skills and competencies that may not be readily sourced in-country. The expanded IT network and complexity of EHRs will increase demand for technical and support personnel, some of whom may have to be contracted or the functions outsourced. Recruitment activities need to commence early in the implementation phase. The human resource study provides a useful point from which to intervene. Provision will also be made in the budget for technical assistance to back-stop programme implementation particularly in the first 12-24 months.

The appointment of a National HIS Coordinator is critical to the implementation of the HIS strategy. The Coordinator will have primary responsibility for driving the implementation process (see Governance Framework below). S/he will prepare on annual basis, an action plan with budgets for review by the Core Team and Steering Committee. Feedback from the Committees will be taken into account in finalising the action plan.

The financing of activities in the strategic plan will come largely from government tax revenues. Cost estimates for Year 1 activities will be submitted for approval by the government. This will come as a separate attachment to the strategy document. A financial plan which details costs for each activity in the plan will subsequently be developed during the first year of implementation. The cost of this activity will also be included in the budget for Year 1.

Traditionally, donors have played a limited role in health sector financing in Trinidad and Tobago. Nevertheless, this remains an option that can be explored if the need to close financing gaps arises in the future.

VIII. MONITORING AND EVALUATION

Governance Framework

Successful implementation of the HIS strategy requires that appropriate structures be in place to guide the process through the entire 5-year period. In so doing, it is important to avoid creating new or parallel structures that take away even more of the limited capacity currently in place. Instead, existing structures should as much as possible be adapted to the wider concept of integrated national HIS. The recommended structure for HIS strategy implementation is shown in Figure 5.

Central Coordination

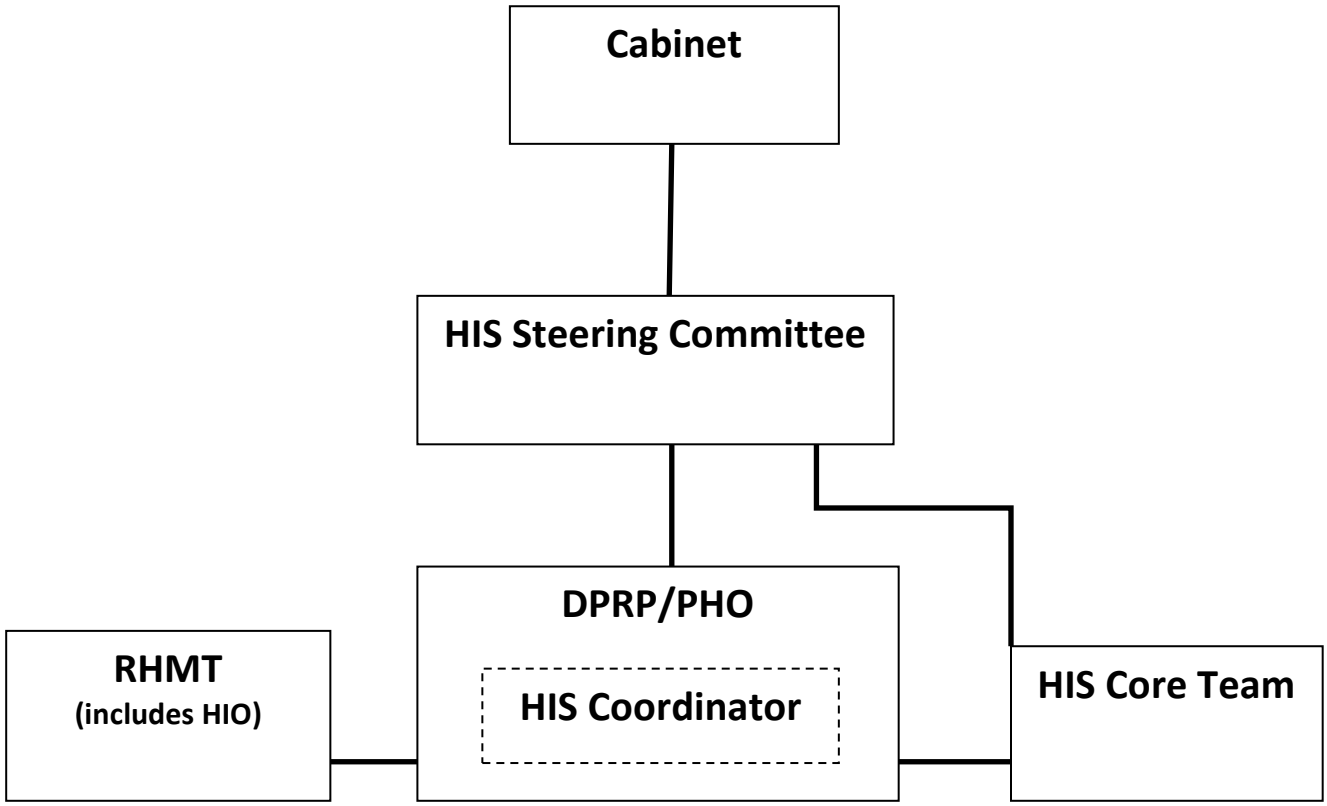
i) HIS Steering Committee (Policy/Advocacy/Oversight)

