

Ministry of Health



# National Health Information System Assessment 2011 JAMAICA

Report on the National Health Information System Assessment  
conducted by major stakeholders across various organizations and  
facilitated by the Ministry of Health, Jamaica with technical support from  
the Pan American Health Organization/World Health Organization

Prepared by: Douladel Willie  
Final Version  
October 24, 2011

## Table of Contents

List of Main Abbreviations .....	v
List of Figures and Tables .....	vi
EXECUTIVE SUMMARY .....	vii
OVERVIEW OF ROADMAP.....	viii
1.0 INTRODUCTION .....	1
2.0 METHODOLOGY.....	3
2.1 Overview of Health Metrics Network Assessment Framework.....	3
2.2 Data Collection .....	3
2.3 Data Analysis.....	4
2.4 Data Presentation .....	4
3.0 RESULTS .....	5
3.1 Resources .....	5
3.1.1 Coordination, Policy and Planning .....	6
3.1.1.1 Findings .....	6
3.1.1.2 Recommendations .....	9
3.1.2 HIS institutions, human resources and financing .....	9
3.1.2.1 Findings .....	9
3.1.2.2 Recommendations .....	11
3.1.3 Infrastructure .....	11
3.1.3.1 Findings .....	11
3.1.3.2 Recommendations .....	13
3.2 Indicators.....	13
3.2.1 Findings .....	13
3.2.2 Recommendations .....	15
3.3 Data sources .....	16
3.3.1 Census .....	16
3.3.1.1 Findings .....	16
3.3.1.2 Recommendations .....	17

3.3.2	Vital Statistics .....	17
3.3.2.1	Findings .....	17
3.3.2.2	Recommendations .....	17
3.3.3	Population-based surveys .....	18
3.3.3.1	Findings .....	18
3.3.3.2	Recommendations .....	18
3.3.4	Health and disease (Individual) records .....	18
3.3.4.1	Findings .....	18
3.3.4.2	Recommendations .....	19
3.3.5	Health service records .....	19
3.3.5.1	Findings .....	19
3.3.5.2	Recommendations .....	20
3.3.6	Resource records .....	20
3.3.6.1	Findings .....	20
3.3.6.2	Recommendations .....	21
3.4	Data management .....	21
3.4.1	Findings .....	21
3.4.2	Recommendations .....	22
3.5	Information products (Data Quality) .....	22
3.5.1	Health Status Domain .....	25
3.5.1.1	Findings .....	25
3.5.1.2	Recommendations .....	26
3.5.2	Health System Domain .....	26
3.5.2.1	Findings .....	26
3.5.2.2	Recommendations .....	27
3.5.3	Determinants of Health domain .....	27
3.5.3.1	Findings .....	27
3.5.3.2	Recommendations .....	28
3.5.4	Additional Selected Indicators .....	28
3.5.4.1	Findings .....	28
3.5.4.2	Recommendations .....	29
3.6	Dissemination and use .....	30

3.6.1	Analysis and use of information .....	30
3.6.1.1	Findings .....	30
3.6.1.2	Recommendations .....	31
3.6.2	Use of Information for policy and advocacy .....	31
3.6.2.1	Findings .....	31
3.6.2.2	Recommendations .....	31
3.6.3	Use of Information for planning and priority setting .....	31
3.6.3.1	Findings .....	31
3.6.3.2	Recommendations .....	31
3.6.4	Use of Information for resource allocation .....	32
3.6.4.1	Findings .....	32
3.6.4.2	Recommendations .....	32
3.6.5	Use of Information for implementation and action .....	32
3.6.5.1	Findings .....	32
3.6.5.2	Recommendations .....	32
4.0	DISCUSSION .....	33
5.0	LIMITATIONS TO STUDY METHODOLOGY .....	34
6.0	GENERAL CONCLUSIONS AND RECOMMENDATIONS .....	35
	REFERENCES .....	36
	APPENDICES .....	37
	Appendix 1 – Summary Recommendations .....	37
	Appendix 2 – List of Participants, Jamaica NHIS Assessment .....	44
	Appendix 3 – List of all items/questions by component and average score for each .....	49

## List of Main Abbreviations

CDC	Centers for Disease Control
GIS	Geographic Information System
HIS	Health Information System
HIT	Health Information and Technologies Steering Committee
HMN	Health Metrics Network
HMSR	Hospital Monthly Summary Report
ICT	Information and Communication Technology
MCSR	Monthly Clinic Summary Report
MOH	Ministry of Health, Jamaica
NHIS	National Health Information System
PAHO	Pan American Health Organization
PIOJ	Planning Institute of Jamaica
RGD	Registrar General's Department
RHA	Regional Health Authority
SITU	Systems Information Technology Unit
STATIN	Statistical Institute of Jamaica
UNFPA	United Nations Population Fund
USAID	United States Agency for International Development
WHO	World Health Organization

## List of Figures and Tables

### Figures

Figure number	Title of Figure	Page number
Figure I	Roadmap to applying HMN Framework	ix
Figure 2.0	HMN Framework	3
Figure 3.0	Average scores for HIS components	5
Figure 3.1	Assessment of HIS Resources	6
Figure 3.2	Assessment of Indicators	14
Figure 3.3	Assessment of Data Sources	16
Figure 3.4	Assessment of Data Management	22
Figure 3.5	Assessment of Information Products (Data Quality)	23
Figure 3.6	Comparison of Data Quality Assessment Criteria	24
Figure 3.7	Comparison of Data Quality Assessment Criteria within Health Status Domain	25
Figure 3.8	Comparison of Data Quality Assessment Criteria within Health Systems Domain	27
Figure 3.9	Comparison of Data Quality Assessment Criteria within Determinants of Health Domain	28
Figure 3.10	Comparison of Data Quality Assessment Criteria for the five additional indicators	29
Figure 3.11	Assessment of Dissemination and use	30

### Tables

Table number	Title of Table	Page number
Table 3.0	Comments made by assessors regarding coordination, policy and planning items	8
Table 3.1	Comments made by assessors regarding HIS institutions, human resources and financing	10
Table 3.2	Comments made by assessors regarding infrastructure	12
Table 3.3	Comments made by assessors regarding indicators	15
Table 3.4	Overall data quality assessment scores for health domains	24

## EXECUTIVE SUMMARY

In July 2011 the Ministry of Health (MOH) Jamaica, in collaboration with national and sub-national partners in health and non-health organizations and under the technical leadership of the Pan American Health Organization/World Health Organization (PAHO/WHO), conducted a National Health Information System (NHIS) assessment. (See Appendix 1 – List of participants, Jamaica NHIS Assessment). This assessment followed the guidelines of the Health Metrics Network (HMN) Framework and used the HMN Assessment Tool version 4.00.

The HMN Assessment Tool identifies 6 components of a Health Information System (HIS) and provides criteria against which to assess these components. It also outlines a scoring mechanism and posits how to interpret the results. The 6 components of the HIS are: HIS Resources, Indicators, Data Sources, Data Management, Information Products and Dissemination and Use. The components HIS Resources, Data Sources and Dissemination and Use have 3, 6 and 5 sub-components, respectively, which are individually evaluated as part of the overall assessment of these components. The HMN assessment is the first step in a larger programme which emphasizes integration and stakeholder participation; proper data collection, storage and analysis methods; and timely use of data to inform policy and practice. (See Figure I - Roadmap to applying HMN Framework).

Jamaica's NHIS assessment revealed strengths and weaknesses in the existing system. Strengths were largely in the presence of useful data sources such as censuses and vital registration systems. Other strong points include effective and efficient monitoring of core health status and systems indicators. It was observed that in cases where weaknesses were noted in entire components or relative weakness between sub-components the underlying contributing factors were similar in nature. These were often due to an inability to establish and maintain effective systems/procedures for full stakeholder collaboration and participation; inadequate infrastructure (amount and capacity), human resources (number and skill level) and financing; poor reporting mechanisms; and limited use of data. The Indicators component was identified as the strongest component in Jamaica's HIS while Data Management and HIS resources were the weakest. Analysis of the responses to the Data Management assessment criteria reveals that the low rating for Data Management was driven largely by the absence of integrated computerised systems and databases.

As Jamaica applies the HMN Framework to its HIS development it is in the best interest of the stewards of the local health system to act in a timely manner to resolve the challenges that exist and also ensure that mechanisms are in place to maintain or improve the high performing components. The way forward must involve creating novel and lasting approaches to obtaining full stakeholder input, especially in the case of the private sector and non-health organizations. The MOH should capitalize on the technical support offered through PAHO/WHO and other development partners, adopt best practices of countries were applicable as well as develop internal capacity to steer and implement the initiatives. Tangible support must be received at the highest level within the MOH and stakeholder groups and a clear plan must be devised following the HMN guidelines but also considering the local context in which the health system operates.

## OVERVIEW OF ROADMAP

The Health Metrics Network (HMN) has outlined a 3-phase approach for application of the HMN Framework and standards for the strengthening of health information systems within individual countries. This *roadmap* (Figure I) depicts an iterative process, highlighting the requirements, activities and outputs and illustrating how these can be utilised for decision-making. The first phase in the implementation schedule involves leadership, coordination and assessment. It is in this phase that key persons from major stakeholder groups are identified, personal and organizational commitments are sought and achieved and a baseline HIS assessment is performed. Senior decision makers in government are instrumental to providing leadership at this stage and it is also critical that a “champion” for the process is identified from within this group. Coordination activities include identifying and convening the full spectrum of stakeholders. It is imperative that a very thorough approach is taken to ensure that all providers and end users of health information, as well as any intermediary groups are brought into the process in this defining first phase. Having proper leadership and stakeholder participation makes it possible for conducting a HIS assessment which completes Phase 1. This situational analysis of the HIS in the country will reveal the adequacy of the current system for providing and utilising health information and identify areas requiring improvement. A successful completion of Phase 1 is followed by Phase 2 which involves priority setting and planning. The findings of the HIS assessment will drive this phase as stakeholders will identify areas that need to be addressed, devise and prioritise action plans according to HIS vision, severity of HIS problem, resources and any other parameter(s) deemed necessary. Costing will also be done at this stage and efforts made to secure funding. Phase 2 then feeds into Phase 3 where the HIS strengthening actions and activities planned in Phase 2 are implemented. The process becomes cyclic as implementation of HIS strengthening activities, policies and procedures as well as the passage of time will initiate a new wave of the process, beginning again with Phase 1 activities.

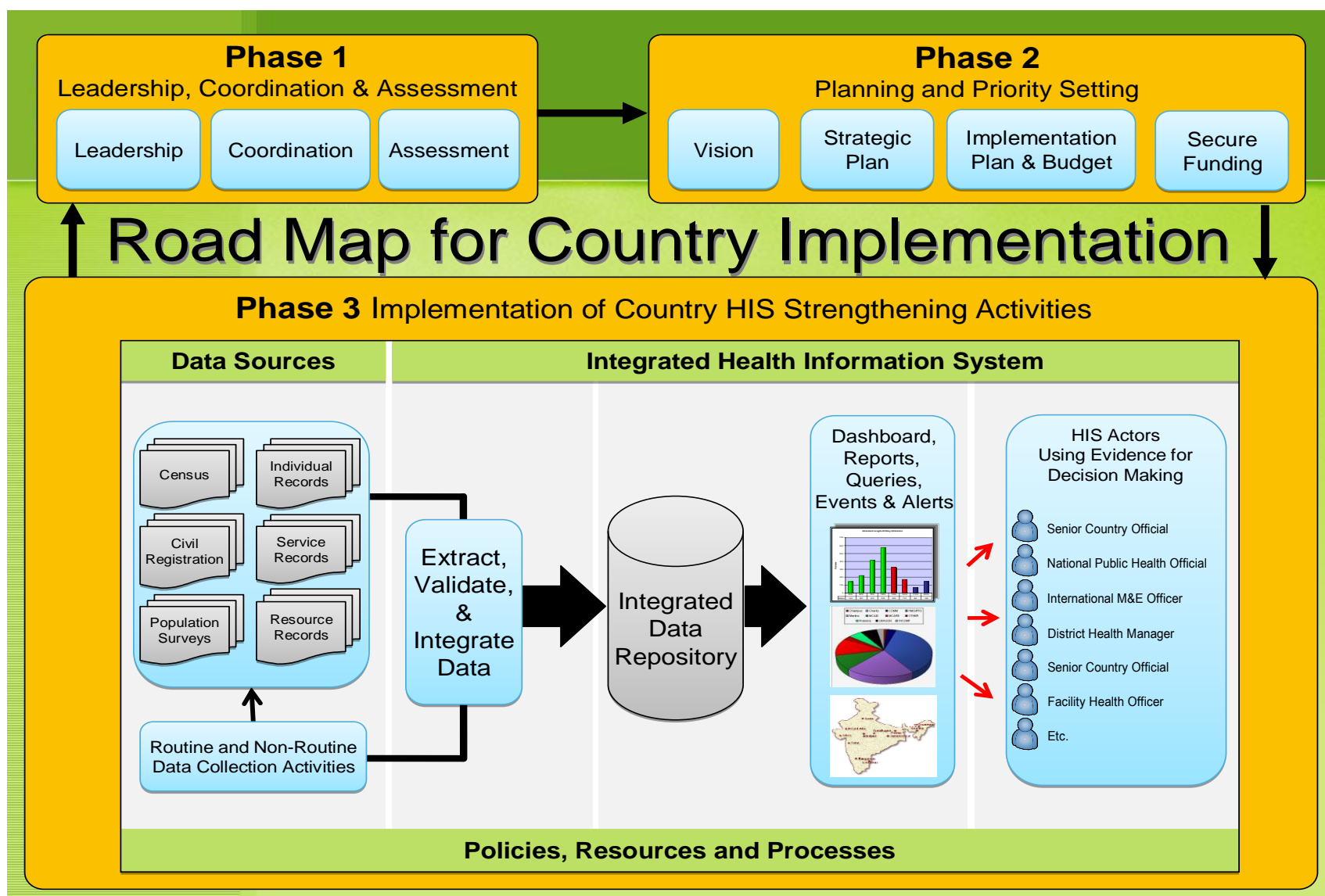


Figure I. Roadmap to applying HMN Framework

## 1.0 INTRODUCTION

In recognition of the importance of accurate and timely health information to health policy, planning, practise and ultimately health outcomes, HIS strengthening has become a priority area in many countries; and is driven by local and international organizations and initiatives.

The Health Metrics Network (HMN) was established in 2005 and is the first global partnership dedicated to strengthening national HISs. HMN operates as a network of global, regional and country partners. It provides a means of HIS assessment and sustainable improvement through the use of the *HMN Framework*.<sup>1</sup> A major thrust of the HMN Framework is to foster partnerships and cooperation among the various national and sub-national organizations which collect, store and utilise health information as these entities often have data usage systems with different evolutionary paths specific to their own individual needs. Such partnerships have the potential to provide systems where maximum returns are achieved on data collection activities resulting in better health outcomes, rather than multiple parallel systems with minimal benefit to overall health.

As of June 2010, 83 countries were reportedly applying the principles and approaches of the HMN Framework to strengthen their HISs. Of note, is that 69% of low and lower-middle income countries are included in that number.<sup>2</sup> In the Caribbean and Latin America, several countries are at varying stages of HIS reform utilising approaches and tools based on the HMN Framework. For example, Belize, Trinidad and Tobago and the Turks and Caicos Islands have conducted HIS assessments and have moved on to subsequent stages of the process.

### **Jamaica's Health System and HIS management**

Jamaica's healthcare system is under the stewardship of the MOH, Jamaica. The healthcare system underwent major reform in the 1990s and in 1997 many administrative and management processes of the MOH were decentralised and now fall under the purview of 4 Regional Health Authorities (RHAs). Public sector healthcare is administered through health facilities managed by the 4 RHAs. The MOH retained responsibility for policy, standards, regulation and monitoring and also has in its ambit statutory agencies such as the National Council for Drug Abuse, the Child Development Agency and the office responsible for registering vital events - the Registrar General's Department (RGD). The country also has a very robust private health sector which caters to a significant proportion of the population, providing a wide range of healthcare services at all service levels. The public and private health sectors are therefore producers, repositories and users of a large amount of health information. Additionally, health data is collected and used by the country's statistical office - Statistical Institute of Jamaica (STATIN); the national planning organization – the Planning Institute of Jamaica (PIOJ) and several other bodies including research institutions such as those based in academic institutions like the University of the West Indies. The reporting relationships and data sharing agreements/responsibilities among all these entities are not always clearly defined, however, some are mandated and generally adhered to, for example those relating to communicable diseases notification and outbreak reporting.

Within the MOH at the central level, the Health Information Unit (HIU) manages health data submitted on a monthly basis from hospitals and clinics and there is also a central information

---

<sup>1</sup><http://www.who.int/healthmetrics/about/whatishmn/en/index.html>

<sup>2</sup> Results Report June 2010, HMN, WHO

technology unit called Systems Information Technology Unit (SITU). At the level of the RHA, each region has a Management Information System Department. It is to be noted that administrative information systems for finance and accounting, human resources management, maintenance, and inventory and asset management exist and but are not all standardised and they are utilised to varying extents by RHAs. Despite these units, no formal linkage exists between HIU and health records administrators at the level of the RHA. An additional component is the presence of several programme - and disease - specific health information and information technology systems which also operate within the MOH such as the HIV Monitoring and Evaluation System and the HIV/AIDS Treatment System.

