Malaysian Health Reference Data Model (MyHRDM)

Health Informatics Centre
Planning Division
Ministry of Health Malaysia

MyHRDM 1.1

Malaysian Health Reference Data Model (MyHRDM)

Editors

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Foreword by
Director-General of Health Malaysia

Malaysia Health Reference Data Model (MyHRDM) was developed among others to enable interoperability between various health information system in Malaysia. When different health information systems refer and adopt similar high-level national data model, health data can be linked across the continuum of care, be it in public or private sectors. The exchange of information across these health information systems will allow the Ministry of Health Malaysia to gain a holistic overview of the quality of healthcare services given to and received by our patients.

This MyHRDM document demonstrates how key concepts in healthcare are consistently and precisely defined, as well as how each of these concepts are related to one another. For example, documenting on the definition of "Organisation" and illustrating its relation to the different types of "Provider" and "Discipline" in medicine. A consensus approach will facilitate exchange of data and generation of information efficiently and with minimum degree of misunderstanding, which is especially required for both individual patient care and population health. A comprehensive view is needed to deliver quality care through proper health system planning, which can be achieved via periodic reporting, monitoring, and benchmarking at national and international levels.

The development of MyHRDM was initiated in 2013 based on the effective approach taken by the development of Reference Data Model from international experience. MyHRDM was further refined in 2015 where all concepts were utilized in the development of the Malaysian Health Data Warehouse (MyHDW) 1.0, *Sistem Maklumat Rawatan Perubatan* (SMRP) 2.0 and Patient Registry Information System (PRIS) 1.0. MyHRDM will continue to refine, evolve and grow as required.

Ministry of Health Malaysia would like to acknowledge all members who have contributed in the tremendous preparation of MyHRDM. This is a commendable achievement in the effort for an integrated health system. I hope that all future health related applications would refer to MyHRDM for their system development. It is hoped that in future, interoperability can be achieved between various health information systems to improve patient care and enhance healthcare system in our country.
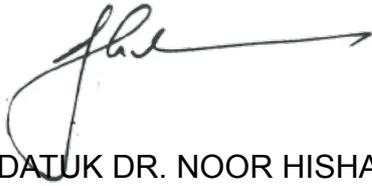
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Acronyms

Acronym	Description
CIHI	Canadian Institute for Health Information
DW/BI	Data Warehouse/Business Intelligence
EDW	Enterprise Data Warehouse
ETL	Extract, Transform and Load
GIS	Geographic Information System
KKM	Kementerian Kesihatan Malaysia
MAMPU	Malaysian Administrative Modernization and Management Planning Unit Management
MyHDD	Malaysian Health Data Dictionary
MyHDW	Malaysian Health Data Warehouse
MyHRDM	Malaysian Health Reference Data Model
MyHIF	Malaysian Health Information Framework
MRO	Medical Record Officer
NOR	National Obstetrics Registry
PAS	Privacy Assurance Service
RDBMS	Relational Database Management System
RN	Running Number
SCD	Slowly Changing Dimension
SMRP	Sistem Maklumat Rawatan Pelanggan
SME	Subject Matter Experts
SRB	System Requirement Book
SQL	Structured Query Language
T&CM	Traditional and Complementary Medicine
VPI	Virtual Person Identifier

1. INTRODUCTION

1.1. Purpose

To support the development work of Malaysian Health Data Warehouse (MyHDW) 1.0, *Sistem Maklumat Rawatan Pelanggan* (SMRP) 2.0 and Patient Registry Information System (PRIS) 1.0 and the associated Conceptual Data Warehouse Architecture, it was necessary to establish an initial approved version of Malaysian Health Reference Data Model (MyHRDM) and make this available to the development team.

The initial development of MyHRDM concerns building consensus on key Concepts. A Concept, sometimes called an Entity, is related to a precise definition that is universally agreed on by the stakeholders involved, for example, Encounter and Visit; these concepts if agreed upon in various systems like SMRP, PRIS and TPC/OHCIS, will allow for the creation of a model that is repeatable and consistent in all the mentioned systems. By defining these two Concepts in a clear and agreed-upon manner we were able to build reporting and information products efficiently and with the minimum degree of misunderstanding. In addition, query questions that involve multiple Service Type such as the movement of patients from Inpatient to Rehabilitation services for example, will be easier to perform in contrast to not having the model.

It should be noted that an often-overlooked assumption associated with these types of data models is that in addition to providing standardised business definitions these are ultimately intended for deployment in Relational Database Management Systems (RDBMS) such as Oracle or SQL Server. This fact combined with the mathematical precision of the models explains the importance of these types of structures when building data centric systems. Until recently, for the last 30 to 40 years, nearly all serious system development involving large amounts or complex data have utilised RDBMS's and thus the need for modelling to ensure these are defined in an efficient, internally consistent and high performing manner. With the advent of newer technology such as Hadoop, Graph Databases, Document Databases etc. over the last while, real alternatives to RDBMS's are now viable, that said, at

the time of writing they are still used for the majority of deployments and hence the need for Entity/Relation (E/R) data models. While there is also a movement within the industry towards increasing use of semantic relationships (semantic web, ontology models, Resource Description Framework (RDF) etc.) it is likely that traditional structured data as expressed through data models and databases will sustain and work as part of a broader environment including these semantically integrated data sources. As such ongoing maintenance and development of a minimum set of core structure data concepts will still be required and the ongoing maintenance and development of MyHRDM is planned. In 2013 an initial exercise was undertaken to build the HRDM and define several concepts to support this as part of a MyHDW workshop. This work was successful within the confines of an exploratory workshop but required further work to complete to a level consummate with use in the development of deployable solutions such as those which are the topic of this report.