A number of committees were earlier set up by the MOH to support HIS development under the HSRP but some of these are now defunct. The IT Steering Committee is one of those still active – its composition and function will be modified to fit the broader vision of HIS. The Health Information System Steering Committee as the new body will be called will provide oversight on HIS strengthening efforts in the country. The Committee will function in policy and advisory roles. Responsibilities will include setting standards and guidelines for information management, and investment in HIS. A Terms of Reference (TOR) is provided as (Annex II)

ii) HIS Core Team (Monitoring/Facilitation/Advisory)

Supporting the Steering Committee is the HIS Core Team which will have responsibility for monitoring and facilitating the implementation of activities laid out in the HIS strategy. The Core Team has been an integral part of the strategy development process. It will continue in this facilitatory and advisory role, providing critical technical input on implementation and acquisition/role-out of health IT as outlined in the TOR (Annex III).

Figure 5: Proposed HIS Governance Structure



Notes: DPRP – Department of Policy, Research and Planning, Ministry of Health
HIO – Health Information Officer
HIS – Health Information System
PHO – Public Health Observatory
RHMT – Regional Health Management Team (or equivalent)

iii) National HIS Coordinator

The ICT Division of the MOH had up to this point assumed responsibility for central coordination of HIS strengthening activities. The HIS assessment in 2009/2010 and development of the strategic plan in 2011/2012 are some of the achievements already made. A great deal of institutional memory resides within this unit and should be preserved to the extent possible. Recognising, however, the need for the MOH to maintain a specialised IT unit particularly and considering the additional workload that will result from the installation of the HIMS, a gradual transfer of responsibility for HIS coordination to another department or agency is proposed as a way forward. Such a move will also diminish the tendency to revert to purely IT focus in the development of the HIS in the future.

It is envisaged in the short-run that the ICT Division will continue to drive the process. Upon approval of the strategic plan, responsibility will be transferred to a unit or entity like the Department of Policy, Research and Planning in the MOH which should have in place a senior officer (Manager level at the minimum) to serve as National HIS Coordinator. The designate will have skills in epidemiology, public health, health informatics or health care management plus field experience in HIS development or Monitoring and Evaluation. An alternative would be to transfer this function to a (central) PHO should such an entity emerge from the evaluation and future restructuring of the existing PHO. This will ensure that health intelligence capability is developed in the most efficient way.

Regional Coordination

The national committees mentioned above will strive for balanced representation from RHAs but avoid being so large to the point where effectiveness is compromised. The value in establishing regional HIS committees is questionable in a situation where human resource capacity is limited. It is thus proposed that oversight of RHA-level implementation be handled by existing regional management teams, strengthened where necessary by inclusion of a Health Information Officer. The effectiveness of this arrangement will be assessed midway into implementation (in Year 3) and modifications made as necessary.

The Governance Framework is expected to go into effect as soon as the HIS strategic plan is approved by the Government.

Performance Framework – Indicators

To enhance monitoring and evaluation, output and outcome indicators have been specified for activities under each strategic objective as shown in the Work Plan. A Performance Framework specifying key indices and annual targets for each strategic objective is also available (Annex IV). Baseline values for indicators are only partially available; the remainder will be obtained in the first year of implementation.

Critical Success Factors:

- Adhere closely to work plan and implementation guidelines
- Beef-up human resource capacity (engage competent hands)
- Be diligent in the costing of activities
- Ensure adequate funding
- Retain institutional memory (to the extent possible)
- Set and manage expectations especially with regards to EHRs

IX. RISK MANAGEMENT

A multi-sectoral approach as proposed under this strategy is prone to multiple conflicts arising from internal and external stakeholders. These can be so powerful as to derail the implementation of key components of the strategy and should not be overlooked. An attempt to weed out duplication of functions across agencies, for instance, can be threatening in a period of economic uncertainty and job losses even where efficiency gains from such consolidation of functions are quite apparent. Measures to mitigate (known) risks are presented in Table 3 below. Effective monitoring of the implementation process is however critical to minimise damage from unforeseen events.