Even a cursory view of this current situation would reveal the necessity for a more integrated approach to HIS management in order to have more efficient and effective health systems and ultimately better health outcomes. In April 2010 the Permanent Secretary in the MOH established a Health Information and Technologies Steering Committee (HIT) comprising multidisciplinary officers from the MOH and the RHAs. The main mandate of this committee is the strengthening of the country's NHIS. In July, 2011, with technical support from the Pan American Health Organization/World Health Organization (PAHO/WHO) and facilitated by the MOH through the HIT, Jamaica conducted an assessment of its HIS according to the standards and guidelines of the HMN Framework. The main objectives were to: inform stakeholders about the key concepts and aspects of a HIS as well as the importance of strengthening the national HIS and to develop an objective baseline of the country's HIS across the 6 HIS components identified in HMN assessment tool, namely: HIS Resources; Indicators; Data Sources; Data Management; Information Products (Data Quality); and Dissemination and Use. This was to allow for the identification of strengthening priorities and for comparable follow-up evaluations to measure progress. The findings and recommendations coming out of that assessment are presented in this report.

## 2.0 METHODOLOGY

### 2.1 Overview of Health Metrics Network Assessment Framework

The HMN framework identifies components and standards for a HIS and provides an approach for its assessment. Guidelines are also provided for HIS strengthening activities. All these are done so that the overall HMN Goal – to *increase the availability, accessibility, quality and use of health information vital for decision making at country and global levels*-can be achieved (Figure 2.0). The Assessment aspect of the framework offers an evaluation system which individually examines each component and sub-component/information category by asking relevant stakeholders to rank its level of adequacy (highly adequate, adequate, present but not adequate and not adequate at all) by comparing the current situation with the gold standard criteria. The meaning of the level of adequacy is specifically explained for each component/sub-component. Each level of adequacy is assigned a certain number of points. Points are summed and averages obtained and reported for each component.

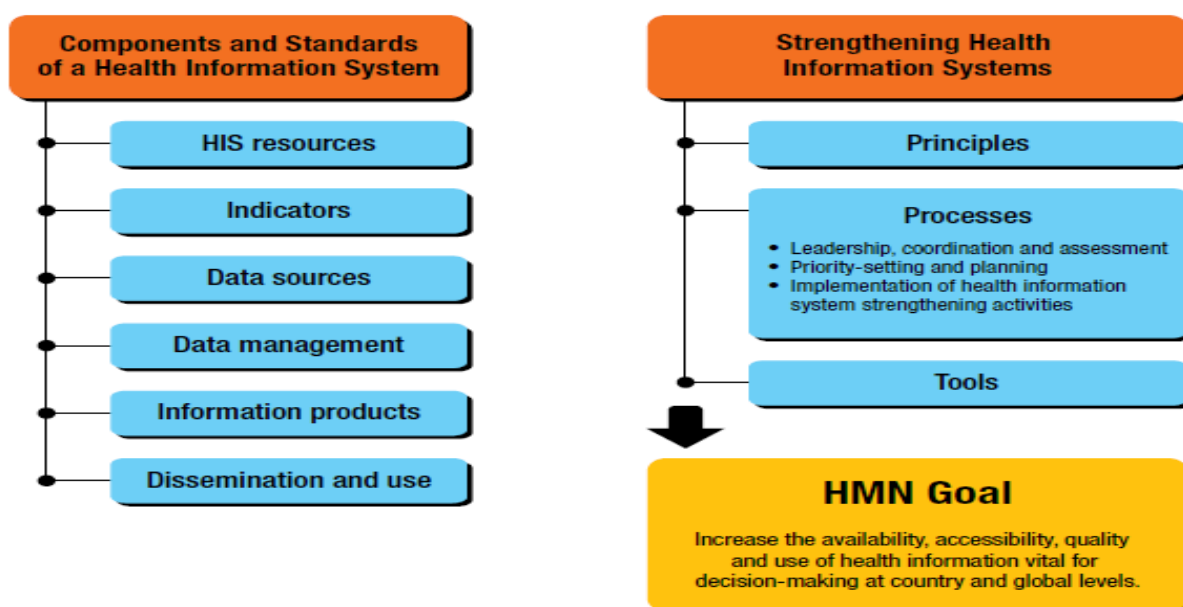


Figure 2.0. HMN Framework

### 2.2 Data Collection

Data were collected using the HMN Assessment Tool.<sup>3</sup> Stakeholders were arranged into 8 groups according to the following categories:

- 1) Health Management Information System (included Health Information Management, Information Technology and Surveillance professionals)
- 2) Ministry of Health Senior Planners and Policy-Makers
- 3) Statistics and Demography

<sup>3</sup> [http://www.who.int/healthmetrics/tools/Version\\_4.00\\_Assessment\\_Tool3.pdf](http://www.who.int/healthmetrics/tools/Version_4.00_Assessment_Tool3.pdf)

- 4) Ministry of Health Programme Managers
- 5) Financial Monitoring and Evaluation
- 6) Sub-National (Regional Health Authorities)
- 7) Resource Tracking
- 8) Non- Project Donors

Note: Groups 5 and 7 were combined to undertake the assessment. Each Group had: a Facilitator; a Data Recorder; paper-based score sheets for each participant (circled items); laptop with HMN Assessment Tool; and a HMN Assessment Booklet (e-copy). The Facilitator was responsible for reviewing questions and response options with the group and leading the discussion on rationale for scores. Participants recorded a score for each item on individual score sheets. The Data Recorder captured key points of discussion in the “comments” section of the tool and also entered individual scores for each question in the tool electronically. It is important to note that while discussion on the rationale for scores was encouraged and facilitated, consensus scoring was discouraged. By design, not all components were assessed by all groups. Also, not all individual assessment items within sub-components and components were addressed by all groups. All groups were brought together at the end of the assessment to discuss any significant finding or challenge from the assessment process. Each group compiled their data and presented their findings at the end of the workshop. Additionally, the groups worked together to undertake a Strength, Weaknesses, Opportunities, Threats (SWOT) analysis.

## 2.3 Data Analysis

Data were analysed according the guidelines of the HMN assessment tool. Briefly, for each group, average scores were computed for each sub-component and component then the average score presented as a percentage of the maximum possible score. A similar approach was taken, combining the scores of all the groups to give an overall average for each sub-component and component, as appropriate. In cases where an item was not assessed by a group the points were not included in calculating the number of maximum possible points for that item. Each percentage was also converted to one of four categorical classifications depending on its value: not adequate at all (0% to 25%); present but not adequate (>25% to 50%); adequate (>50% to 75%) or highly adequate (>75% to 100%). Computations are built into the assessment tool and percentages and graphs automatically generated.

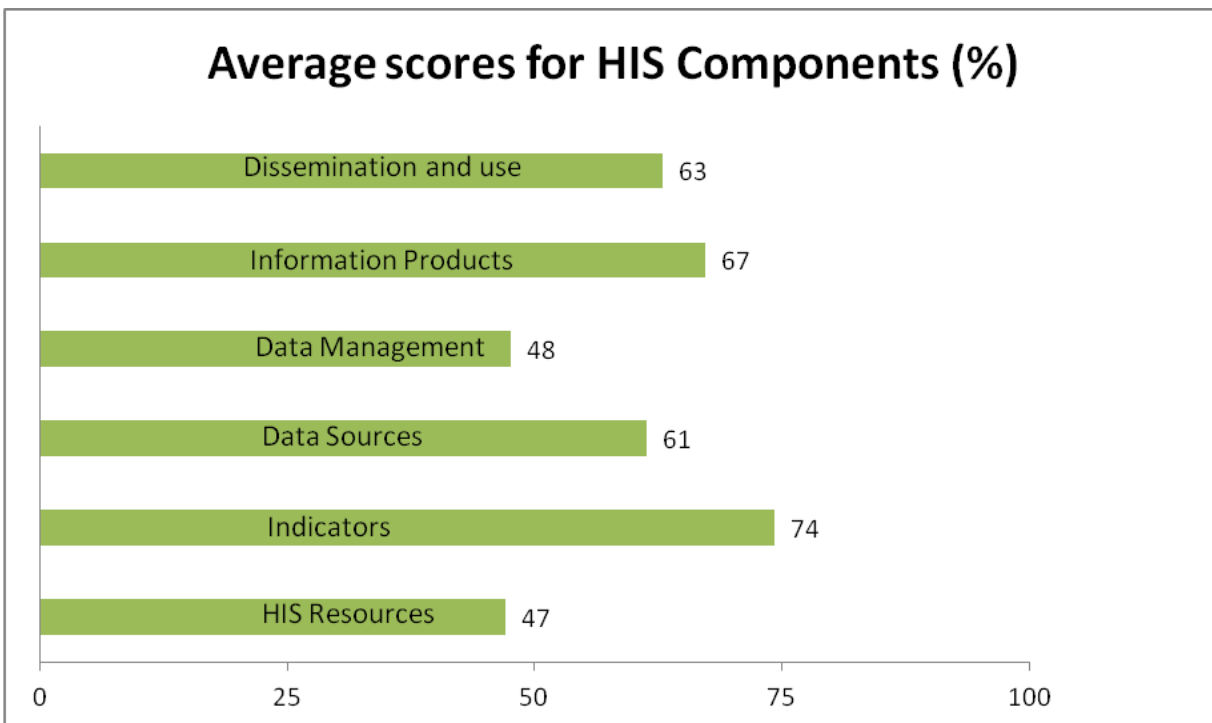
## 2.4 Data Presentation

An overall summary assessment of all HIS components is presented. Additionally, data are presented separately for each HIS component and sub-component depicting the ratings for each group as well as the overall rating for all groups combined. Graphs are used to compare percentages across and within components and comments made during group discussions are summarised according to themes or presented verbatim, as appropriate.

## 3.0 RESULTS

### Overall Assessment

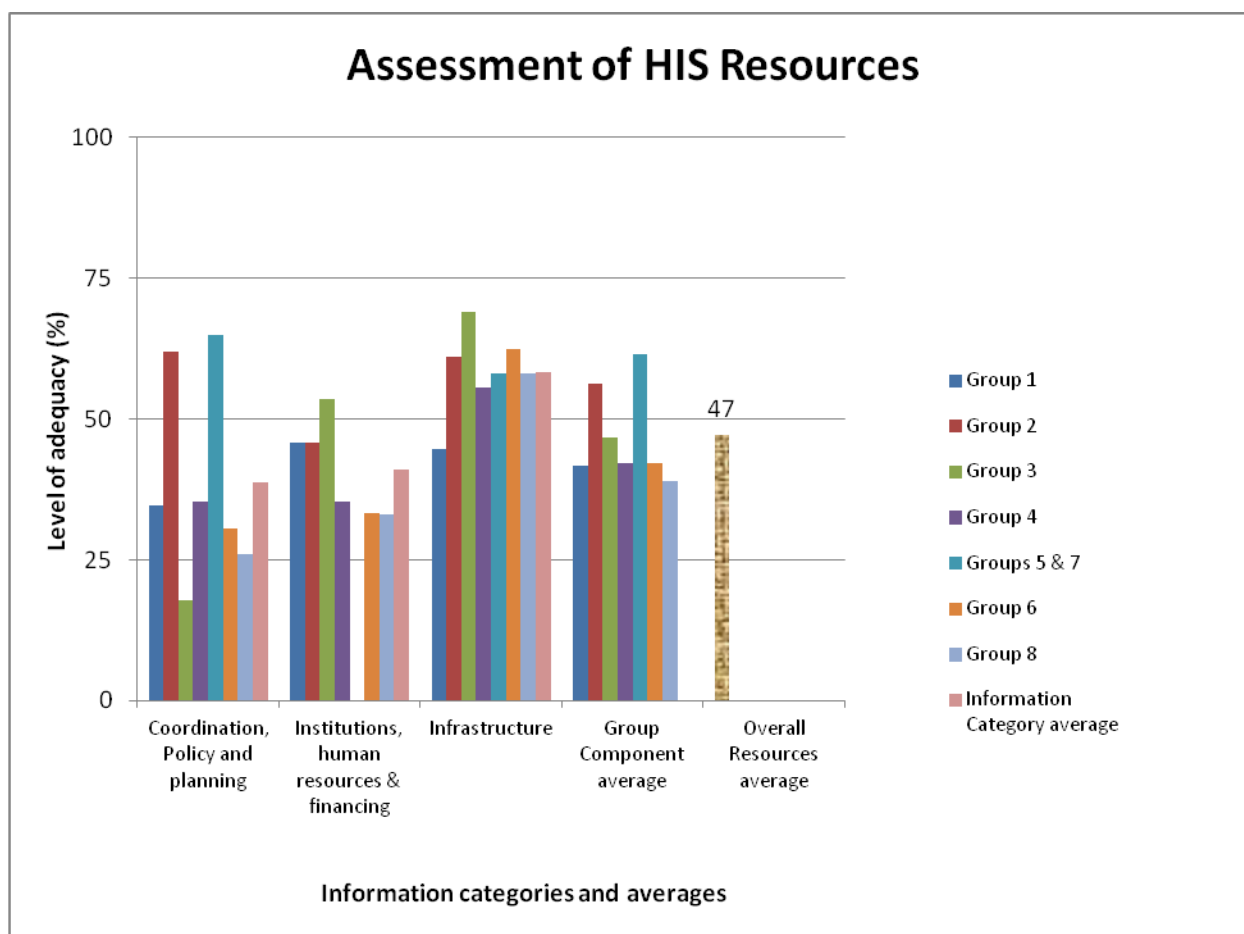
Figure 3.0 shows the average scores for each of the 6 HIS components as determined by all the groups. HIS Resources and Data Management received similar scores and these were the lowest of all the scores obtained, falling in the category of present but not adequate. The remaining four components: Data Sources, Dissemination and Use, Information Products and Indicators were deemed adequate by the assessors with the score for Indicators (74%) falling just below the lower limit for the category of highly adequate.



**Figure 3.0. Average scores for HIS components.** Bar Chart showing overall ratings of HIS components as determined by all the groups combined.

### 3.1 Resources

Figure 3.1 shows the ratings obtained from assessment of HIS resources. Individual group ratings are shown for each sub-component along with average component score as given by each group and the overall component score when all the group scores are considered. The average component scores given by the groups ranged from 39% to 62% resulting in an overall component score of 47% and a classification of present but not adequate. Group 2 (MOH Senior Planners and Policy Makers) and Groups 5 & 7 (Financial Monitoring and Evaluation & Resource Tracking) were the only groups to rate resources as adequate on average (56% and 62% respectively). The other groups, on average, rated the component as present but not adequate with all scores falling in the relatively narrow range of 39% to 47%.



**Figure 3.1. Assessment of HIS Resources.** Bar Chart showing ratings of information categories within the Resources component and average component scores by each assessment group. Group 1-Health Management Information System; Group 2-Ministry of Health Senior Planners and Policy-Makers; Group 3-Statistics and Demography; Group 4-Ministry of Health Programme Managers; Group 5-Financial Monitoring and Evaluation; Group 6-Sub-national (Regional Health Authorities); Group 7-Resource Tracking; Group 8-Non-Project Donors

### 3.1.1 Coordination, Policy and Planning

#### 3.1.1.1 Findings

This information category/sub-component received an overall score of 39% (present but not adequate) but had somewhat varied responses between the assessment groups. The levels of adequacy ranged from a low of 18% (not adequate at all), given by Group 3 (Statistics and Demography) to a high of 65% (adequate), given by Groups 5 & 7 (Financial Monitoring and Evaluation & Resource Tracking). Four (4) of the five (5) remaining groups gave this component scores ranging between 26% and 35% putting it in the category of present but not adequate while Group 2 (MOH Senior Health Planners and Policy Makers) rated the component as adequate (62%). In addition to assigning scores to specific items within this sub-component, assessors also commented on the items, offering justification for the scores. Table 3.0 highlights the comments made by the different groups for each item. In general the groups seemed to express the same sentiments regarding many of the items under assessment. For example, for the item which addresses the presence of legislation covering health information, the common opinion was that this was not adequate. Persons stated that legislation exists for certain types of

health data and not others as well as they are not always enforced and do not include all relevant producers and repositories of health data. In addressing the item on whether there exists a national committee in charge of HIS coordination, the comments were that if such a body exists it needs to be more visible and all stakeholders are to be incorporated.