Table 3: Risks and Mitigation

	Risk	Mitigation
a.	Change in political leadership and priorities for the health sector	• Ensure that HIS strategy is consistent with national health sector strategic plan 2012-2016 • Front-load His improvement activities within limits of available capacity • Intensify advocacy and stakeholder education on expected gains from integrated HIS development • Implement HIS governance structure so that institutional memory is broad
b.	Limited human resource capacity to effectively manage expanded ICT infrastructure	• Undertake comprehensive HR study which includes current and future needs - incorporate wider HR planning and management issues • Implement short- and medium-term remedial measures with regards to critical IS/IT staff at MOH and RHA level • Consider outsourcing IT support functions at RHA level to private sector for 24 months or more (as may be necessary) • Revise ICT project plans to adequately reflect HR needs

c.	Insufficient funding	• Undertake detailed costing of HIS interventions to include capital and recurrent costs – to be done in Year 1 of the plan • Implement appropriate mix of low-cost, high impact interventions • Ensure adequate oversight of programme/fund management • Explore external sources of financing
d.	Limited buy-in from clinicians on EHRs	• Mount advocacy and public education prior to implementation of HIMS • Identify physician champions of EHR at national and regional levels • Adopt effective change management techniques
e.	ICT system failures (including security breach)	• Install security updates to protect against unauthorized access, virus and malware attacks • Develop a plan for preventive maintenance to reduce system downtime • Set up IT help desk and monitor user support trends closely • Develop/update IT business continuity plans – warm and cold site implementation
f.	Sustainability of improvements	• "Programme" as against "Project" approach increases likelihood that institutional memory will be built across multiple departments/Organisations • Minimise staff turnover • Continue advocacy to support resource mobilisation

X. IMPROVING COMMUNICATION AND CHANGE MANAGEMENT

Measures to improve communication and facilitate change are key to successful implementation of the HIS strategy. Patients and health care providers need to be informed on the benefits and limitations of computerised health IT to moderate expectations. Recognising that successful implementation of the HIS strategy cannot be achieved via technology alone, the government will give due attention to strengthening institutional preparedness and change management at central and regional levels. In this regard, the MOH (with active involvement of its Change Management Unit) has already held preparatory meetings with all RHAs on the implementation of the national HIS strategic plan and its implication for the regions.

As a first step, RHAs were requested to identify teams to work with the Change Management Unit in this transition process. Furthermore, the Ministry sponsored training in Basic Computer Literacy across the sector to include RHAs, the Department of Health & Social Services (Tobago) and the vertical programmes. As at December 2011, a total of

738 staff had been trained. The training exercise will move to a more advanced level in the next phase.

Some resistance can be expected as the transition is made from manual to electronic systems. This is not uncommon with older clinicians who tend to be late adopters of technology. Productivity losses will also likely accompany the installation of EHRs; the first few months of system implementation can be frustrating to clinicians. These are potential sources of conflict that should be anticipated and effectively managed.

Specific measures to smooth the transition include the following:

- Disseminate HIS strategy to stakeholders including those in the private sector – communicate clearly the activities planned for Year 1 of implementation.

- Begin implementation of change management activities very early at sites identified for roll out of health IT – experience from the eHealth card project suggests that 6-8 months of stakeholder engagement would be required from sensitisation to deployment of technology.

- Define and manage expectations from ICT projects (especially those related to the HIMS); educate stakeholders on system capabilities and limitations at different stages of implementation – this is one of the critical success factors identified from the implementation of the eHealth card pilot in one of the test sites.[15]

- Provide quarterly or half-yearly updates to stakeholders on the implementation of strategic objectives to sustain interest; use multiple channels (intranet, website, bulletins) to reach multiple audiences (see list of workshop participants in Annex V).

- Encourage active involvement of RHA and hospital CEOs in the implementation of the HIS strategy and change management activities at regional level.

- The Change Management Unit will continuously monitor developments in different regions and make recommendations for improvement to the MOH and Core Team.