**Table 3.0. Comments made by assessors regarding coordination, policy and planning items**. \*HMSR-Hospital Monthly Summary Report, \*\*MCSR-Monthly Clinic Summary Report

Item	Comment
I.A.1	<p>The country has up-to-date legislation providing the framework for health information covering the following specific components: vital registration; notifiable diseases; private sector data including social insurance; confidentiality; and fundamental principles of official statistics</p> <ul style="list-style-type: none"> <li>• Legislation exists for some components, e.g. vital registration and confidentiality</li> <li>• Legislation not always up to date or enforced</li> <li>• No private sector legislation - this should be a priority</li> </ul>
I.A.2	<p>The country has up-to-date regulations and procedures for turning the fundamental principles of official statistics into good practices, and for ensuring the integrity of national statistical services (by ensuring professionalism, objectivity, transparency and adherence to ethical standards in the collection, processing and dissemination of health-related data)</p>
I.A.3	<p>There is a written HIS strategic plan in active use addressing all the major data sources described in the HMN Framework (censuses, civil registration, population surveys, individual records, service records and resource records) and it is implemented at the national level</p> <ul style="list-style-type: none"> <li>• HIS is understood to be a national plan that is written and used</li> </ul>
I.A.4	<p>There is a representative and functioning national committee in charge of HIS coordination</p> <ul style="list-style-type: none"> <li>• Committee only includes MOH, but it should involve other stakeholders to make it representative</li> <li>• Committee may be functional but not being felt by all in the health sector</li> <li>• Role and functions of committee not known. Issues of resources not yet tested</li> <li>• The MOH has a Health Information and Technologies Steering Committee. Under PIOJ, there is a Vital Statistics Commission which has broad representation from various Ministries and development partners have been invited in an observer status</li> </ul>
I.A.5	<p>The national statistics office and ministry of health have established coordination mechanisms (e.g., a task force on health statistics); this mechanism may be multisectoral</p> <ul style="list-style-type: none"> <li>• It is desirable to have a committee established including members from STATIN, PIOJ, MOH with terms of reference to be established</li> <li>• Informal relationships in place. There is a data sharing agreement between STATIN and RGD</li> </ul>
I.A.6	<p>There is a routine system in place for monitoring the performance of the HIS and its various subsystems</p> <ul style="list-style-type: none"> <li>• There is no such system or committee</li> <li>• System for feedback from MOH has broken down for HMSR* and MCSR** etc. No known system for PAS and other components</li> </ul>
I.A.7	<p>It is official policy to conduct regular meetings at health-care facilities and health-administration offices (e.g., at national, regional/provincial or district level) to review information on the HIS and take action based upon such information</p> <ul style="list-style-type: none"> <li>• Written manuals, guidelines and agreements exist but no broad official policy as for example surveillance</li> <li>• Question interpreted as internal policies not legislation</li> <li>• Although there is an HIS Unit, it is unclear how it interacts with the different areas</li> <li>• Not aware of a policy in place</li> <li>• Information generated from system is reviewed (and mandated by policy) but system itself is not</li> <li>• Review of data is more consistent in primary care than in hospital care.</li> </ul>

### 3.1.1.2 Recommendations

Based on the assessment the following are recommended:

Led by MOH

- Develop a HIS strategic plan with particular emphasis on creating an enabling environment to realise HIS objectives.
- Expand the membership of the HIT Steering Committee to include other government ministries and agencies which collect, analyse and/or use health related data, non-health organizations that collect data of importance to health and private sector health professionals. Terms of reference of the committee should be clear
  - Private sector health professionals can be targeted through their professional associations
  - For the long term creative ways should be devised to provide incentives to committee members
- Develop relevant policies and regulations for data sharing and reporting relationships between HIS committee (or body mandated by it) and relevant organizations as well as devise measures to encourage compliance

### 3.1.2 HIS institutions, human resources and financing

#### 3.1.2.1 Findings

HIS institutions, human resources and financing received an overall rating of 41% placing this sub-component in the category of present but not adequate. With the exception of group 3 (Statistics and Demography), all the groups rated this sub-component in this 2<sup>nd</sup> quartile with the scores ranging from 33% to 46%. Group 3 gave a score of 54% which ranked the component in the 3<sup>rd</sup> quartile, adequate. (See figure 3.1). Groups 5 & 7 (Financial Monitoring and Evaluation & Resource Tracking) did not assess this sub-component. Table 3.1 shows the comments made by the groups regarding the items of this sub-component.

**Table 3.1. Comments made by assessors regarding HIS institutions, human resources and financing**

Items		Comments
I.B.1	The ministry of health has adequate capacity in core health information sciences (epidemiology, demography, statistics, information and ICT)	<ul style="list-style-type: none"> <li>Interpreted in the context of the global public health sector. Regional perspective can also be considered</li> <li>Completeness and quality needs improvement, especially for deaths.</li> </ul>
I.B.2	The national statistics office has adequate capacity in statistics (demography, statistics, ICT)	<ul style="list-style-type: none"> <li>Financial and Human resources inadequate</li> </ul>
I.B.3	There is a functional central HIS administrative unit in the ministry of health to design, develop and support health-information collection, management, analysis, dissemination and use for planning and management	<ul style="list-style-type: none"> <li>This refers to HIU in MOH</li> <li>In recent history, there have been few advances to HIS in country. Unable to capture key indicators such as breastfeeding at 6 wks.</li> <li>Limited use of data for planning and management purposes - confidence in integrity of data influences use</li> </ul>
I.B.4	There is a functional central HIS administrative unit responsible for population censuses and household surveys that designs, develops and supports health-information collection, management, analysis, dissemination and use for planning and management	
I.B.5	At subnational levels (e.g., regions/provinces and districts) there are designated full-time health information officer positions and they are filled	<ul style="list-style-type: none"> <li>Don't have enough positions; all positions are filled. Posts needs to be created for a significant number of new positions</li> <li>Who is a Health Information officer? Clarification on the intended meaning of the word designated?</li> <li>Way less than 50%. However, even where posts exist, it is not attractive</li> <li>There are dedicated health records clerks in all of the health facilities - not trained at the level of a health information officer</li> </ul>
I.B.6	HIS capacity-building activities have taken place over the past year for HIS staff of the ministry of health (statistics, software and database maintenance, and/or epidemiology) at national and subnational levels	<ul style="list-style-type: none"> <li>Training occurs but it is not sufficient. Even though it is limited, it is still heavily dependent on donor support</li> </ul>
I.B.7	Capacity-building activities have taken place over the past year for staff of the national statistics office (statistics, and software and database maintenance) at national and subnational levels	<ul style="list-style-type: none"> <li>The capacity building is limited, and has depended to a large extent on external sources</li> </ul>
I.B.8	HIS capacity-building activities have taken place over the past year for health-facility staff (on data collection, self-assessment, analysis and presentation)	<ul style="list-style-type: none"> <li>Crisis driven rapid response parish level training done within the past year. Donor funds used at parish level re HIV programme</li> <li>Korean system has been piloted in the SERHA in 2 hospitals. Training of health records staff and others has led to improved timeliness of reports</li> <li>All components noted have not been addressed. Eg.Data collection is stressed more than analysis</li> <li>Capacity building in data collection, coding - more training needs to be done especially in analysis and presentation</li> </ul>
I.B.9	Assistance is available to health and HIS staff at national and subnational levels in designing, managing and supporting databases and software	<ul style="list-style-type: none"> <li>Limitations in terms of software design, other aspects adequate. System development skills very limited:</li> <li>Pace of growth is very slow</li> <li>PAHO technical cooperation</li> </ul>
I.B.10	Acceptable rate of health-information staff turnover at national level in the ministry of health	
I.B.11	Acceptable rate of health information staff turnover at national level in national statistics office	<ul style="list-style-type: none"> <li>The turnover has been moderate over recent years</li> </ul>
I.B.12	There are specific budget-line items within the national budget for various sectors to provide adequately for a functioning HIS for all relevant data sources in the ministry of health	<ul style="list-style-type: none"> <li>Not familiar with the national budget and sector allocation</li> <li>There is not a specific budget line at MOH level; but at the regional/parish levels, there are other budget lines that are used to take that into consideration</li> </ul>
I.B.13	There are specific budget-line items within the national budget for various sectors to provide adequately for a functioning statistics system for all data sources in the national statistics office	<ul style="list-style-type: none"> <li>PAHO and UNFPA are not in a position to answer as the agencies do not have the information to inform a position</li> </ul>

### 3.1.2.2 Recommendations

Based on the assessment the following are recommended:

Suggested participating organisations - MOH, RHA, PAHO/WHO, UNFPA:

- Conduct an assessment of health information HR needs and advocate for necessary amendments to established cadres
- Partner with local education institutions to recruit skilled Statisticians, Health Information Management professionals (commonly called Medical Records staff), Epidemiologists, IT and other personnel who will be essential to an efficient HIS in their respective capacities
- Create attractive remuneration packages to entice highly skilled personnel
- Invest in existing HR by supporting their educational development. Consider instituting mechanisms for developing their skill set whether by sending them to be trained or bringing in suitably qualified personnel to conduct on-the-job training
- Conduct a formal evaluation of the role and function of the HIU including an examination of how it is aligned within the Organizational Structure of the MOH. Assess the programme specific health information systems within MOH and IT operations within the RHAs and see how they can be integrated and certain aspects reconciled to prevent duplication and provide a useful HIS. (Note: the suggestion is not to eliminate these systems but to see how the entities can collaborate for an improved HIS while still achieving their unique objectives)
- Take full advantage of technical cooperation and funding support from organizations such as PAHO/WHO and United States Agency for International Development (USAID)
- Seek financial support from the private sector locally and international development partners for specific components/aspects HIS and for strengthening activities

### 3.1.3 Infrastructure

#### 3.1.3.1 Findings

Assessment of the Infrastructure component resulted in an average score of 58% and thus classification as adequate. Group 1 (Health Management Information System) rated this component at 45% (present but not adequate) while for the other groups all ratings were in the adequate category with individual group scores ranging from a low of 56% (MOH programme managers) to a high of 69% (Statistics and Demography). (See figure 3.1). Table 3.2 shows the comments made regarding specific items within the Infrastructure component. The comments generally allude to infrastructure being unsuitable for demands and needs. Issues raised include financial constraints, limited manpower and equipment and onerous procurement procedures.

**Table 3.2. Comments made by assessors regarding Infrastructure**

Item	Comments
I.C.1	Recording forms, paper, pencils and other supplies that are needed for recording health services and disease information are available
I.C.2	Recording forms, paper, pencils and supplies that are needed for reporting vital statistics are available
I.C.3	<p>Computers are available at the relevant offices at national, regional/provincial and district levels to permit the rapid compilation of subnational data</p> <ul style="list-style-type: none"> <li>• Procurement process part of the problem as the timeliness is a challenge. Preventative maintenance/replacement is another challenge. Outdated system requirements that are unable to meet needs of users are another challenge. As an example, Health Records Dept in both primary care and hospital has been without a computer for &gt;1 year in one parish waiting on replacement parts that are not that expensive. Budgetary allocation is a limitation</li> </ul>
I.C.4	<p>A basic ICT infrastructure (telephones, internet access and e-mail) is in place at national, regional/provincial and district levels</p> <ul style="list-style-type: none"> <li>• Refers to corporate email not personal email accounts. There is disparity between departments, basic ICT not fulfilled at the national level, some regions more advanced</li> <li>• District = parish and not health districts. Email accounts may not be assigned to all persons at these levels but those with a critical need have for the most part. Internet/computer access is available but it is also limited. CUG may not be available to all regional/parish officers. Challenges with reliability of PBX system</li> </ul>
I.C.5	<p>Support for ICT equipment maintenance is available at national, regional/provincial and district levels</p> <ul style="list-style-type: none"> <li>• Support is inadequately staffed and poorly resourced. Support exists but there are delays in accessing it at parish/district level as support at regional level also services support at parish level. (NB Support is judged as responsiveness, available personnel and financial resources relative to needs)</li> </ul>

### 3.1.3.2 Recommendations

Based on the assessment the following are recommended:

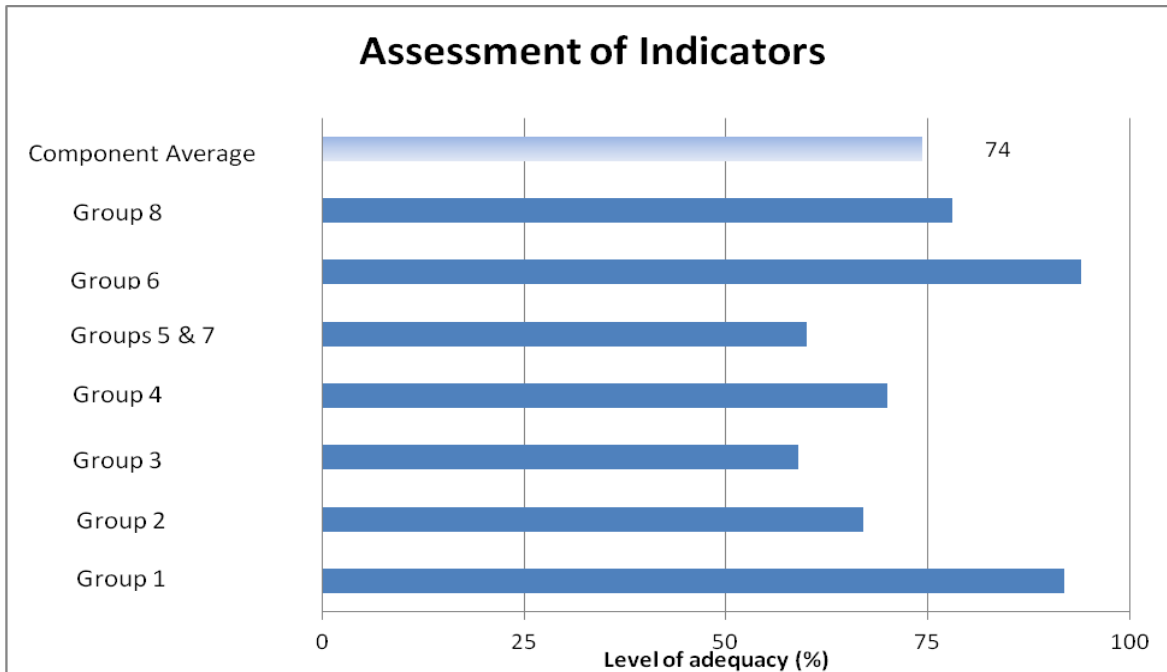
Suggested participating organisations - MOH, RHA, Ministry of Finance:

- Review procurement guidelines and make necessary amendments to sanction procurement of material and equipment at the level of the RHA, the Public Health Department and the individual health facility as far as is reasonable and feasible
- Ensure equity (not necessarily equality) in terms of the provision of ICT infrastructure between departments and regions and the MOH and its agencies
- Conduct staff evaluations and take necessary actions to ensure a competent staff to handle ICT maintenance issues
  - The option of outsourcing personnel can be considered as it may not be feasible to recruit competent staff for all IT needs
  - Also consider pooling skills between MOH and RHAs re IT specialists for efficiency rather than current mechanism of each RHA functioning independently of each other and of the MOH/SITU

## 3.2 Indicators

### 3.2.1 Findings

Figure 3.2 illustrates the assessment of Indicators highlighting adequacy scores given by the groups and the overall component average when all the group scores are combined. Three groups (Non-Project Donors, Health Management Information System and Sub-National (RHA)) rated Indicators as highly adequate with scores of 78%, 92% and 94% respectively. The remaining groups rated this component as adequate with scores ranging from 59% (Statistics and Demography) to 70% (MOH Programme Managers). The component overall obtained an average score of 74% and a classification of adequate. Table 3.3 shows the comments made by the groups in their assessment of specific items of the Indicators component.