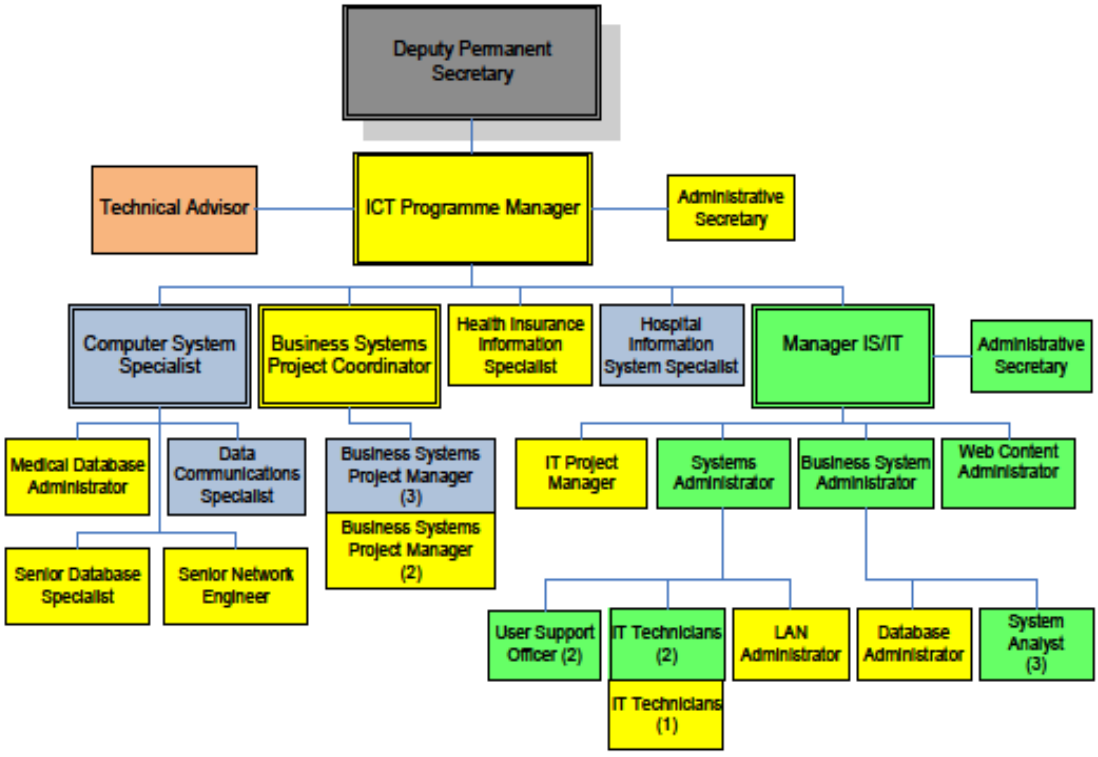
XI. NEXT STEPS

The strategic plan does not capture all HIS strengthening activities that are on-going or planned in the country within the specified time-frame (2012-2016). It will take several years before a fully integrated NHIS evolves. However, the activities outlined in the plan are feasible and have great potential to modernise the HIS. Following adoption of the strategic plan by stakeholders, it will be presented to the Cabinet for ratification.

[15] eHealth project is an electronic patient registration system installed in two health centers; it may have been wrongly perceived by patients as a full EMR that enabled electronic transfer of patient records

Annex I (a)

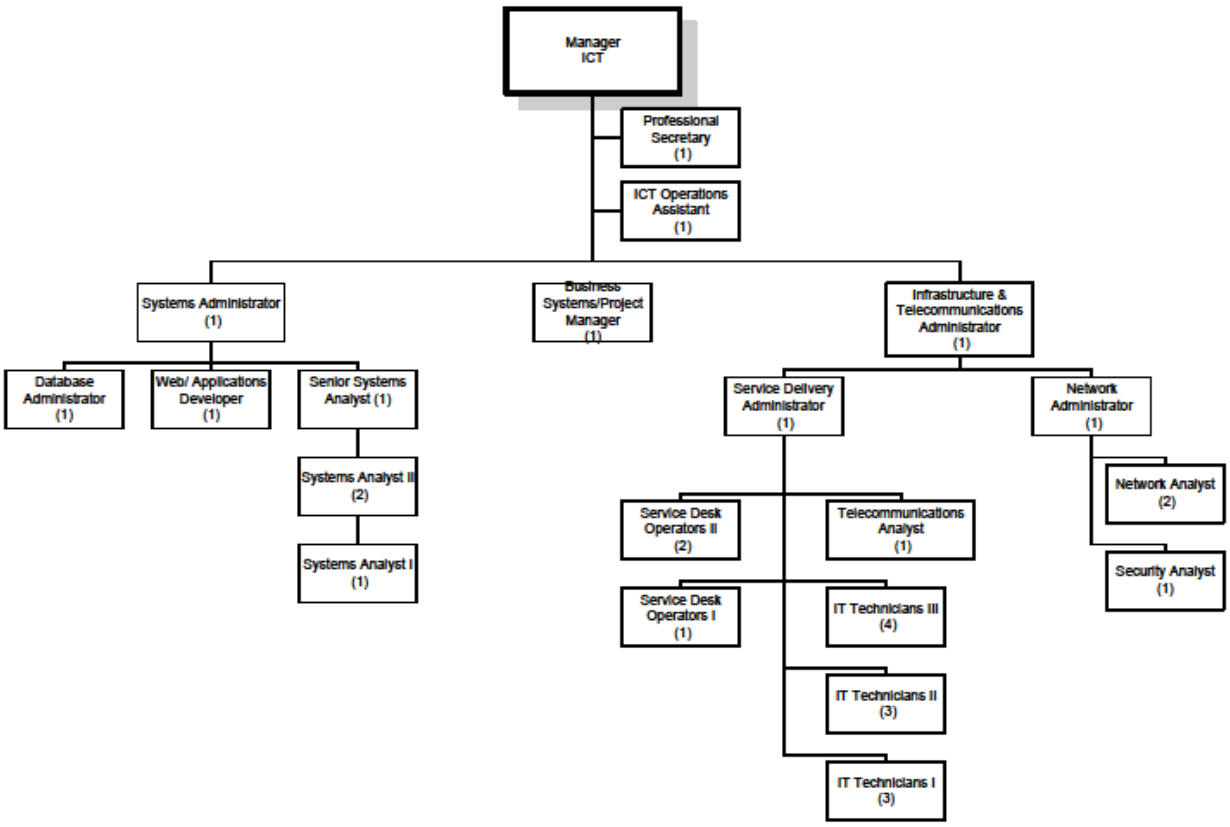
Organisational Chart of ICT Division, Ministry of Health



Note: Vacancies are coloured yellow.