**Figure 3.2. Assessment of Indicators.** Bar Chart showing ratings given for Indicators by each assessment group along with the overall average score for the component. Group 1-Health Management Information System; Group 2-Ministry of Health Senior Planners and Policy-Makers; Group 3-Statistics and Demography; Group 4-Ministry of Health Programme Managers; Group 5-Financial Monitoring and Evaluation; Group 6-Sub-national (Regional Health Authorities); Group7-Resource Tracking; Group 8-Non-Project Donors

**Table 3.3. Comments made by assessors regarding Indicators**

Item	Comments
II.A.1	<p>National minimum core indicators have been identified for national and subnational levels, covering all categories of health indicators (determinants of health; health system inputs, outputs and outcomes; and health status)</p> <ul style="list-style-type: none"> <li>• Basic indicators exists in regards to PAHO/WHO</li> <li>• Based on the information given at this workshop there are some systems in place to identify some of these indicators</li> <li>• Issue is that there are minimum indicators but there is scope for improvement/strengthening</li> </ul>
II.A.2	<p>There is a clear and explicit official strategy for measuring each of the health-related MDG indicators relevant to the country</p>
II.A.3	<p>Core indicators are defined in collaboration with all key stakeholders (e.g., ministry of health (MoH), national statistics office (NSO), other relevant ministries, professional organizations, subnational experts and major disease-focused programmes)</p> <ul style="list-style-type: none"> <li>• A lot is happening with programmes and external partners but more sharing is needed. There are several initiatives (currently underway)</li> </ul>
II.A.4	<p>Core indicators have been selected according to explicit criteria including usefulness, scientific soundness, reliability, representativeness, feasibility and accessibility</p> <ul style="list-style-type: none"> <li>• The PAHO core indicators (and rationale are clearly understood); (the rationale behind) additional MOH indicators is not always clear; there are uncertainties regarding how they are selected</li> </ul>
II.A.5	<p>Reporting on the minimum set of core indicators occurs on a regular basis</p> <ul style="list-style-type: none"> <li>• There are annual reports submitted for example to PAHO/WHO including core health indicators and immunization - however, there is not a comprehensive report of all of the core indicators by all partners (national and external)</li> </ul>

### 3.2.2 Recommendations

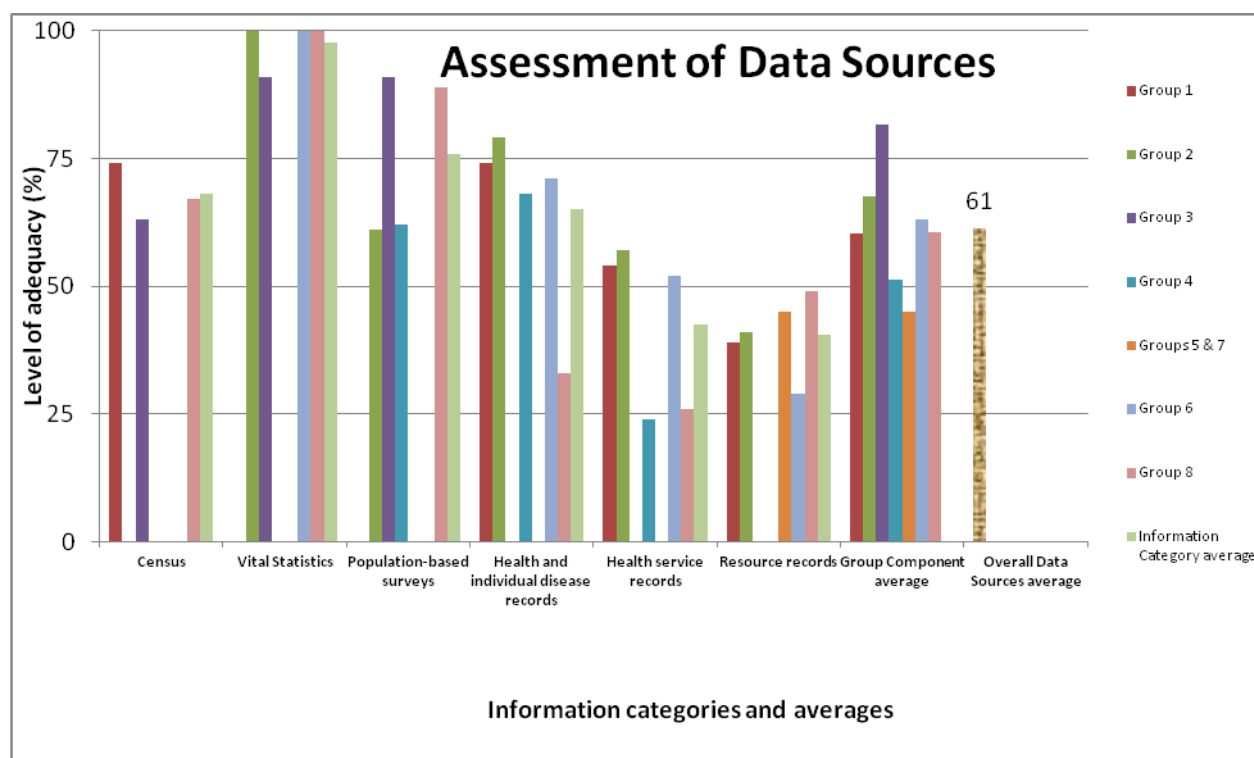
Based on the assessment the following are recommended:

Suggested participating organisations - MOH, RHA, STATIN, PIOJ, RGD, PAHO/WHO:

- Continue (and certainly improve as necessary) use of indicators developed by national stakeholders and those mutually agreed on by Jamaica and development partners including PAHO/WHO Strengthen monitoring and evaluation activities and emphasize timely reporting of all indicators at the sub-national and national levels
  - Institute legislation and policy governing the mandatory reporting on core indicators to the MOH by public and private health sectors
  - Reports should be available (perhaps in a web-based abbreviated form while still covering core indicators) to the general public and not only persons within the MOH and its partners

### 3.3 Data sources

Figure 3.3 shows the findings of the Data Sources assessment. Overall, this component was rated as adequate obtaining an average score of 61%. There were moderate between-group variations in the average score assigned to this component: While the assessment of five groups resulted in a classification of adequate, the other two groups diverted in both directions with one group (Statistics and Demography) giving a score of 82% (highly adequate) and the other (Financial Monitoring and Evaluation & Resource Tracking) giving a score 45% (present but not adequate).



**Figure 3.3. Assessment of Data Sources.** Bar Chart showing ratings of information categories within the Data Sources component and average component scores by each assessment group. Group 1-Health Management Information System; Group 2-Ministry of Health Senior Planners and Policy-Makers; Group 3-Statistics and Demography; Group 4-Ministry of Health Programme Managers; Group 5-Financial Monitoring and Evaluation; Group 6-Sub-national (Regional Health Authorities); Group 7-Resource Tracking; Group 8-Non-Project Donors

#### 3.3.1 Census

##### 3.3.1.1 Findings

The Census sub-component was assessed by the following groups: Health Management Information System; Statistics and Demography; and Non-Project Donors and received an average score of 68%, falling in the category of adequate (See figure 3.3). There was only slight variation in the scores assigned by the three groups that rated this sub-component as individual scores were 74%, 63% and 67% respectively. It should be noted that four separate elements comprise the Census sub-component/information category (as is the case for the other sub-components within the Data Source component) and combining the score of each of these elements gives the overall sub-component score. Depending on the country's unique situation it might not have been necessary to assess all four elements. Additionally, the group's perception

of the country's situation could also influence whether certain elements were assessed. The Statistics and Demography group assessed all four elements (Contents, Capacity and Practices, Dissemination, Integration and Use); Health Management Information System group assessed two elements (Dissemination, Integration and Use) and the Non-Project Donors assessed two elements (Capacity and Practices, Integration and Use). For all groups each element was given an individual rating of adequate or highly adequate with the exception of Integration and use when rated by Non-Project Donors (this was deemed present but not adequate). The Non-Project Donors group commented on the element addressing integration and use of census data stating that "population projections (are) used in some health programmes but not across all programmes."

### **3.3.1.2 Recommendations**

Based on the assessment the following are recommended:

Suggested participating organisations - PIOJ, STATIN, MOH:

- Assist in capacity building ventures and ensure that appropriate mechanisms are in place for knowledge transfer and ensuring continuity so that this data source remains active and efficient
- Explore options to provide support to other programmes
- Consider means in keeping with technological advances to improve dissemination of data
- Employ greater utilisation of estimates to inform planning across varying health programmes

## **3.3.2 Vital Statistics**

### **3.3.2.1 Findings**

The Vital Statistics sub-component was assessed by the following groups: MOH Senior Planners and Policy Makers; Statistics and Demography; Sub-National; Non-Project Donors. The overall average score given was 98% (highly adequate). (See figure 3.3). Group 3 (Statistics and Demography) rated this component as highly adequate at 91% while the other groups rated it at 100%. Group 3 assessed all four elements while Groups 2 (MOH Senior Planners and Policy Makers) and 6 (Sub-National) assessed Integration and use and Group (Non-Project Donors) assessed Contents. All elements were rated as highly adequate. Despite the designation of this component as highly adequate, it was interesting to note that all three groups that provided comments in addition to scores addressed the issue of data quality, in particular completeness and accuracy of the data. Also noteworthy is the fact that the item within Capacity and Practices that relates to frequency of assessment of completeness of civil registration was deemed present but not adequate. One group stated that improvement is needed particularly in the area of (registration of) deaths.

### **3.3.2.2 Recommendations**

Based on the assessments the following are recommended:

Suggested participating organisations - RGD, MOH in partnership with private health professionals/facilities:

- Partner with relevant authorities to implement measures to ensure timely and accurate reporting of vital events
- Conduct routine data quality checks including full epidemiological studies
- Use best practices and assist in capacity building activities, including training, with other organizations that generate health data

### 3.3.3 Population-based surveys

#### 3.3.3.1 Findings

This sub-component was assessed by Groups 2 (MOH Senior Planners and Policy Makers), 3 (Statistics and Demography), 4 (MOH Programme Managers) and 8 (Non-Project Donors) and was given an average of 76% (highly adequate) (See figure 3.3). Two of the groups (3 and 8) rated the sub-component as highly adequate (91% and 89% respectively) while the other two (2 and 4) gave ratings of 61% and 62% respectively (adequate). Groups 3 and 4 addressed all four elements while Group 8 addressed all elements except Dissemination and Group 2 addressed Contents and Integration and Use. All elements were deemed adequate or highly adequate by all the groups with the exception of Integration and Use which was deemed present but not adequate by Group 2. In commenting on 'Contents', stakeholders noted that while a Maternal and Child Health Survey had been conducted by the MOH about 4 years ago data quality issues were a concern as a small sample size yielded unstable estimates. As part of the Capacity and Practices assessment it was questioned whether the data being collected allowed for disaggregation according to socioeconomic status. Mention was made of the Survey of Living Conditions (publication of the PIOJ and STATIN) which captures health and sociodemographic information. On the element of Integration and Use it was noted by the MOH Programme Managers that surveys are not a line item in the budget and so are conducted when funding is available. Reference was again made to the Survey of Living Conditions but it was acknowledged that although health information is produced from this survey there is no coordinated and permanent effort between PIOJ/STATIN and MOH in this regard.

#### 3.3.3.2 Recommendations

Based on the assessment the following are recommended:

Suggested participating organisations MOH, PIOJ, STATIN in collaboration with research institutions:

- MOH should consider including population surveys with a primary health focus as a standard activity (and thus a budgeted item) at least once every five years
- Explore possibilities for collaborating and maximise opportunities that are available with established surveys
- On advice and consensus employ proper survey design methodology to ensure confidence in data once collected and analysed and also so as not to waste scarce resources

### 3.3.4 Health and disease (Individual) records

#### 3.3.4.1 Findings

This sub-component was assessed by the following groups: 1 (Health Management Information System), 2 (MOH Senior Planners and Policy Makers), 4 (MOH Programme Managers), 6 (Sub-National) and 8 (Non-Project Donors). The average score given was 65% (adequate). The

groups were fairly similar in their rating of this sub-component with the main disparity coming from the rating given by Group 8 of 33% (present but not adequate). The ratings of the other groups ranged from 68% to 79%. (See figure 3.3). All the elements in the Health and Disease sub-component were rated as being highly adequate or adequate by all the groups with the exception of Capacity and Practices which was rated as present but not adequate by Group 8. This was the only element addressed by Group 8 and Group 2. Group 1 and 4 addressed all elements while Group 6 addressed all excepting Contents. Assessors gave varied comments on the element of Capacity and Practice. One group stated that capacity and practice in all three areas - diagnose and record; report and transmit timely data; and analyse and act on data - needed strengthening. Others argued that the capacity to diagnose and record exists but reporting is not usually done in a timely manner. Reasons cited include the fact some persons have other responsibilities and so time is a factor. The issue of retrieving patient information was also cited as a challenge and it was also noted that very often nurses' notes are more complete than doctors' notes. On the issue of mapping populations using Geographic Information System (GIS) applications, it was noted this area needs strengthening in terms of human resources. It was stated that this type of technology is not yet fully institutionalized within the MOH. It was further stated that currently only one person is involved in generating maps and that while training is provided it is not sustainable. It was stated that dissemination of data is generally facilitated by monthly or quarterly bulletins but there are challenges regarding the quality of data presented as there are instances where different reports present dissimilar estimates for the same parameter.

### 3.3.4.2 Recommendations

Based on the assessments the following recommendations were made:

Suggested participating organisations - MOH in collaboration with the private health sector, RHA, Educational institutions:

- Through continuing education, improve on the ability of health workers making primary diagnoses to diagnose diseases especially re-emerging diseases
- Build capacity among existing MOH staff to facilitate full institution of Health GIS and eventually the expansion of this tool to enterprise Health GIS
- Review reporting mechanism to identify steps that contribute to breakdown in the process and seek to address these. Consider incentives and not only sanctions
- Review and revise patient information system transitioning to an electronic system eventually while merging forms that collect the same information in the interim if feasible
- Address human resource needs to ensure that personnel is adequate with respect to numbers and skill

### 3.3.5 Health service records

#### 3.3.5.1 Findings

On average, Health Service Records were classified as present but not adequate (43%). The two lowest ratings were 24% (not adequate at all) and 26% (present but not adequate). These were in contrast to the other three ratings which were at the lower end of the third quartile ranging from 52% to 57% (adequate) (See figure 3.3). Groups 1 (Health Management Information System), 2 (MOH Senior Planners and Policy Makers), 6 (Sub-National) and 8 (Non-Project Donors) assessed all four elements of the Health Service Records sub-component while Group 4 (MOH Programme Managers) assessed two elements (Contents, Integration and

Use). Of the four elements, Contents, received the least favourable assessment obtaining a rating in either of the two lower quartiles (not adequate at all or present but not adequate) from all the assessment groups. Integration and Use fared somewhat better than Contents. Dissemination, which fared similarly to Capacity and Practices, was the best rated (deemed at least adequate by all groups). The specific assessment items under 'Contents' addressed two main issues: (i) the presence of a health service based information system that brings together data from all public and private facilities and (ii) the presence of a systematic approach to evaluating the quality of services provided by health facilities. Assessors commented that a system exists but data submission/integration may not always be consistent in all areas and that they were unaware of any routine surveys done to evaluate the quality of health services. On the matter of Capacity and Practices, persons noted that in many cases the established cadre for health information staff may be inadequate. It was also mentioned that training is primarily through sensitizations or in-service training but these are inadequate. It was noted that the term health information is very broad and content addressed in group discussions may be limited. Regarding Dissemination, some persons acknowledged the presence of an annual summary of health service statistics published with statistics disaggregated by major geographical or administrative region but others admitted that they had not personally seen them. It was also noted that regarding the extent to which districts or similar administrative units compile their own monthly/quarterly and annual summary reports, disaggregated by health facility, the Monthly Clinic Summary Report (MCSR) and the Hospital Monthly Statistical Report (HMSR) would fit these criteria. It was emphasized, however, that this report is not necessarily comprehensive and has challenges with timeliness. Concerning Integration and Use it was stated that reporting from the vertical HIV programme does not integrate well with general surveillance and health service reporting as the reporting cycle of the HIV programme does coincide with what is required nationally. It was also noted that MOH is working with PAHO/WHO and the Centers for Disease Control (CDC) to improve the quality of immunization data.

### 3.3.5.2 Recommendations

Based on the assessment the following are recommended:

Suggested participating organisations - MOH, RHA, private health sector, PAHO/WHO, CDC:

- Review current health services information system and address weaknesses
- Incorporate routine surveys to evaluate quality of health services
- Consider legislation to improve private sector cooperation and compliance
- Generate timely reports from information collected
- Move to consolidate reporting systems and reconcile programme-specific methods with wider surveillance system
- Address programme- specific initiatives with the overall bigger picture of a thorough HIS in mind

### 3.3.6 Resource records

#### 3.3.6.1 Findings

Assessment of the Resource Records sub-component resulted in a rating of 41% (present but not adequate). All assessment groups rated this sub-component in this 2<sup>nd</sup> adequacy quartile (present but not adequate) with the scores ranging from 29%to 49%, (See figure 3.3). All the groups excepting 3 (Statistics and Demography) and 4 (MOH Programme Managers) conducted this assessment.

Assessment of Resource Records focused on four main areas, namely: Infrastructure and Health Services; Human resources; Financing and Expenditure; and Equipment, Supplies and Commodities. Some groups made comments on specific items in addition to providing their rating scores. On Infrastructure and Health Services it was stated that there is no database of health facilities for the private sector and that while Global Positioning System (GPS) coordinates exist, there is no link to GPS coordinates in the (public sector) database. Relating to updating of databases and maps it was stated that maps have not been updated in recent time (as long as 2 decades in some cases) and so are likely to be inaccurate. Regarding Human Resources (HR), some persons requested clarification on who is regarded as a health professional. It was noted that there is a national database for the public sector. However, this was described as underutilized and disorganized and many persons indicated being unaware of its existence. It was stated that RHAs are usually asked for data based on categories of workers. Of note it was mentioned that the private sector is not included in regional or national HR database. Persons stated that not much was known regarding updating national HR database. It was acknowledged that the Medical, Nursing, and other Councils track (their respective) health professionals but there still remains the need for a comprehensive HR database. It was noted that academic institutions maintain a database (of their graduates); however, this is not shared on a routine basis with the MOH. Mention was also made of a previous initiative in which an HR database (one-time) was completed by MOH in collaboration with PAHO/WHO and training institutions. As it relates to Equipment, Supplies and Commodities it was stated that an annual inventory is usually done but a status report is not always presented.

### 3.3.6.2 Recommendations

Based on the assessment the following are recommended:

Suggested participating organisations - MOH, RHA, PAHO/WHO, Private sector health professionals, Academic institutions, Regulatory bodies for health professions:

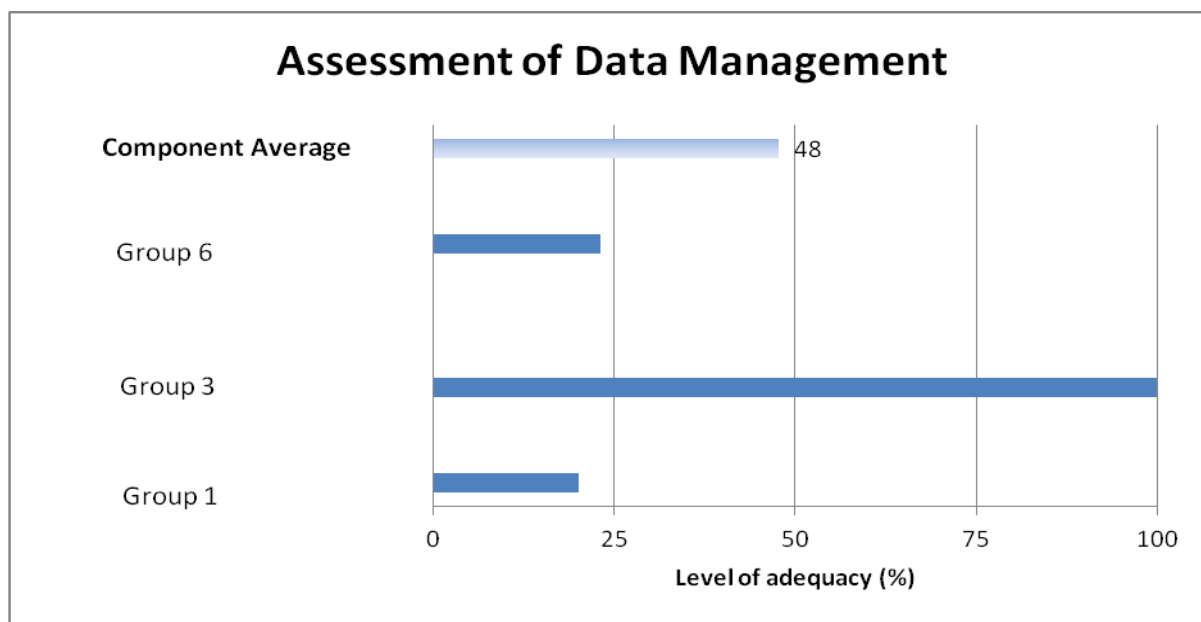
- Expand health facilities database to include the private sector
- Improve on use of GPS/GIS technology : include GPS coordinates in facilities database; update maps
- Review work done previously as well as consult with ongoing approaches concerning developing a database of health HR. Establish relationships with academic institutions and health professionals' regulatory bodies to facilitate information sharing for the long term
- Improve management of equipment and supplies through better record keeping. Inventory-keeping and timely status reports should be mandated

## 3.4 Data management

### 3.4.1 Findings

Figure 3.4 illustrates the assessment of the Data Management component displaying the groups' adequacy scores as well as the average score for the component. The component received an average score of 48% (present but not adequate) following group scores of 20% (not adequate at all – Group 1, Health Management Information System), 23% (not adequate at all – Group 6, Sub-National) and 100% (highly adequate - Group 3, Statistics and Demography). For Group 3, three of the five specific items were assessed while the other groups assessed all

five. Regarding the specific item addressing the existence and implementation of written procedures for varying data management processes and activities such as data collection, storage, cleaning, quality control, analysis and presentation for target audiences, it was noted that written procedures do not exist for all processes/activities.



**Figure 3.4. Assessment of Data Management.** Bar Chart showing ratings given for Data Management by each assessment group along with the overall average score for the component. Group 1-Health Management Information System; Group 3-Statistics and Demography; Group 6-Sub-national (Regional Health Authorities)

### 3.4.2 Recommendations

Based on the assessment the following are recommended:

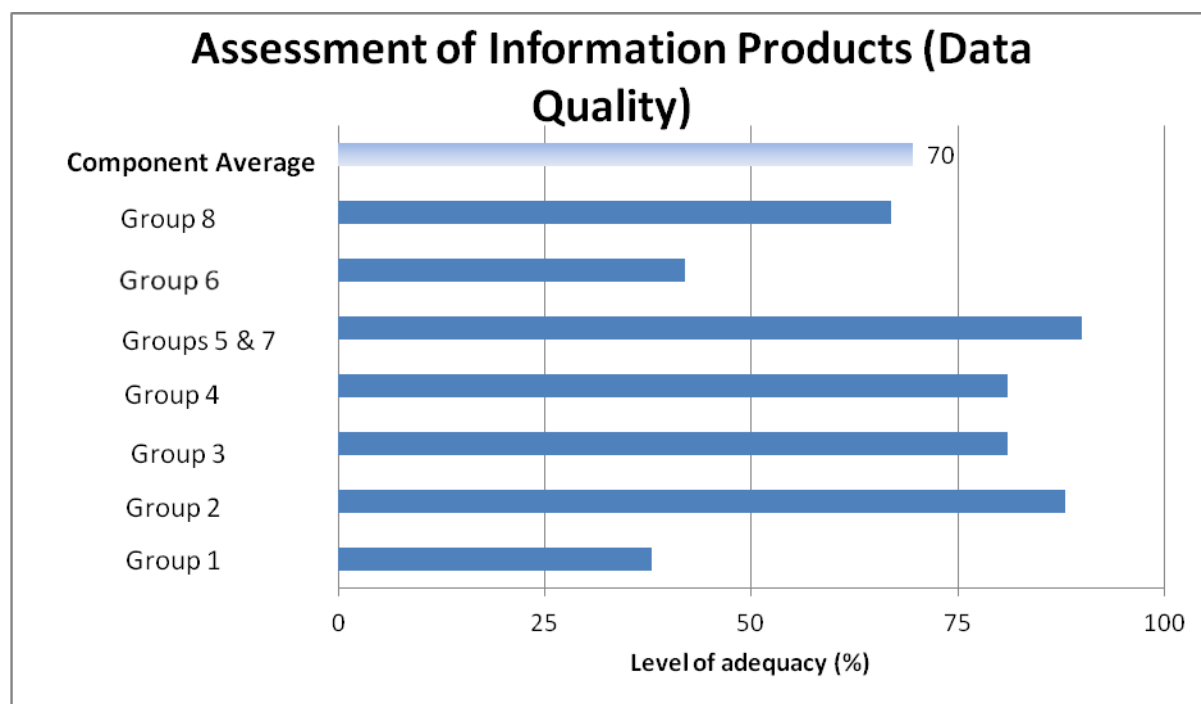
Suggested participating organisations - MOH, HIS stakeholders:

- Develop written guidelines for all data management procedures. These should be allowed to evolve as the country embraces an integrated HIS with contribution and partnerships involving a wide cross section of stakeholders
  - Institute monitoring mechanisms and an overall enabling environment (consider adequate human and non-human resources) to ensure adherence to guidelines
- Conduct training for capacity building to ensure proper management of data
- Sensitize staff as to the importance of the data they collect as this is likely to impact on the importance they place on collecting quality data and reporting it through the necessary channels

## 3.5 Information products (Data Quality)

Assessment of this component involved examining ten main/core indicators across three domains and according to certain selected quality assessment criteria, namely: data collection method; timeliness; periodicity; consistency; representativeness; disaggregation; adjustment method and estimation method. Five additional indicators of special relevance to the Jamaican

setting were also examined; these were non-communicable diseases (NCD), mental health, environmental health, adolescent health, and health promotion. Each group did not assess every indicator nor were all quality assessment criteria always used in assessing each indicator. Figure 3.5 shows the scores that were determined for the component by each group along with the overall component average rating. Data Quality was given an adequacy rating of 38% and 42% (present but not adequate) by Groups 1 (Health Management Information System) and 6 (Sub-National) respectively while Group 8 (Non-Project Donors) rated it as adequate (67%) and all the other groups rated it as highly adequate. The component average was 70% (adequate).



**Figure 3.5. Assessment of Information Products (Data Quality).** Bar Chart showing ratings given for Data Management by each assessment group along with the overall average score for the component. Group 1-Health Management Information System; Group 2-Ministry of Health Senior Planners and Policy-Makers; Group 3-Statistics and Demography; Group 4-Ministry of Health Programme Managers; Group 5-Financial Monitoring and Evaluation; Group 6-Sub-national (Regional Health Authorities); Group 7-Resource Tracking; Group 8-Non-Project Donors

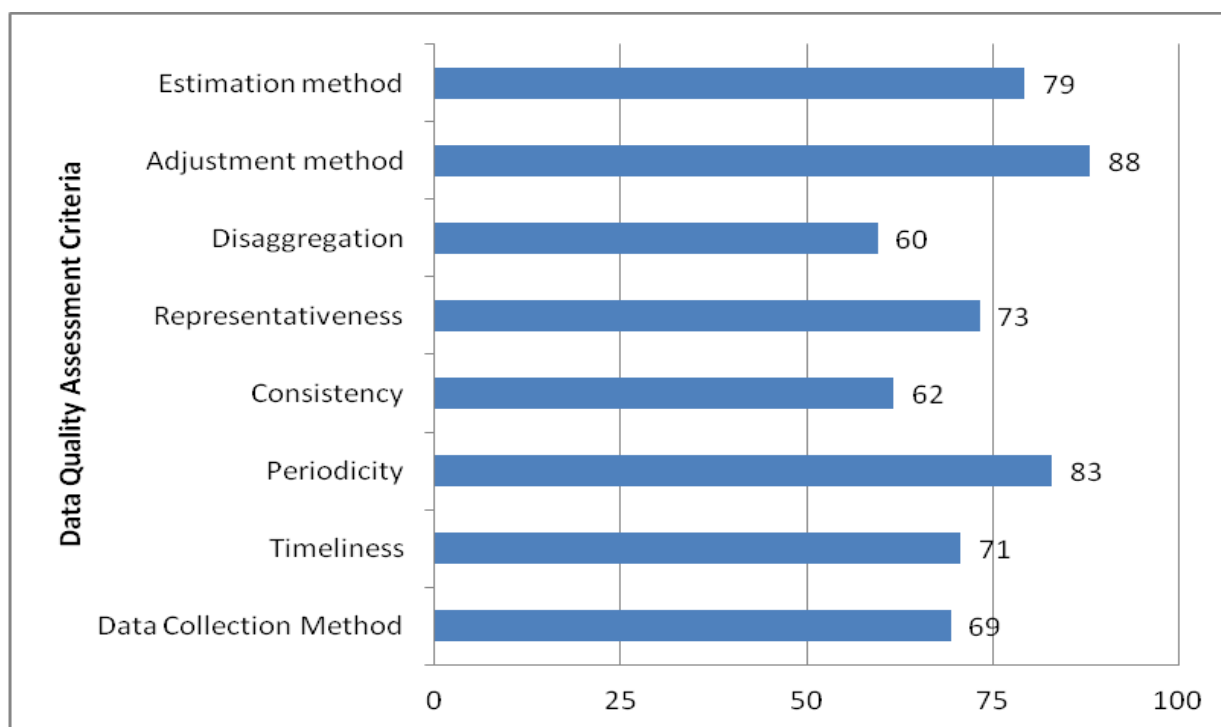
The overall data quality scores by health domain and also the scores for the five additional selected indicators are presented in table 3.4. These scores show slight variation between health domains. Health status and Determinants of health domains received similar scores - 85% and 81% respectively and both fared better than the Health systems domain which received a rating of 73%. The indicators within these domains generally received similar ratings (data not shown). Of the five additional indicators assessed, the Health promotion indicator was the least favourably rated, at 48%.

**Table 3.4. Overall data quality assessment scores for health domains.**

Health Domain and Additional Indicators	Data quality scores (% adequacy rating)
Health status	85, highly adequate
Health systems	73, highly adequate
Determinants of health	81, highly adequate
Additional indicators	
NCD	66, adequate
Mental health	64, adequate
Environmental health	55, adequate
Adolescent health	62, adequate
Health promotion	48, present but not adequate

### Assessment Criteria

A general comparison of the eight assessment criteria is presented in figure 3.6. This does not take into consideration variation between indicators and domains but shows for each criterion the total number of points obtained as a percentage of the maximum number of points that could be obtained when these are evaluated across all indicators and domains.



**Figure 3.6. Comparison of Data Quality Assessment Criteria.** Bar chart showing the overall performance of each data quality component for all indicators combined.

All measures of data quality were at least adequate when examined at this aggregate level. The assessment criterion which focussed on adjustment method was rated the highest (88%) while similarly rated consistency and disaggregation received the lowest ratings (62% and 60% respectively).

### 3.5.1 Health Status Domain

#### 3.5.1.1 Findings

The Health Status domain focused on the following three indicators: under-5 mortality, maternal mortality, and HIV prevalence. Groups 2 (MOH Senior Planners and Policy Makers), 3 (Statistics and Demography), 4 (MOH Programme Managers) and 8 (Non-Project Donors) assessed data quality of these core indicators. Figure 3.7 compares these three indicators in respect of the performance of each quality assessment criteria. The quality assessment criteria of data collection method, timeliness and periodicity fared similarly well across the three indicators and were the best rated, on average, consistently falling in the category of highly adequate. The quality of the data used to assess HIV prevalence was rated highly adequate for all criteria except that of disaggregation, which was rated as adequate. Under-5 mortality and maternal mortality received similar quality ratings for consistency, representativeness and disaggregation (approximately 68%). For Under-5 mortality these criteria were consistently rated below their counterparts for HIV prevalence. A similar pattern was observed for maternal mortality with the exception of disaggregation which was lower for the HIV prevalence indicator (70% vs 73%). Regarding the mortality aspect of the Health Status Domain, it was noted that vital statistics definitions have been recently published by STATIN with the help of PAHO/WHO and United Nations Population Fund (UNFPA). In addressing data collection methods for maternal mortality, assessors advised that Jamaica uses the Reproductive Age Mortality Survey (RAMOS) to evaluate maternal mortality ratio. On the matter of consistency for the same indicator (maternal mortality) the point was made that there are concerns regarding confidence in the integrity of the data. Pertaining to the data collection criterion of the HIV prevalence indicator it was stated that purposive sampling is used for surveys in high risk populations such as men who have sex with men. On the matter of consistency it was noted that there is no reason to believe that the data have (adverse) consistency issues.

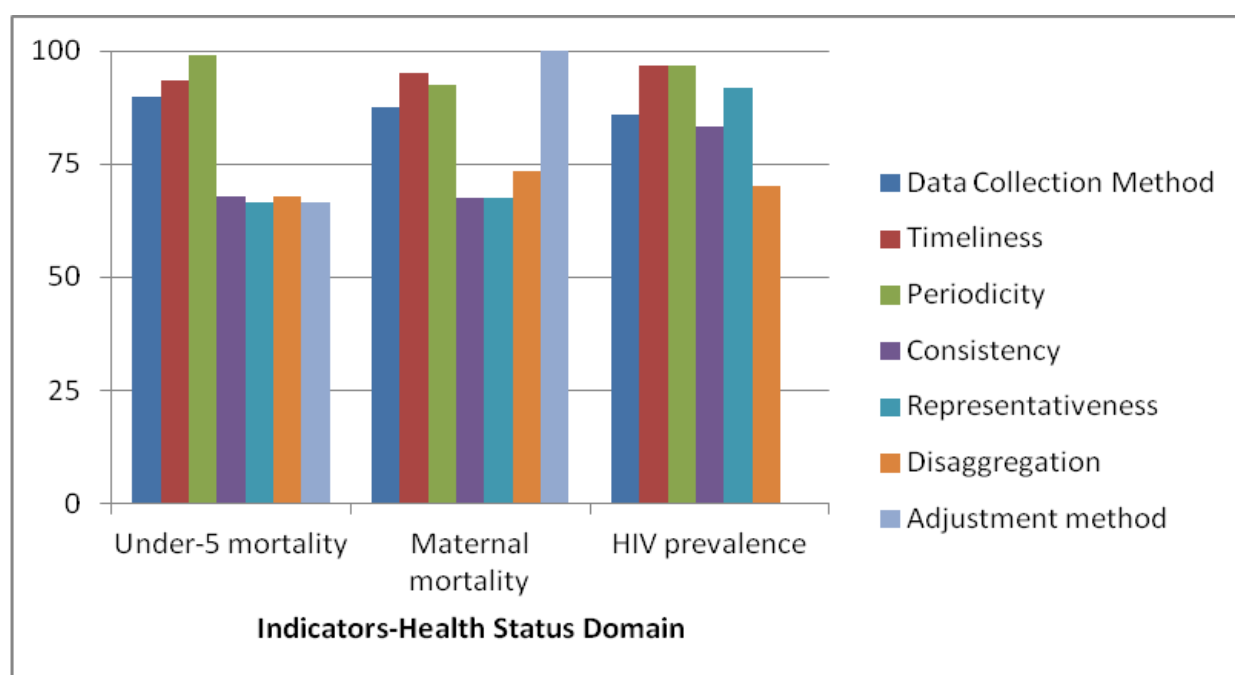


Figure 3.7. Comparison of data quality assessment criteria within Health Status Domain.