Annex I(b)

Regional Health Authority
Information and Communication Technology Department



Annex II

NATIONAL HEALTH INFORMATION SYSTEM STEERING COMMITTEE

TERMS OF REFERENCE

Background

The Government of Trinidad and Tobago is committed to building an integrated health information system (HIS) that supports national health goals. A strategic plan that lays out priorities for HIS strengthening for the period 2012-2016 has been developed. Activities cover both population-based and institution-based health information and address needs in the public, private and non-profit sectors.

To ensure successful implementation of the strategy, a high-level, multi-sectoral committee will be set up to advise the government and stakeholders on policies, standards and guidelines for HIS development.

Composition

The Health Information System Steering Committee will comprise a maximum of 15 members drawn from the following institutions (number of persons in brackets):

a) Ministry of Health (3)
   - Permanent Secretary
   - Chief Medical Officer
   - Director, Policy, Research & Planning

b) Ministry of Legal Affairs (1)

c) Central Statistical Office (2)

d) Chief Executive Officer, RHA including Tobago (3)

e) iGovTT (1)

f) Local representative of PAHO (1)

g) Local representative of IDB or other multilateral Organisation (1)

h) Non-profit/private health care provider (1)

i) Other (2) – where necessary

Functions

The Committee will function in policy and advisory roles and will have the following responsibilities:

i. Approve HIS policies, standards, protocols and formats for reporting and sharing data among stakeholders
ii. Approve standards for IT infrastructure development/acquisition by MOH and regional health authorities
iii. Approve financial plan for HIS strengthening – detailed costing of activities to be done in Year 1
iv. Mount top-level advocacy to mobilise resources for HIS strategy implementation
v. Facilitate inter-agency coordination of HIS initiatives and investments
vi. Review annual financial plans and targets for HIS strengthening
vii. Review recommendations put forward by the HIS Core Team with regards to programme implementation
viii. Approve revisions to implementation plan where applicable
ix. Review and approve appraisal/evaluation reports on major proposals for investment in HIS

Tenure

Each member will serve a (renewable) term of 2 years for a maximum of two terms (4 years total). Not more than 50 percent of members may be replaced in any given year.

Frequency of Meetings:

The Committee will be chaired by the Permanent Secretary, Ministry of Health and will meet at the minimum, three times yearly to review reports on the implementation of the HIS strategic plan and projects that emanate from the plan. Secretarial support will be provided by the Department of Policy, Research and Planning in the MOH or any other unit that is charged with responsibility for coordinating the implementation of the HIS strategy.

Reporting

Minutes of meetings of the Committee will be circulated to the accounting officers of the agencies represented. An annual report will be submitted to the Cabinet.

Annex III

NATIONAL HEALTH INFORMATION SYSTEM CORE TEAM

TERMS OF REFERENCE

Background

The Government of Trinidad and Tobago is committed to building an integrated health information system (HIS) that supports national health goals. A strategic plan that lays out priorities for HIS strengthening for the period 2012-2016 has been developed. Activities cover both population-based and institution-based health information and address needs in the public, private and non-profit sectors. To facilitate the implementation of the strategy, a multi-disciplinary, multi-sectoral technical committee will be set up.

Composition

The Health Information System Core Team will comprise a maximum of 15 members drawn from the following institutions (number of persons in brackets):

a) Ministry of Health (3)
   - Policy, Research & Planning
   - National Surveillance
   - ICT Division

b) National HIS Coordinator (1)

c) Ministry of Legal Affairs (1)

d) Central Statistical Office (2)

e) RHAs (including Tobago) Health Information Manager (3)

f) RHA County medical Officer (2)

g) Representative of a multilateral donor Organisation (1)

h) Non-profit/private health care provider (2)

Functions

The Committee will function in facilitatory and advisory roles. It will have the following responsibilities:

i. Facilitate the implementation of activities outlined in the strategic plan
ii. Develop/review policies, standards, protocols and formats for reporting and exchange of data among stakeholders

iii. Develop/review standards for IT infrastructure by the MOH and RHAs
iv. Review/provide technical input to HIS Policy
v. Advise on operational issues such as functionality, interoperability, and security of Electronic Health Records (including business continuity plans)
vi. Review financial plan for HIS strengthening – detailed costing of activities to be done in Year 1
vii. Facilitate inter-agency coordination of HIS initiatives and investments
viii. Review annual financial plans and targets for HIS strengthening and provide comments to HIS Steering Committee
ix. Support advocacy efforts and dissemination of information in respect of the HIS to stakeholders in the public, private and non-profit sectors
x. Facilitate conduct of mid-term review and evaluation of HIS strategy
xi. Review appraisal/evaluation reports on key HIS initiatives and provide comments to Steering Committee

Tenure

Each member will serve a (renewable) term of 2 years and a maximum of two terms (4 years total). No more than 50 percent of members may be replaced in any given year.