### 3.5.1.2 Recommendations

Based on the assessment the following are recommended:

Suggested participating organisations - MOH, RGD, private facilities, HIV programme officers:

- Consider all important sub-groups within population of interest and collect adequate data to allow for disaggregation
- For mortality data in particular, investigations needed to determine the factors affecting consistency for example any or all of the following: data collection or analysis methods, definitions, issues affecting accuracy in reporting
- Consider methods to improve representativeness

### 3.5.2 Health System Domain

#### 3.5.2.1 Findings

Six indicators comprise the Health System domain, namely: Immunization Coverage by 12 Months of Age (adjusted from measles coverage in HMN assessment tool); Deliveries Attended by Skilled Health Professionals; Tuberculosis (TB) Treatment Success Rate under DOTS; General Government Health Expenditure (GGHE) per Capita; Private Expenditure on Health per Capita; and Density of Health Workforce by 1000 population. This domain (though not all indicators) was assessed by all groups. Private expenditure on health per capita was assessed by Group 8 – Non-project Donors - using the data collection criterion and was rated as not adequate at all with a score of zero. The data quality for the indicator of density of health workforce per 1000 population received, on average, a lower rating than the other indicators within the health systems domain. It was assessed in terms of data collection method and timeliness. These two criteria performed reasonably well with the other indicators but were ranked in second lowest quartile (present but not adequate) in this case. Immunization coverage was rated highly adequate in terms of data collection and representativeness. Periodicity and consistency were rated as adequate while disaggregation and timeliness were ranked present but not adequate. For deliveries attended by skilled health professional, TB treatment and GGHE per capita it was observed that all assessment criteria were at least rated as adequate with the notable exception of consistency and disaggregation in the deliveries indicator and representativeness in TB treatment which were all rated present but not adequate. Regarding data collection it was noted for immunization that data are not collected from many facilities that do immunizations, but these are outside of the public sector. Representatives advised that the MOH is working with CDC and PAHO/WHO to improve immunization statistics. For deliveries attended by a skilled health professional it was acknowledged that household surveys are not used for these investigations and that data are not routinely collected from the private sector. On the matter of coverage it was noted for immunization that while this parameter is estimated every year (within three months of the end of the previous calendar year) the findings are not routinely published. Also stated was the fact that the majority of the data on immunization is from the public sector and so there are concerns about representativeness. Regarding disaggregation it was stated that for deliveries attended by skilled health professional the variables income and education are excluded. For consistency in the TB treatment indicator it was remarked that patients default and are lost to follow up.

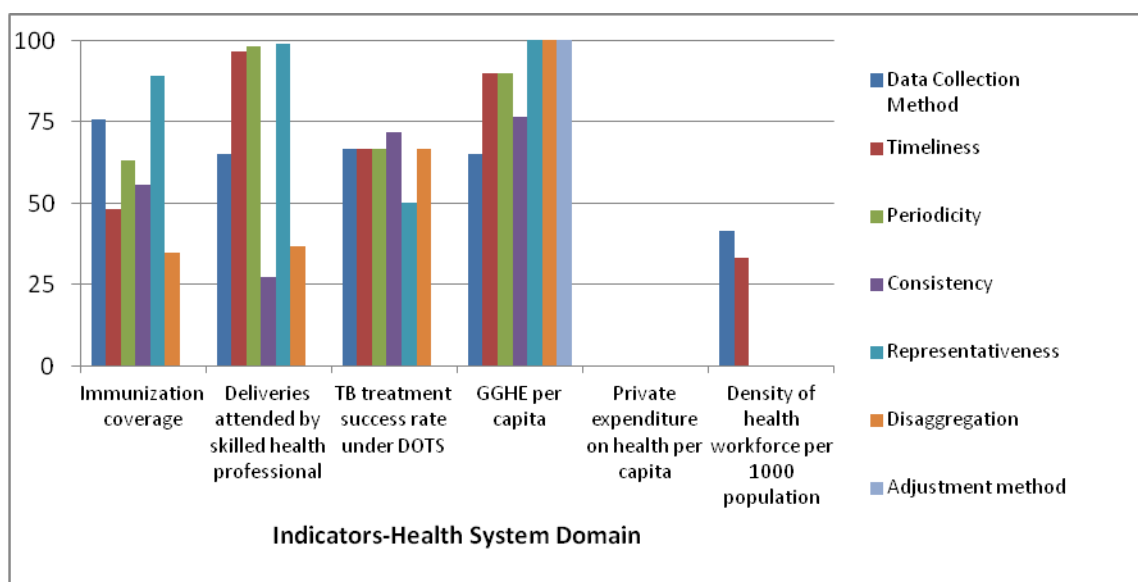


Figure 3.8. Comparison of data quality assessment criteria within Health System Domain.

### 3.5.2.2 Recommendations

Based on the assessment the following are recommended:

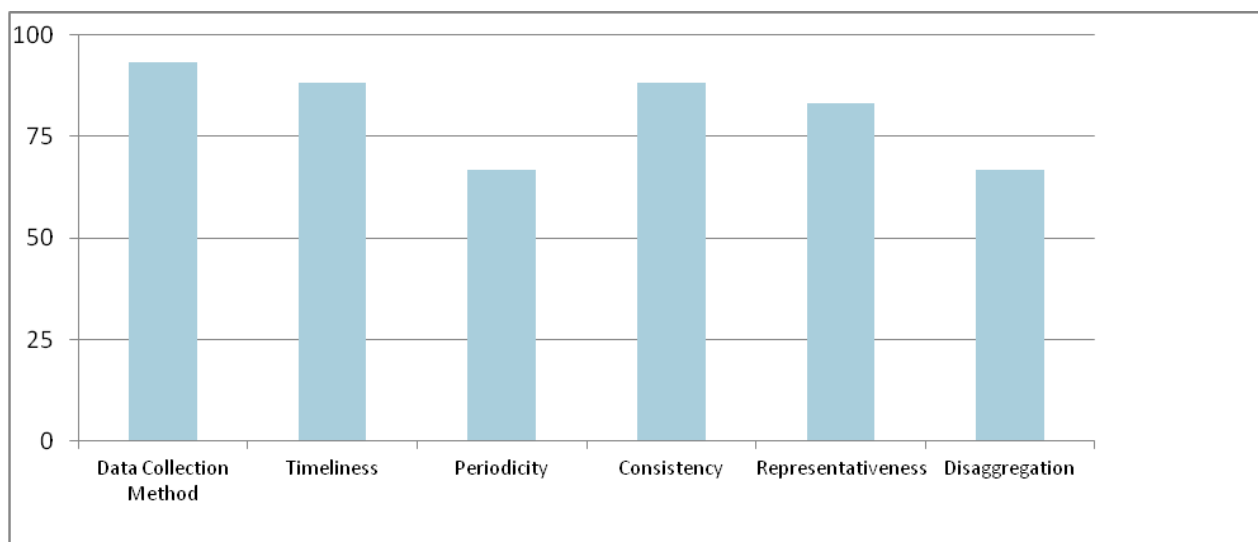
Suggested participating organisations - MOH, private facilities, Ministry of Finance:

- Set mechanisms in place to increase private sector input across all indicators
- Make long term commitment to establishing the systems to accommodate health workforce assessment
- Incorporate nationally representative surveys for deliveries attended by a skilled health professional to provide a second source of data instead of using administrative statistics only
- Identify and address issues affecting consistency as these issues reduce confidence in data quality
- Focus on important subgroups and allow for disaggregation, especially for immunization and deliveries attended by skilled health professional
- Work to improve timeliness with respect to immunization
- Explore measures to reduce loss to follow up regarding TB treatment

### 3.5.3 Determinants of Health domain

#### 3.5.3.1 Findings

The single indicator in this domain addressed smoking prevalence in persons over 15 years old. Data quality was rated as highly adequate in terms of all but two of the assessment criteria. Periodicity and disaggregation were deemed adequate (see figure 3.9).



**Figure 3.9. Comparison of data quality assessment criteria within Determinants of Health Domain**

### 3.5.3.2 Recommendations

Based on the assessment the following are recommended:

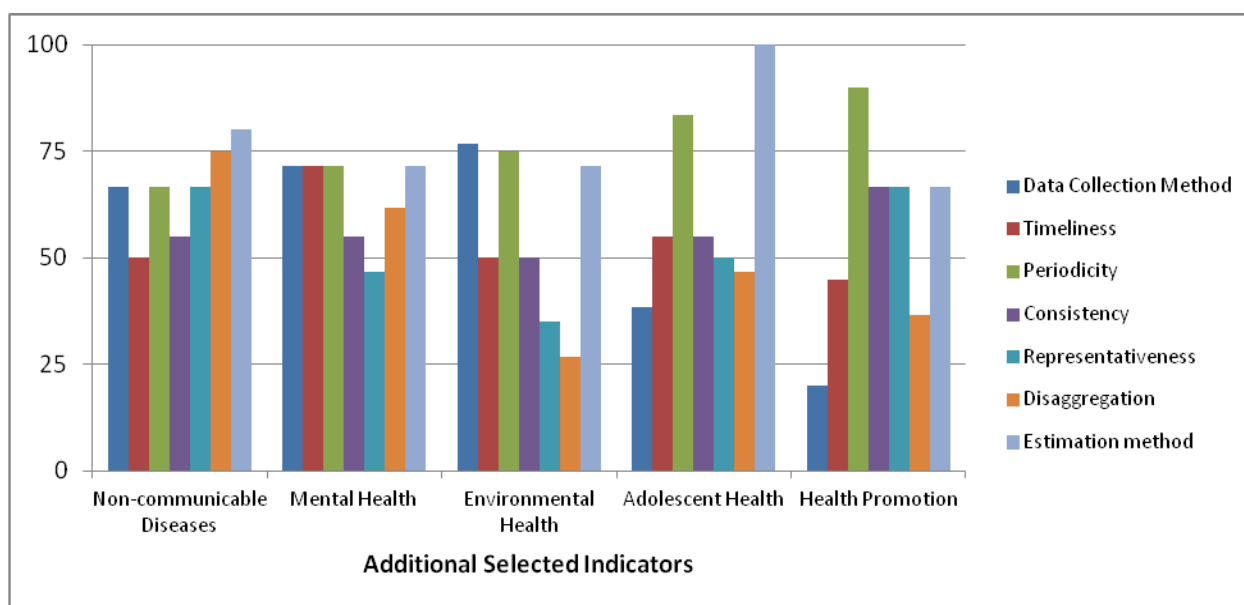
Suggested participating organisations - MOH, research institutions:

- Address the issue of periodicity by arranging to regularly conduct studies over an appropriate and a defined period of time
- Collect data to allow for disaggregation at the level of important subgroups

### 3.5.4 Additional Selected Indicators

#### 3.5.4.1 Findings

Groups 4 (MOH Programme Managers) and 6 (Sub-National) assessed these indicators; the combined ratings are shown in Figure 3.10. For non-communicable diseases (NCD) and mental health, all assessment criteria consistently received at least adequate quality ratings with the exception of timeliness for NCD (borderline adequate) and representativeness for mental health (present but not adequate). For environmental health, quality scores were lowest for representatives and disaggregation while scores for the other criteria were rated at least adequate. Data collection method received low quality ratings for adolescent health and health promotion when compared to the other indicators. This was particularly true for the latter indicator for which the criterion was deemed not adequate at all. Periodicity, consistency and estimation method were rated as at least adequate across all indicators.



**Figure 3.10. Comparison of data quality assessment criteria for the five additional indicators**

### 3.5.4.2 Recommendations

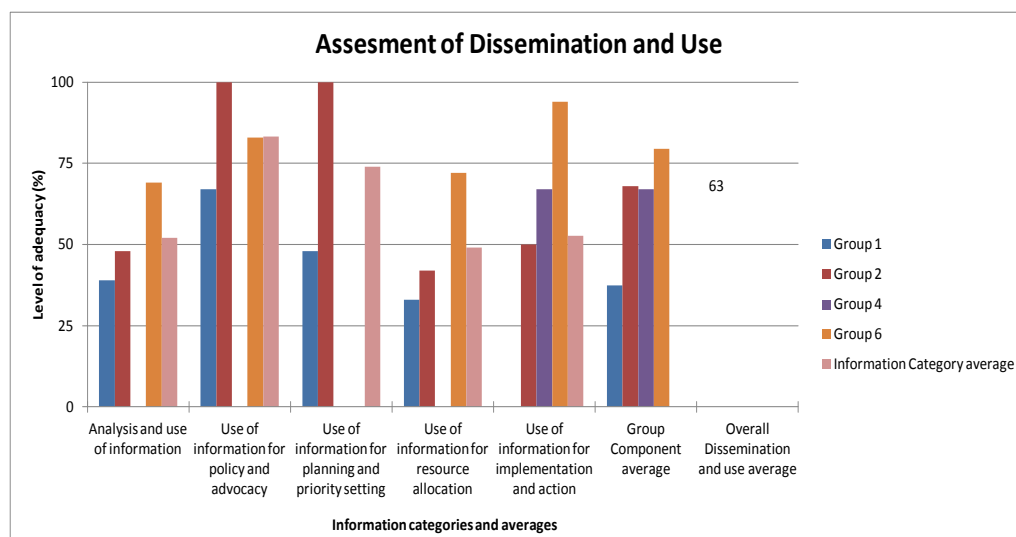
Based on the assessment the following are recommended:

Suggested participating organisations: MOH, RHA, Private facilities:

- Improve data collection method for health promotion and adolescent health indicators to facilitate proper evaluation of the indicators
- Address the issue of timeliness for all these indicators. This should be a priority if the focus is on evidence-based policies and practices
- Improve representativeness especially for mental health, environmental health and adolescent health assessments
- Improve survey methods to allow for disaggregation by relevant subgroups for environmental health, adolescent health and health promotion

## 3.6 Dissemination and use

Figure 3.11 shows the ratings from assessment of the Dissemination and Use component. Overall the component received a rating of adequate with the component average at 63%. With the exception of Group 1 (Health Management Information System), all groups on average rated this component as adequate or highly adequate. Group 1 gave an average rating of 37% (present but not adequate). It should also be noted that the ratings given by Group 1 were consistently lower than those given by the other groups across all the sub-components assessed.



**Figure 3.11. Assessment of Dissemination and use.** Bar Chart showing ratings of information categories within the Dissemination and use component and average component scores by each assessment group. Group 1-Health Management Information System; Group 2-Ministry of Health Senior Planners and Policy-Makers; Group 3-Statistics and Demography; Group 4-Ministry of Health Programme Managers; Group 5-Financial Monitoring and Evaluation; Group 6-Sub-national (Regional Health Authorities); Group 7-Resource Tracking; Group 8-Non-Project Donors

### 3.6.1 Analysis and use of information

#### 3.6.1.1 Findings

This sub-component/information category was assessed by the following groups: Health Management Information System, 1; MOH Senior Planners and Policy Makers, 2; and Sub-National, 6. The average adequacy score was 52% (adequate) and the group ratings were 39%, 48% (both present but not adequate) and 69% (adequate) respectively. (See figure 3.11). With respect to the item on senior managers and policy makers demanding complete, timely, accurate, relevant and validated HIS information, assessors commented that while these demands are made they are often not met with desired timeliness. In addressing the use of graphs and maps it was noted that the use of graphs is not consistent. In some areas they are used mainly in the health facilities while in others they are used mainly in administrative sections. It was noted that maps are not in all facilities and even when present not all of them are up to date.

### 3.6.1.2 Recommendations

Based on the assessment the following are recommended:

Suggested participating organisations - MOH, RHA, health information officers:

- Senior managers and policy makers dialogue with health information officers and mutually agree on HIS reporting schedules
- Senior managers and senior administrative personnel ensure that necessary mechanisms are in place to facilitate the provision of HIS information in a timely manner
- Update maps and train health staff to interpret same

## 3.6.2 Use of Information for policy and advocacy

### 3.6.2.1 Findings

On average this component was rated as highly adequate, receiving a score of 83%. The ratings by the three groups (1, 2 and 6) ranged from 67% to the maximum rating of 100%. (See figure 3.11). It was noted that reports are usually late and not disseminated beyond the national level.

### 3.6.2.2 Recommendations

Based on the assessment the following are recommended:

Suggested participating organisations - MOH Senior planners and policy makers:

- Put measures in place to allow for timely mandatory reporting to MOH to ensure appropriate and relevant actions and decisions are made. These should consider all stages of the process and their unique requirements
- Reports should address all relevant indicators and be disseminated to all stakeholders including those at the sub-national level

## 3.6.3 Use of Information for planning and priority setting

### 3.6.3.1 Findings

This sub-component was assessed by Groups 1 and 2 with the groups showing major variation in the ratings. Group 1 (Health Management Information System) rated this sub-component at 48% (present but not adequate) while Group 2 (MOH senior planners and policy makers) rated the component at the maximal 100%. The average of these two ratings placed the sub-component in the adequate category at 74%. (See figure 3.11)

### 3.6.3.2 Recommendations

Based on the assessment the following are recommended:

Suggested participating organisations - MOH, RHA

- Evaluate the current priorities at the national and sub-national level and determine the extent to which they are driven by current health data
- Commit to using information for planning and priority setting and ensure documentation reflects this

### **3.6.4 Use of Information for resource allocation**

#### **3.6.4.1 Findings**

Groups 1, 2 and 6 assessed this sub-component. Groups 1 (Health Management Information System) and 2 (MOH Senior Planners and Policy Makers) both rated the component in the category of present but not adequate, at 33% and 42% respectively. Group 6 (Sub-national, RHA) gave a score of 72% and thus a rating of adequate. Overall the component was rated at 49% (present but not adequate). The comment was made that the approved budget is usually inadequate to meet the resource needs identified.

#### **3.6.4.2 Recommendations**

Based on the assessment the following are recommended:

Suggested participating organisations - MOH, RHA:

- Review most recent budget proposed and report (to internal stakeholders) on the budget justification and indicate the sums approved highlighting any differences between what was requested and what was finally issued stating the rationale behind adjustments
- At the national and sub-national level decision makers and programme planners commit to selecting at least one area which has reliable data and allocate resources according to outlined needs. Outcome measures addressing effectiveness should be developed and assessed

### **3.6.5 Use of Information for implementation and action**

#### **3.6.5.1 Findings**

This component was rated as present but not adequate, adequate and highly adequate by Groups 2 (MOH Senior Planners and Policy Makers), 4 (MOH Programme Managers) and 6 (Sub-National) respectively. Combining these ratings gave classification of adequate at a score of 53%. It was stated that information is often incomplete and not on time.

#### **3.6.5.2 Recommendations**

Based on the assessment the following are recommended:

Suggested participating organisations - MOH, RHA:

- Develop at least one action plan that will be driven by evidence from health data
- Commit to interim review and making programme adjustments as dictated by the evidence

## 4.0 DISCUSSION

The HIS assessment undertaken by MOH and PAHO/WHO, their partners and other health and non-health stakeholders has allowed for a comprehensive review the existing system in Jamaica. This has revealed strengths and weaknesses in the system and thus has provided evidence to drive the change for improvement.

One main objective of the assessment was to inform stakeholders about the key concepts and aspects of a NHIS as well as the importance of its strengthening. This was achieved through the four-day workshop. Prior to the actual assessment, technical experts from PAHO/WHO and the MOH made presentations to the stakeholders where these issues were addressed.

The other main objective was to obtain a baseline of the country's NHIS across the 6 HIS components outlined in HMN Framework and Assessment tool. The assessment showed that in general the Data Management and HIS Resources components are the weakest components (rated present but not adequate) while the component with focus on Indicators is the strongest (rated just below the minimum value of the highly adequate category). The remaining three are of similar strength (rated as adequate).

Jamaica as a whole has not capitalized on the opportunities in ICT and in many sectors systems continue to operate on archaic mechanisms and platforms that give sub-optimal performances. The health sector and its partners are not exempt. This provides an explanation for the low rating received for the data management component as the gold standards embrace electronic operations.

Sub-components within HIS Resources focus on areas where there have been long standing challenges. As a consequence this component received a low rating. Many of these are areas not unique to HIS Resources. As a result of an almost systemic shortcoming these challenges carry over into various areas within the public and private sectors and civil society. The areas include policy and legislation, financing, infrastructure and human resources.

The assessment results for the indicators component are not surprising largely because Jamaica has partnered extensively with international organizations and is signatory to many international commitments which focus on assessing core health indicators. As a result many of these are included in the country's health priorities and plans at the national and sub-national levels.

The sub-components within Data Sources, Dissemination and Use and Information Products address many areas and practices at which MOH and its partners do excellent work. In many instances these address programme-specific approaches and indicators which are current local health priorities and for which extensive reform has already taken place. Relative weak sub-components exist within these apparently strong components and are generally explained by issues relating to governance.

## 5.0 LIMITATIONS TO STUDY METHODOLOGY

- Non-response to items
  - Some group members acknowledged that they were unable to respond to particular items because of inadequate knowledge. This could have resulted in average scores reflecting the views of a few persons which may or may not be an adequate reflection of the truth. The situation would be made worse if these persons were 'extreme mode responders' who are likely to rate at extreme high or extreme low points on scales
- Subjective assessments
  - The tool does not require documentary evidence but relies on report from persons. Self assessments must be taken in context as participants' biases are likely. Hence some highly adequate ratings that are disproportionate may need special attention, perhaps even more so than disproportionately low ratings as there is the possibility that persons may have rated areas which fall under their programme areas/job higher than other areas
- Unfamiliarity with tool - stakeholders had only a brief introduction to the tool prior to using it in assessment of the HIS components
  - Limited understanding or even misunderstanding could affect accuracy in rating. Failure to grasp the importance of all aspects of the tool including the use of the 'comments' feature could have caused its limited use in some areas and thus failure to capture vital qualitative information. The use of a facilitator, however, should have minimised this
- Inadequate knowledge on the part of assessors
  - Not placing the right persons in the right groups could have resulted in persons not being in the best position to accurately rate the areas (due to lack of knowledge). This in turn could have resulted in extreme variations in scores between groups for the same component or sub-component. More specifically, lack of adequate knowledge could play a role in low scores

## 6.0 GENERAL CONCLUSIONS AND RECOMMENDATIONS

The NHIS assessment revealed both strong and weak areas in the country's HIS system. Sub-component analysis and key descriptive information from stakeholders have provided useful information on (i) critical areas which can serve as models from which best practices can be adapted and (ii) areas which are in need of improvement and perhaps reform.

Several components and sub-components which received low ratings are challenged by similar underlying causes which manifest themselves differently in different situations. These include the absence of enabling environments for establishing and maintaining stakeholder partnerships; inadequate human and non-human resources management (including failure to secure resources equal to meet demands); failure to have timely submission of information including administrative reports and survey findings; inadequate use (or report of use) of data to inform policy and practice.

As a way forward stakeholders led by the MOH should consider:

- Committing to acting on the findings of the Jamaica NHIS assessment
- Ensuring that all relevant systems are in place for the optimal performance of the HIT Steering Committee which will play a key role in driving the HIS strengthening activities and plans
- Developing an operational plan to promptly address priority areas and ensuring that necessary allowances are made in the budget
- Developing a national a strategic plan for HIS development
  - It is important to act with urgency while stakeholders including senior MOH officials are still sensitive to the HIS needs and HIS strengthening is high on the priority list of international support organizations
  - It is imperative that the strategic plan includes action plans for the 'systemic challenges' including how to get private sector collaboration
- Incorporating SWOT analysis findings and develop SWOT Matrix to be used for both operational and strategic planning; that is, how to:
  - Use strengths to maximize opportunities
  - Use strengths to minimize threats
  - Minimize weaknesses by capitalizing on opportunities
  - Minimize weaknesses by avoiding threats
- Using HMN Framework for post-assessment steps

## REFERENCES

About the Health Metrics Network. (n. d.) Retrieved from <http://www.who.int/healthmetrics/about/whatishmn/en/index.html>

HMN, WHO. Results Report. (2010) Retrieved from [http://www.who.int/healthmetrics/news/HMN\\_Results\\_Report\\_2010\\_web.pdf](http://www.who.int/healthmetrics/news/HMN_Results_Report_2010_web.pdf)

Assessing the National Health Information System An Assessment Tool. (n. d.) Retrieved from [http://www.who.int/healthmetrics/tools/Version\\_4.00\\_Assessment\\_Tool3.pdf](http://www.who.int/healthmetrics/tools/Version_4.00_Assessment_Tool3.pdf)

## APPENDICES

### Appendix 1 – Summary Recommendations

#### RESOURCES

##### Coordination, Policy and Planning

Led by MOH

- Develop a HIS strategic plan with particular emphasis on creating an enabling environment to realise HIS objectives.
- Expand the membership of the HIT Steering Committee to include other government ministries and agencies which collect, analyse and/or use health related data, non-health organizations that collect data of importance to health and private sector health professionals. Terms of reference of the committee should be clear
  - Private sector health professionals can be targeted through their professional associations
  - For the long term creative ways should be devised to provide incentives to committee members
- Develop relevant policies and regulations for data sharing and reporting relationships between HIS committee (or body mandated by it) and relevant organizations as well as devise measures to encourage compliance

##### HIS institutions, human resources and financing

Suggested participating organisations - MOH, RHA, PAHO/WHO, UNFPA:

- Conduct an assessment of health information HR needs and advocate for necessary amendments to established cadres
- Partner with local education institutions to recruit skilled Statisticians, Health Information Management professionals (commonly called Medical Records staff), Epidemiologists, IT and other personnel who will be essential to an efficient HIS in their respective capacities
- Create attractive remuneration packages to entice highly skilled personnel
- Invest in existing HR by supporting their educational development. Consider instituting mechanisms for developing their skill set whether by sending them to be trained or bringing in suitably qualified personnel to conduct on-the-job training
- Conduct a formal evaluation of the role and function of the HIU including an examination of how it is aligned within the Organizational Structure of the MOH. Assess the programme specific health information systems within MOH and IT operations within the RHAs and see how they can be integrated and certain aspects reconciled to prevent duplication and provide a useful HIS. (Note: the suggestion is not to eliminate these systems but to see how the entities can collaborate for an improved HIS while still achieving their unique objectives)

- Take full advantage of technical cooperation and funding support from organizations such as PAHO/WHO and United States Agency for International Development (USAID)
- Seek financial support from the private sector locally and international development partners for specific components/aspects HIS and for strengthening activities

## **Infrastructure**

Suggested participating organisations - MOH, RHA, Ministry of Finance:

- Review procurement guidelines and make necessary amendments to sanction procurement of material and equipment at the level of the RHA, the Public Health Department and the individual health facility as far as is reasonable and feasible
- Ensure equity (not necessarily equality) in terms of the provision of ICT infrastructure between departments and regions and the MOH and its agencies
- Conduct staff evaluations and take necessary actions to ensure a competent staff to handle ICT maintenance issues
  - The option of outsourcing personnel can be considered as it may not be feasible to recruit competent staff for all IT needs
  - Also consider pooling skills between MOH and RHAs re IT specialists for efficiency rather than current mechanism of each RHA functioning independently of each other and of the MOH/SITU

## **Indicators**

Suggested participating organisations - MOH, RHA, STATIN, PIOJ, RGD, PAHO:

- Continue (and certainly improve as necessary) use of indicators developed by national stakeholders and those mutually agreed on by Jamaica and development partners including PAHO/WHO Strengthen monitoring and evaluation activities and emphasize timely reporting of all indicators at the sub-national and national levels
  - Institute legislation and policy governing the mandatory reporting on core indicators to the MOH by public and private health sectors
  - Reports should be available (perhaps in a web-based abbreviated form while still covering core indicators) to the general public and not only persons within the MOH and its partners

## **DATA SOURCES**

### **Census**

Suggested participating organisations - PIOJ, STATIN, MOH:

- Assist in capacity building ventures and ensure that appropriate mechanisms are in place for knowledge transfer and ensuring continuity so that this data source remains active and efficient
- Explore options to provide support to other programmes
- Consider means in keeping with technological advances to improve dissemination of data
- Employ greater utilisation of estimates to inform planning across varying health programmes

## **Vital Statistics**

Suggested participating organisations - RGD, MOH in partnership with private health professionals/facilities:

- Partner with relevant authorities to implement measures to ensure timely and accurate reporting of vital events
- Conduct routine data quality checks including full epidemiological studies
- Use best practices and assist in capacity building activities, including training, with other organizations that generate health data

## **Population-based surveys**

Suggested participating organisations - MOH, PIOJ, STATIN in collaboration with research institutions:

- MOH should consider including population surveys with a primary health focus as a standard activity (and thus a budgeted item) at least once every five years
- Explore possibilities for collaborating and maximise opportunities that are available with established surveys
- On advice and consensus employ proper survey design methodology to ensure confidence in data once collected and analysed and also so as not to waste scarce resources

## **Health and disease (Individual) records**

Suggested participating organisations - MOH in collaboration with private health sector, RHA, Educational institutions:

- Through continuing education, improve on the ability of health workers making primary diagnoses to diagnose diseases especially re-emerging diseases
- Build capacity among existing MOH staff to facilitate full institution of Health GIS and eventually the expansion of this tool to enterprise Health GIS
- Review reporting mechanism to identify steps that contribute to breakdown in the process and seek to address these. Consider incentives and not only sanctions
- Review and revise patient information system transitioning to an electronic system eventually while merging forms that collect the same information in the interim if feasible
- Address human resource needs to ensure that personnel is adequate with respect to numbers and skill

## **Health service records**

Suggested participating organisations - MOH, RHA, private health sector, PAHO/WHO, CDC:

- Review current health services information system and address weaknesses
- Incorporate routine surveys to evaluate quality of health services
- Consider legislation to improve private sector cooperation and compliance
- Generate timely reports from information collected
- Move to consolidate reporting systems and reconcile programme-specific methods with wider surveillance system

- Address programme- specific initiatives with the overall bigger picture of a thorough HIS in mind

## **Resource records**

Suggested participating organisations - MOH, RHA, PAHO/WHO, Private sector health professionals, Academic institutions, Regulatory bodies for health professions:

- Expand health facilities database to include the private sector
- Improve on use of GPS/GIS technology : include GPS coordinates in facilities database; update maps
- Review work done previously as well as consult with ongoing approaches concerning developing a database of health HR. Establish relationships with academic institutions and health professionals' regulatory bodies to facilitate information sharing for the long term
- Improve management of equipment and supplies through better record keeping. Inventory-keeping and timely status reports should be mandated

## **Data management**

Suggested participating organisations - MOH, HIS stakeholders:

- Develop written guidelines for all data management procedures. These should be allowed to evolve as the country embraces an integrated HIS with contribution and partnerships involving a wide cross section of stakeholders
  - Institute monitoring mechanisms and an overall enabling environment (consider adequate human and non-human resources) to ensure adherence to guidelines
- Conduct training for capacity building to ensure proper management of data
- Sensitize staff as to the importance of the data they collect as this is likely to impact on the importance they place on collecting quality data and reporting it through the necessary channels

## **Information products (data quality)**

### **Health status domain**

Suggested participating organisations - MOH, RGD, private facilities, HIV programme officers:

- Consider all important sub-groups within population of interest and collect adequate data to allow for disaggregation
- For mortality data in particular, investigations needed to determine the factors affecting consistency for example any or all of the following: data collection or analysis methods, definitions, issues affecting accuracy in reporting
- Consider methods to improve representativeness

### **Health System Domain**

Suggested participating organisations - MOH, private facilities, Ministry of Finance:

- Set mechanisms in place to increase private sector input across all indicators
- Make long term commitment to establishing the systems to accommodate health workforce assessment

- Incorporate nationally representative surveys for deliveries attended by a skilled health professional to provide a second source of data instead of using administrative statistics only
- Identify and address issues affecting consistency as these issues reduce confidence in data quality
- Focus on important subgroups and allow for disaggregation, especially for immunization and deliveries attended by skilled health professional
- Work to improve timeliness with respect to immunization
- Explore measures to reduce loss to follow up regarding TB treatment

### **Determinants of Health domain**

Suggested participating organisations - MOH, research institutions:

- Address the issue of periodicity by arranging to regularly conduct studies over an appropriate and a defined period of time
- Collect data to allow for disaggregation at the level of important subgroups

### **Additional Selected Indicators**

Suggested participating organisations - MOH, RHA, Private facilities:

- Improve data collection method for health promotion and adolescent health indicators to facilitate proper evaluation of the indicators
- Address the issue of timeliness for all these indicators. This should be a priority if the focus is on evidence-based policies and practices
- Improve representativeness especially for mental health, environmental health and adolescent health assessments
- Improve survey methods to allow for disaggregation by relevant subgroups for environmental health, adolescent health and health promotion

### **Dissemination and use**

#### **Analysis and use of information**

Suggested participating organisations - MOH, RHA, health information officers:

- Senior managers and policy makers dialogue with health information officers and mutually agree on HIS reporting schedules
- Senior managers and senior administrative personnel ensure that necessary mechanisms are in place to facilitate the provision of HIS information in a timely manner
- Update maps and train health staff to interpret same

#### **Use of Information for policy and advocacy**

Suggested participating organisations - MOH Senior planners and policy makers:

- Put measures in place to allow for timely mandatory reporting to MOH to ensure appropriate and relevant actions and decisions are made. These should consider all stages of the process and their unique requirements
- Reports should address all relevant indicators and be disseminated to all stakeholders including those at the sub-national level

## **Use of Information for planning and priority setting**

Suggested participating organisations - MOH, RHA

- Evaluate the current priorities at the national and sub-national level and determine the extent to which they are driven by current health data
- Commit to using information for planning and priority setting and ensure documentation reflects this

## **Use of Information for resource allocation**

Suggested participating organisations - MOH, RHA

- Review most recent budget proposed and report (to internal stakeholders) on the budget justification and indicate the sums approved highlighting any differences between what was requested and what was finally issued stating the rationale behind adjustments
- At the national and sub-national level decision makers and programme planners commit to selecting at least one area which has reliable data and allocate resources according to outlined needs. Outcome measures addressing effectiveness should be developed and assessed

## **Use of Information for implementation and action**

Suggested participating organisations - MOH, RHA

- Develop at least one action plan that will be driven by evidence from health data
- Commit to interim review and making programme adjustments as dictated by the evidence

## **General conclusions and recommendations**

The NHIS assessment revealed both strong and weak areas in the country's HIS system. Sub-component analysis and key descriptive information from stakeholders have provided useful information on (i) critical areas which can serve as models from which best practices can be adapted and (ii) areas which are in need of improvement and perhaps reform.

Several components and sub-components which received low ratings are challenged by similar underlying causes which manifest themselves differently in different situations. These include the absence of enabling environments for establishing and maintaining stakeholder partnerships; inadequate human and non-human resources management (including failure to secure resources equal to meet demands); failure to have timely submission of information including administrative reports and survey findings; inadequate use (or report of use) of data to inform policy and practice.