Frequency of Meetings:

The Committee will be chaired by the National HIS Coordinator and will meet quarterly at the minimum to review reports on the implementation of the HIS strategic plan and projects that emanate from the plan. The Department of Policy, Research and Planning in the MOH or any other unit that is charged with responsibility for coordinating the implementation of the HIS strategy will provide secretarial services.

Reporting

Minutes of meetings of the Committee will be circulated to the accounting officers of the agencies represented. An annual report will be submitted to the Cabinet.

Annex IV

	KEY PERFORMANCE INDICES									
	Programme Objective & Performance Index	**Index type (Output/ Outcome)**	**Baseline (Year)**	**2012**	**2013**	**2014**	**2015**	**2016**	**Frequency of Reporting**	**Comments, Data Sources, Methods of Calculation**
1	**Strengthen HIS Policy and Regulatory Framework**									
i	Updated HIS legislation is disseminated to key stakeholders in public, NGO and private sector (Yes/No)	Outcome	No (2010)	No	Yes	Yes	Yes	Yes	As soon as published	▪ HIS policy to be reviewed every 5 years. ▪ Public sector stakeholders include CSO, MOH, and RHAs.
ii	Percent of central government health expenditures allocated to HIS	Outcome	0.43% (2009)	2.5%	2.5%	3.0%	3.0%	3.0%	Annual	▪ A measure of the effectiveness of advocacy. ▪ Index = [HIS allocation in MOH budget / Total MOH budget] x 100%. ▪ Numerator and denominator to include external funds and allocations for M&E if information is available.
2	**Expand ICT Infrastructure and Connectivity**									
i	Percent of public health sector sites with secured broad-band connectivity	Output	44% (2011)	50%	70%	100%	100%	100%		▪ Data source: Administrative records. ▪ Index = [Total number of public health sector sites connected / Total number of public health sector sites] x 100 %.

ii	Percent of eligible users accessing the health network services	Output	15% (2011)	18%	35%	45%	75%	95%	Monthly	▪ Data source: Review of system logs and connections, data flow and information downloads. ▪ Index = [Total number of users who logged-in / Total number of eligible users] x 100%.
iii	Average Complaint Resolution Time for health IT services (in hours)	Outcome	81 (2011)	48	36	24	12	12	Monthly	▪ Measures responsiveness of ICT Division to clients; baseline is derived from Jan.-Jun. 2011 data. ▪ Index = [Total number of work days to resolve user complaint / Total number of tickets logged] x 100%.
3	**Enhance Integration of Data Sources**									
i	Percent of communities mapped for health resources, disease patterns and social determinants of disease	Output	0% (2010)	20%	40%	50%	75%	100%	Semi-annually	▪ As at Nov. 2011, all health facilities were mapped (mapping shown on MOH website). ▪ Data source: Administrative records.
ii	Lead time from collation to publication of Population and Vital Statistics Report (in months)	Outcome	48 (2010)	36	24	12	12	6	Annual	▪ Vital statistics collated by MLA are passed on to CSO for coding and publication as necessary. ▪ Reference point is January 1 of each year to the month of publication of statistics for preceding year ended December 31.

4	**Improve Data Management**									
i	Percent of health facilities reporting at least 80% of agreed indicators within 30 days of end of period	Output	TBD (2010)	TBD	TBD	TBD	TBD	TBD	Monthly	▪ Measures timeliness of data transmission. ▪ Source: Summary reports generated monthly by M&E unit and HIMS. ▪ Index = [Number of reports received on time / Total number reports expected] x 100%.
ii	Accuracy Rate for data entry (percent)	Outcome	TBD (2010)	TBD	TBD	TBD	TBD	TBD	Quarterly	▪ Sample may include out- and in-patient data. ▪ Index = [No. of errors / total no. of data points] x 100%.
5	**Build HIS Human Resource Capacity**									
i	HIS/IT staff vacancy rate	Outcome	50% (2011)	40	30	25	20	15	Semi-annual	▪ Contract staff may be included in supply estimates. ▪ Data source: Administrative records and reports - baseline is derived from rapid assessment of HIS human resource situation.
ii	Staff turnover (in percentage)	Outcome	TBD (2010)	TBD	TBD	TBD	TBD	TBD	Semi-annually	▪ Data source: Administrative records. ▪ Index = [Number of staff that left service / Total number staff on payroll] x 100%.