As a way forward stakeholders led by the MOH should consider:

- Committing to acting on the findings of the Jamaica NHIS assessment
- Ensuring that all relevant systems are in place for the optimal performance of the HIT Steering Committee which will play a key role in driving the HIS strengthening activities and plans

- Developing an operational plan to promptly address priority areas and ensuring that necessary allowances are made in the budget
- Developing a national a strategic plan for HIS development
  - It is important to act with urgency while stakeholders including senior MOH officials are still sensitive to the HIS needs and HIS strengthening is high on the priority list of international support organizations
  - It is imperative that the strategic plan includes action plans for the 'systemic challenges' including how to get private sector collaboration
- Incorporate SWOT analysis findings and develop SWOT Matrix to be used for both operational and strategic planning; that is, how to:
  - Use strengths to maximize opportunities
  - Use strengths to minimize threats
  - Minimize weaknesses by capitalizing on opportunities
  - Minimize weaknesses by avoiding threats
- Using HMN Framework for post-assessment steps

## Appendix 2 – List of Participants, Jamaica NHIS Assessment

Dr. Mario Aguilar  
Health Advisor  
UNFPA  
52 Knutsford Boulevard  
Kingston 10  
Jamaica  
Tel: (Mobile)(876) 363-0062  
Email: aguilar@unfpa.org

Mrs. Yvonne Alexander-Gayle  
Health Records Administrator  
Southern Regional Health Authority  
St. Elizabeth Health Department  
Black River  
Jamaica  
Tel: (Mobile)(876) 874-2614  
Email: yvonne.gayle@srha.gov.jm

Mr. Jasper Barnett  
Health Economist  
Ministry of Health  
2-4 King Street  
Kingston  
Jamaica  
Tel: (Office)(876) 967-7607  
Email: barnettj@moh.gov.jm

Mr. Michael Bent  
Parish Manager  
Southern Regional Health Authority  
1 Muirhead Avenue  
May Pen  
Clarendon  
Jamaica  
Tel: (Office)(876) 986-4548  
Tel: (Mobile)(876) 470-4745  
Email: michael.bent@srha.gov.jm

Mrs. Launa Binns-Watson  
Regional Nursing Supervisor  
Western Regional Health Authority

C/o Cornwall Regional Hospital  
Mr. Salem  
St. James  
Jamaica  
Tel: (Office)(876) 503-2182  
Email: elbynz@care2.com

Mr. Adrian Booth  
Regional Programme Development Officer  
South East Regional Health Authority  
Tel: (Mobile)(876) 282-2279  
Email: adrianb@serha.gov.jm

Mr. Arnold Cooper  
MIS Director  
Western Regional Health Authority  
P.O. Box 900, Montego Bay.  
Tel: 381-4255  
Email: arnold.cooper@wrha.gov.jm

Dr. Sonia Copeland  
Director, Health Promotion and Protection Division  
Ministry of Health  
2-4 King Street  
Kingston, Jamaica  
Tel: (Office) (876) 967-1103 ext . 2080  
Email: copelands@moh.gov.jm

Dr. Jean Dixon  
Permanent Secretary  
Ministry of Health  
2-4 King Street  
Kingston  
Jamaica  
Tel: (Office)(876) 967-1100 /3/5/7  
Email: dixonj@moh.gov.jm

Dr. Melody Ennis  
Director, Emergency Medical Services  
Ministry of Health  
2-4 King Street

Kingston  
Jamaica  
Tel: (Mobile)(876) 846-8745  
Email: melodyennis5@gmail.com

Ms. Marilyn Entwistle  
Advisor  
Health System and Services Development  
PAHO/WHO  
Oceana Building, 7th Floor  
2-4 King Street  
Kingston, Jamaica  
Tel: (Office)(876) 967-4626  
Email: entwistm@jam.paho.org

Dr. Jose Escamilla  
Health Information Analyst  
PAHO Washington  
525 23rd Street N.W.  
Washington D.C. 20037-2895  
Tel: (Office) (202) 974-3131  
Email: escamillaj@paho.org

Mrs. Patrice Gavin-Byfield  
MIS Director  
North East Regional Health Authority  
Shop #34 - 38 Ocean Plaza,  
Ocho Rios, St. Ann  
Tel: 470-4772  
Email: patrice.gavin@nerha.gov.jm

Mrs. Joan Guy Walker  
Coordinator, Human Resources in Health Project  
Ministry of Health  
2-4 King Street  
Kingston, Jamaica  
Tel: (Office)(876) 619-7000  
Tel: (Mobile)(876) 840-8399  
Email: walkerja@moh.gov.jm

Mr. Howard Hamilton  
Director, Information & Technology  
Statistical Institute (STATIN)

7 Cecelio Avenue  
Kingston 10  
Jamaica  
Tel: (Office)(876) 926-5311  
Tel: (Mobile)(876) 260-1645  
Email: hamiltonhg@yahoo.com

Mr. Charles Hyatt  
LAN Manager  
UNFPA  
52 Knutsford Boulevard  
Kingston 5  
Jamaica  
Tel: (Office)(876) 906-8591  
Email: hyatt@unfpa.org

Mr. Dean Irving  
Financial Analyst  
Ministry of Finance  
30 National Heroes Circle  
Kingston  
Jamaica  
Tel: (Office)(876) 932-5231  
Email: dean.irving@mof.gov.jm

Mrs. Marcia Johnson-Campbell  
Regional Technical Director  
Western Regional Health Authority (WRHA)  
Montego Bay  
St. James  
Jamaica  
Tel: (Mobile)(876) 849-9107  
Email: rtdwrha@gmail.com

Ms. Conchita Lebert  
Biomedical Engineer  
Ministry of Health  
2-4 King Street  
Kingston  
Jamaica  
Tel: (Mobile)(876) 385-2264  
Email: conchil@jamweb.net

Ms. Beulah Lee Thomas  
Parish Officer  
Registrar General's Department  
Twickenham Park  
Spanish Town  
St. Catherine  
Jamaica  
Tel: (Mobile)(876) 448-0517  
Email: beulahthomas@rgd.gov.jm

Mrs. Natricha Levy McFarlane  
Director (Actg.) Epidemiological Research & Data Analysis Unit  
Ministry of Health  
2-4 King Street  
Kingston  
Jamaica  
Tel: (Mobile)(876) 846-8183  
Email: levyn@moh.gov.jm

Ms. Juliet McCalla-Smith  
Senior Statistician  
Statistical Institute of Jamaica  
7 Cecilio Avenue  
Kingston 10  
Jamaica  
Tel: (Office)(876) 926-5311  
Tel: (Mobile)(876) 342-6374  
Email: cdss@statinja.gov.jm

Dr. Affette McCaw-Binns  
Professor of Epidemiology  
University of the West Indies  
Mona Campus  
Kingston 6  
Jamaica  
Tel: (Office)(876) 970-6623  
Tel: (Mobile)(876) 371-2213  
Email: affette.mccawbinns@uwimona.edu.jm

Mrs. Zahra Miller  
Regional Epidemiologist  
North East Regional Health Authority  
34-38 Ocean Village Shopping Centre

Ocho Rios  
St. Ann  
Jamaica  
Tel: (Office)  
Tel: (Mobile)(876) 389-7017  
Email: nailah82@gmail.com

Ms. Paula Morgan  
Support Staff  
PAHO/WHO Jamaica  
7th Floor Ministry of Health Bldg.  
2-4 King Street  
Kingston  
Jamaica  
Tel: (Office)(876) 967-4726  
Tel: (Mobile)  
Email: morganpa@jam.paho.org

Dr. Yvonne Munroe  
Programme Development Officer  
Ministry of Health  
2-4 King Street  
Kingston  
Jamaica  
Tel: (Office)(876) 967-7575  
Tel: (Mobile)(876) 588-8864  
Email: munroey@moh.gov.jm

Mr. Denzil Plummer  
Director, National Registration Unit  
National Registration Unit, Office of the Prime Minister  
1 Devon Road  
Kingston 5  
Jamaica  
Tel: (Office)(876) 922-8486  
Tel: (Mobile)(876) 841-0223  
Email: denzil.plummer@gmail.com

Ms. Heather Prendergast  
Statistical Institute of Jamaica (STATIN)  
7 Cecilio Avenue  
Kingston 10  
Jamaica

Tel: (Office)(876) 926-5311  
Email: hprendergast@statinja.gov.jm

Mr. Garfield Prescod  
Director, Health Facilities Maintenance Unit  
Ministry of Health  
2-4 King Street  
Kingston  
Jamaica  
Tel: (Mobile)(876) 443-6229  
Email: prescodg@moh.gov.jm

Mr. Claudius Ramsay  
Operations & Maintenance Director (Actg.)  
South East Regional Health Authority (SERHA)  
25 Dominica Drive  
Kingston 5  
Jamaica  
Tel: (Mobile)(876) 842-6033  
Email: claudiusr@serha.gov.jm

Mr. Cary Reid  
Analyst  
Clinton Health Access Initiative  
8th Floor Ministry of Health Bldg.  
2-4 King Street  
Kingston  
Jamaica  
Tel: (Mobile)(876) 459-3095  
Email: creid@clintonhealthaccess.org

Mr. Vincent Riley  
Director, Management Information System.  
South East Regional Health Authority  
2nd Floor, The Towers  
25 Dominica Drive  
Kingston 5, Jamaica  
Tel: (Office)754-3439-43  
Tel: (Mobile)(876) 509-0731  
Email: vriley@serha.gov.jm

Dr. Alisha Robb  
Master of Public Health Student

Department of Community Health & Psychiatry  
UWI Mona  
Kingston 7, Jamaica  
Tel: (Mobile)(876) 503-4942  
Email: daniellerobb@hotmail.com

Dr. Michele Roofe  
(Actg.) National Epidemiologist & Chair Health IT  
Ministry of Health  
2-4 King Street  
Kingston, Jamaica  
Tel: (Office) (876) 967-1103 ext . 2494  
Email: roofem@moh.gov.jm

Ms. Jennifer Small  
Director of Finance  
South East Regional Health Authority  
The Towers  
25 Dominica Drive  
Kingston5  
Jamaica  
Tel: (Office)(876) 968-5902  
Email: jennifers@serha.gov.jm

Ms. Yaneka Smith  
Secretary  
Epidemiological Research & Data Analysis Unit  
Ministry of Health  
2-4 King Street  
Kingston  
Jamaica  
Tel: (Office)(876) 967-1103  
Email: smithy@moh.gov.jm

Mr. Claudius Ramsay  
Operations & Maintenance Director (Actg.)  
South East Regional Health Authority  
25 Dominica Drive  
Kingston 5  
Jamaica  
Tel: (Mobile)(876) 842-6033  
Email: claudiusr@serha.gov.jm

Ms. Romae Thorpe

Statistician

Ministry of Health

2-4 King Street

Kingston

Jamaica

Tel: (Office)(876) 922-8400

Email: thorper@moh.gov.jm

Mr. Andrew Wong

Manager, Financial Management Information System

Ministry of Health

2-4 King Street

Kingston

Jamaica

Tel: (Mobile)(876) 846-6949

Email: dmswong2004@yahoo.com

Mr. Sheldon Whorms

Data Technician

HIV/STI Programme

2-4 King Street

Kingston, Jamaica

Tel: (Office) (876) 967-1103 ext . 2127

Email: whormss@moh.gov.jm

Mr. Mark Williams

Systems Administrator

Southern Regional Health Authority

The Towers

3 Brumalia Road

Mandeville, Manchester

Email: sysadmin@srha.gov.jm

Dr. Yasmin Williams

Director, Health Services Support & Monitoring

Ministry of Health

2-4 King Street

Kingston, Jamaica

Tel: (Office)(876) 967-7575

Email: yaswil2@hotmail.com

**Appendix 3 – List of all items/questions by component and average score for each  
HIS components and sub-components and the average scores as determined from NHIS assessment**

<b>COMPONENT</b>	<b>SCORE</b>
<b>Resources</b>	
Coordination, Policy and planning	39
Institutions, human resources & financing	41
Infrastructure	58
Overall Resources average	<b>47</b>
<b>Indicators</b>	
Overall Indicators average	<b>74</b>
<b>Data Sources</b>	
Census	68
Vital Statistics	98
Population-based surveys	76
Health and individual disease records	65
Health service records	43
Resource records	41
Overall Data Sources average	<b>61</b>
<b>Data Management</b>	
Overall Data Management average	<b>48</b>
<b>Information Products</b>	
Overall Information Products average	<b>70</b>

**Dissemination and use**

Analysis and use of information	52
Use of information for policy and advocacy	83
Use of information for planning and priority setting	74
Use of information for resource allocation	49
Use of information for implementation and action	53
Overall Dissemination and use average	<b>63</b>

**Indicators and assessment criteria for Data Quality (Information Products)  
component and the average scores as determined from NHIS assessment****Indicator*****Health Status Domain*****Quality Assessment Criteria****Average %**

Under-5 mortality

Data Collection Method

90

Timeliness

93

Periodicity

99

Consistency

68

Representativeness

67

Disaggregation

68

Adjustment method

67

Estimation method

n/a

Maternal mortality

Data Collection Method

88

Timeliness

95

Periodicity

93

Consistency

68

Representativeness

75

Disaggregation

73

	Adjustment method	100
	Estimation method	n/a
HIV prevalence	Data Collection Method	86
	Timeliness	97
	Periodicity	97
	Consistency	83
	Representativeness	92
	Disaggregation	70
	Adjustment method	n/a
	Estimation method	n/a
<b><i>Health System Domain</i></b>		
Immunization coverage	Data Collection Method	76
	Timeliness	48
	Periodicity	63
	Consistency	56
	Representativeness	89
	Disaggregation	35
	Adjustment method	n/a
	Estimation method	n/a
Deliveries attended by skilled health professional	Data Collection Method	65
	Timeliness	97
	Periodicity	98
	Consistency	28
	Representativeness	99
	Disaggregation	37
	Adjustment method	n/a
	Estimation method	n/a

TB treatment success rate under DOTS	Data Collection Method	67
	Timeliness	67
	Periodicity	67
	Consistency	72
	Representativeness	50
	Disaggregation	67
	Adjustment method	n/a
	Estimation method	n/a
GGHE per capita	Data Collection Method	65
	Timeliness	90
	Periodicity	90
	Consistency	77
	Representativeness	100
	Disaggregation	100
	Adjustment method	100
	Estimation method	n/a
Private expenditure on health per capita	Data Collection Method	0
	Timeliness	n/a
	Periodicity	n/a
	Consistency	n/a
	Representativeness	n/a
	Disaggregation	n/a
	Adjustment method	n/a
	Estimation method	n/a
Density of health workforce per 1000 population	Data Collection Method	42
	Timeliness	33
	Periodicity	n/a

	Consistency	n/a
	Representativeness	n/a
	Disaggregation	n/a
	Adjustment method	n/a
	Estimation method	n/a
<b><i>Determinants of Health Domain</i></b>		
Smoking prevalence (15 yrs and older)	Data Collection Method	93
	Timeliness	88
	Periodicity	67
	Consistency	88
	Representativeness	83
	Disaggregation	67
	Adjustment method	n/a
	Estimation method	n/a
<b><i>Additional Selected Indicator</i></b>		
Non-communicable Diseases	Data Collection Method	67
	Timeliness	50
	Periodicity	67
	Consistency	55
	Representativeness	67
	Disaggregation	75
	Adjustment method	n/a
	Estimation method	80
Mental Health	Data Collection Method	72
	Timeliness	72
	Periodicity	72
	Consistency	55
	Representativeness	47

	Disaggregation	62
	Adjustment method	n/a
	Estimation method	72
Environmental Health	Data Collection Method	77
	Timeliness	50
	Periodicity	75
	Consistency	50
	Representativeness	35
	Disaggregation	27
	Adjustment method	n/a
	Estimation method	72
Adolescent Health	Data Collection Method	38
	Timeliness	55
	Periodicity	83
	Consistency	63
	Representativeness	50
	Disaggregation	47
	Adjustment method	n/a
	Estimation method	100
Health Promotion	Data Collection Method	20
	Timeliness	45
	Periodicity	90
	Consistency	67
	Representativeness	53
	Disaggregation	37
	Adjustment method	n/a
	Estimation method	67

Note: n/a means that assessment criterion was not examined for that indicator

**Overall assessment scores for Core Indicators, Additional Indicators and all Indicators combined according to the criteria: Data collection method, Timeliness, Periodicity, Consistency, Representativeness, Disaggregation, Adjustment method and Estimation method**

<b>Core Indicators</b>	<b>Data Collection Method</b>	<b>Timeliness</b>	<b>Periodicity</b>	<b>Consistency</b>	<b>Representativeness</b>	<b>Disaggregation</b>	<b>Adjustment method</b>	<b>Estimation method</b>
Total Score	83.4	38.8	49.2	41.9	54.6	37	21	n/a
Maximum	114	48	57	66	66	57	24	n/a
%	<b>73</b>	<b>81</b>	<b>86</b>	<b>63</b>	<b>83</b>	<b>65</b>	<b>88</b>	<b>n/a</b>
<b>Additional Indicators</b>								
Total Score	14.4	16.3	20.5	15.4	13.5	14.8	n/a	21.4
Maximum	27	30	27	27	27	30	n/a	27
%	<b>53</b>	<b>54</b>	<b>76</b>	<b>57</b>	<b>50</b>	<b>49</b>	<b>n/a</b>	<b>79</b>
<b>All Indicators</b>								
Total Score	97.8	55.1	69.7	57.3	68.1	51.8	21	21.4
Maximum	141	78	84	93	93	87	24	27
%	<b>69</b>	<b>71</b>	<b>83</b>	<b>62</b>	<b>73</b>	<b>60</b>	<b>88</b>	<b>79</b>