6	**Enhance Dissemination and Use of Health Information**									
i	Percent of trained MOH senior managers and RMT members who use management dashboards at least twice per week.	Output	Not applicable (2011)	Not appli-cable	Not appli-cable	25%	40%	60%	Monthly	User logs and SLA reports; questionnaire surveys
ii	Percent of public health facilities that received quarterly feedback on health statistics	Output	10% (2010)	25%	50%	70%	90%	95%	Quarterly	▪ Feedback should contain specific information oh health facility performance relative to national benchmarks. ▪ Data source: Administrative records and reports. ▪ Index = [Number of health facilities that received quarterly feedback / Total number health facilities] x 100%.
7	**Promote Intersectoral Collaboration**									
i	Number of times interdisciplinary reports were disseminated to stakeholders (including private sector)	Output	Not available (2010)	4	4	4	4	4	Quarterly	Reports to reflect trends and developments in public, private and non-profit sectors.
ii	Number of regional (LAC) conferences/meetings attended HIS staff	Output	Not available 2010	2	2	2	2	2	Semi-annually	Consider including Core Team member as a participant.

	Programme Management									
i	Number of HIS Core Team meetings held per year	Output	Not applicable (2010)	4	4	4	4	4	Quarterly	Minutes of quarterly NHISC meetings.
ii	Percent of programme budget mobilised	Output	Not applicable (2009)	TBD	TBD	TBD	TBD	100%	Quarterly	▪ Targets are cumulative; quarterly financial statements; audit reports. ▪ Index = [Actual amounts disbursed /Proposed budget for the period] x 100%. ▪ Performance is reviewed at HIS-SC meetings.

Notes:

HIS: Health Information System
HIS-CT: Health Information System Core Team
HIS-SC: Health Information System Steering Committee
ICT: Information & Communication Technology
LAC: Latin America/Caribbean
MLA: Ministry of Legal Affairs
NHIS: National Health Insurance Scheme
PACS: Picture Archiving and Communications System

ANNEX V

LIST OF PARTICIPANTS AT STAKEHOLDER WORKSHOP FOR NATIONAL HEALTH INFORMATION SYSTEM STRATEGIC PLANNING, 21-22 September 2011 (DAY 1

1	Akenath Misir	Executive Medical Director SWRHA	South West Regional Health Authority
2	Althea La Foucade	Costing Technician	UWI
3	Andrea Yearwood	Directorate Health Policy Research & Planning	MOH
4	Andy Thomas	Senior Health Economist	MOH
5	Angela Gonzales	DHV / Surveillance	
6	Anil Guptee	County Medical Officer of Health, Victoria	CMOH
7	Anson Caliste	Project Manager	MOH
8	Anton Cumberbatch	Chief Medical Officer	MOH
9	Asif Ali	Director Finance & Projects	MOH
10	Augusta St. Louis	Education/advocacy Officer	
11	B.K. Giuria	HPTSS	
12	Barbie Roopchand	Legal Advisor	MOH
13	Bernadette Theodore-Gandi	PAHO/WHO Representative Trinidad and Tobago	PAHO/ WHO Trinidad and Tobago
14	Brian Amour	Program Director	National Aids Coordinating Unit
15	Carlton Jackman	Research Officer	Eastern Regional Health Authority
16	Cheryll Hay	Deputy Permanent Secretary	MOH
17	Christine Laptiste	Costing Technician	UWI
18	Colin Bissessar	Chief Executive Officer	North Central Regional Health Authority
19	Dave Clement	Director	Central Statistical Office
20	David Jackson	Chief Medical Officer	Augustus Long Hospital
21	Denyse White	Head Consulting	NICTC
22	Gemma Gobin	Medical Records Manager	North West Regional Health Authority
23	Gianluca Giuman		United Nations
24	Godfrey St Bernard	Senior Fellow	University of the West Indies
25	Harry Smith	Medical Officer	CMOH
26	Heera Rampaul	Manager IS/IT	MOH
27	Janelle Alexander	Manager IS/IT	South West Regional Health Authority

28	Jeniffer Andrews	Medical Records Manager	North Central Regional Health Authority
29	Jennifer Andall	Manager - Health Sector HR Planning and Development	MOH
30	Judith Young-Ruiz	Special Communications Advisor	MOH
31	Karmesh Sharma	Epidemiologist	MOH
32	Keith Beharry	Quality Manager	Eastern Regional Health Authority
33	Kenneth Ramchan	Principal	University of Trinidad and Tobago
34	Kumar Sundaraneedi	Medical Director Health Programmes and Technical Support Services	MOH
35	Larry Chinnza		North Central Regional Health Authority
36	Lauren Subar	Hospital Information Systems Specialist	MOH
37	Lawrence Jaisingh	Senior Health Research Specialist	MOH
38	Leah Knights	Administrative Secretary	MOH
39	Lester Thomson	Manager IS/IT	Eastern Regional Health Authority
40	Louella Sealy	Manager IS/IT	North Central Regional Health Authority
41	Marsha Samaroo	Health Systems Research Officer	MOH
42	Michael Reid	Senior Research Officer	
43	Mohanee Sinanan-Mitchell		Central Statistical Office
44	Nadia Alladin-Elliott	Professional	iGovTT
45	Nigel Duke	Manager IS/IT	Tobago Regional Health Authority
46	Nuala Ramkissoon	Non Medical Epidemiologist	National Surveillance Unit
47	Patrick Romano	Research and Policy Officer	Ministry of Legal Affairs
48	Paul Edwards	HIV/STI Surveillance Advisor	PAHO HIV Caribbean Organisation (PHCO)
49	Paul Taylor	Chief Executive Officer	Tobago Regional Health Authority
50	Regilo De Souza	Health Information Specialist	PAHO
51	Richard Spann	Chief Of Staff	Community Hospital
52	Sergio Freue	Computer Systems Specialist	MOH
53	Shamila Ramdhan	Events Coordinator	MOH

54	Shirley Christian-Maharaj		Central Statistical Office
55	Sonia Williams	M & E Officer	MOH
56	Stacey-Ann Bartholomew	Project Officer	MOH
57	Stacy Harricharan	Chief Executive Officer	Eastern Regional Health Authority
58	Stephon Stewart	Business Systems Administrator	MOH
59	Stewart Smith	Senior Health Sector Advisor	MoH
60	Susan Berkeley	General Manager	St. Clair Medical Centre
61	Terry-Ann Atkins-Huggins	Senior Planning Officer (Ag.)	Ministry of Planning and the Economy
62	Thora Wilson	Quality - Manager	Tobago Regional Health Authority
63	Tomas Sandor	IT Technical Advisor	MoH ICT Unit
64	Veejai Heera	Manager	MOH
65	Veronica Roach	Director	National Cancer Registry
66	V. Andy Partapsingh		MOH Victoria
67	Yitardes Gebre	PAHO/WHO Trinidad and Tobago	PAHO
68	Yolande Charles Mottley	Manager, Change Management	MoH

LIST OF PARTICIPANTS AT STAKEHOLDER WORKSHOP FOR NATIONAL HEALTH INFORMATION SYSTEM STRATEGIC PLANNING, 21-22 September 2011 (DAY 2)

No.	PARTICIPANTS	POSITION	ORGANISATION
1	Akenath Misir	Executive Medical Director SWRHA	South West Regional Health Authority
2	Andrea Yearwood	Directorate Health Policy Research & Planning	MOH
3	Andy Thomas	Senior Health Economist	MOH
4	Amanda Ramsaran	ICT Technician	MOH
5	Arveon Lendor	Health Information Officer	MOH
6	Anson Caliste	Project Manager	MOH
7	Carlton Jackman	Research Officer	Eastern Regional Health Authority

8	David Jackson	Chief Medical Officer	Augustus Long Hospital
9	Harry Smith	Medical Officer	CMOH
10	Heera Rampaul	Manager IS/IT	MOH
11	Janelle Alexander	Manager IS/IT	South West Regional Health Authority
12	Jeniffer Andrews	Medical Records Manager	North Central Regional Health Authority
13	Jennifer Andall	Manager - Health Sector HR Planning and Development	MOH
14	Judith Young-Ruiz	Special Communications Advisor	MOH
15	Larry Chinnza		North Central Regional Health Authority
16	Lauren Subar	Hospital Information Systems Specialist	MOH
17	Lester Thomson	Manager IS/IT	Eastern Regional Health Authority
18	Louella Sealy	Manager IS/IT	North Central Regional Health Authority
19	Marsha Samaroo	Health Systems Research Officer	MOH
20	Michael Reid	Senior Research Officer	
21	Mohanee Sinanan-Mitchell		Central Statistical Office
22	Nadia Alladin-Elliott	Professional	iGovTT
23	Nuala Ramkissoon	Non Medical Epidemiologist	National Surveillance Unit
24	Patrick Romano	Research and Policy Officer	Ministry of Legal Affairs
25	Paul Taylor	Chief Executive Officer	Tobago Regional Health Authority
26	Regilio De Souza	Health Information Specialist	
27	Sergio Freue	Computer Systems Specialist	MOH
28	Stephon Stewart	Business Systems Administrator	MOH
29	Susan Berkeley	General Manager	St. Clair Medical Centre
30	Terry-Ann Atkins-Huggins	Senior Planning Officer (Ag.)	Ministry of Planning and the Economy
31	Thora Wilson	Quality - Manager	Tobago Regional Health Authority

32	Tomas Sandor	IT Technical Advisor	MoH ICT Unit
33	Veronica Roach	Director	National Cancer Registry
34	V. Andy Partapsingh	PCP V	MOH Victoria
35	Yitardes Gebre	PAHO/WHO Trinidad and Tobago	PAHO
36	Yolande Charles Mottley	Manager, Change Management	MoH