1.2. Method

MyHDRM adhered to the published MyHDW 2011-2013 Blueprint (*See Appendix 3: MyHDW Framework and Appendix 4: MyHDW Phases*) based on utilizing existing standards such as Malaysian Health Data Dictionary (MyHDD). In the establishment of the artifact, we engaged Subject Matter Experts (SME) from Health Informatics Centre (HIC) of Planning Division, Information Management Division, Oral Health Division, Teleprimary Care of Family Health Division, Pharmacy Division, MAMPU and MIMOS to obtain the precise definition of the concepts related to Malaysian Healthcare System. In addition, the artifact also uses Canadian Institute for Health Information (CIHI) reference data model toolkit[1] (CRDM) as template to supplement the development of MyHRDM. The approach taken to formulate the reference data model is shown in Figure 1.1.

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[1] Canadian Institute for Health Information (CIHI). CIHI Reference Data Model (CRDM) toolkit. 2016. https://www.cihi.ca/sites/default/files/crdm_toolkit_2016_en.pdf
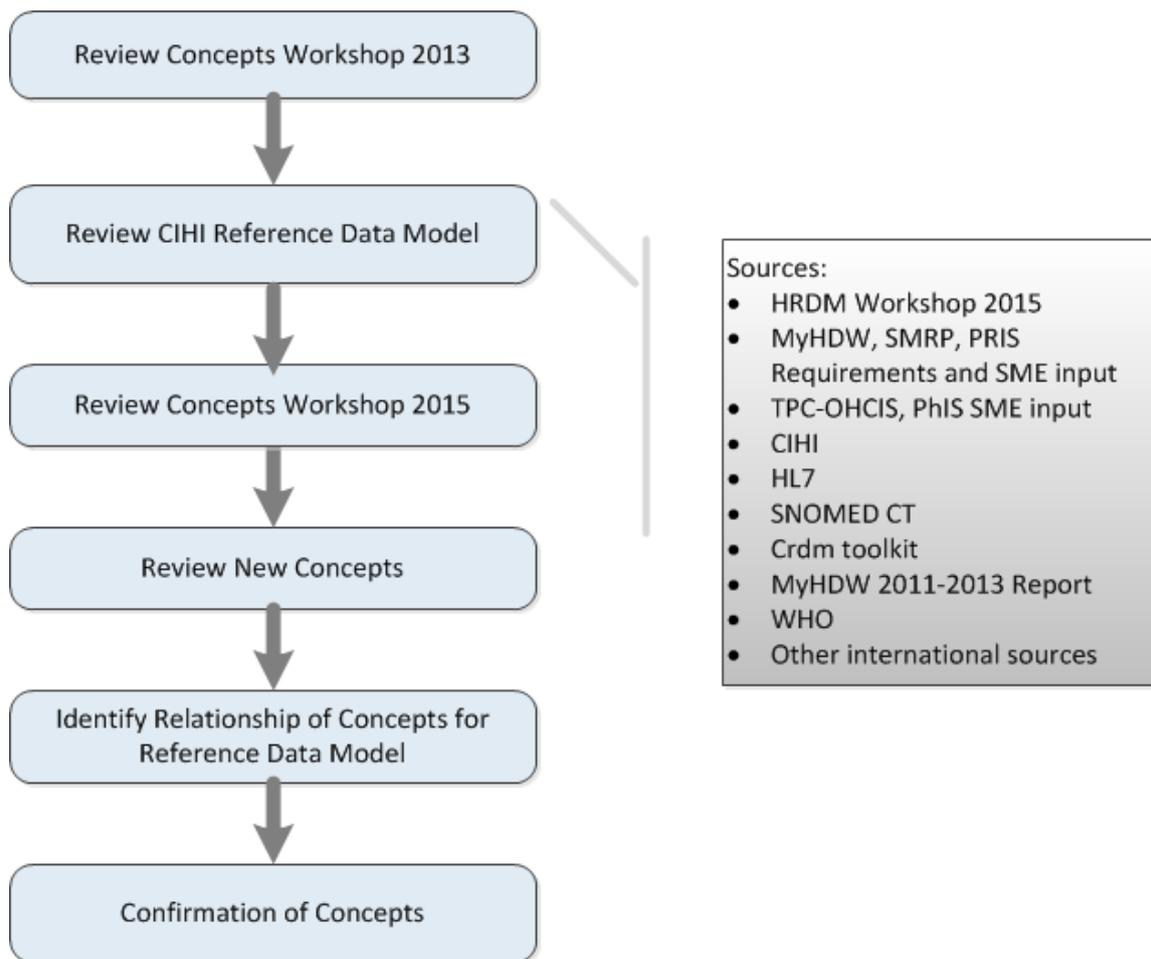
Figure 1.1: Approach of MyHRDM formulation

Firstly, a three-day workshop session with SME is conducted to establish a precise definition and relationship of the models in AnCasa Hotel, KL from 4-6 November 2015. *See Appendix 2 for details of workshop participants*. The participants were given some initial data modeling training. In order to ensure active participation from participants, the workshop has a single group of participants to actively decide on the precise context of the definition. In the workshop, data model diagrams of possible relationship of the concepts were developed to facilitate the workshop in an effective manner. The data model diagrams helped participants visualised the relationship of the concepts and assist the SME in giving the precise input for the concepts relationship which helps defined the MyHRDM. During the workshop, the following concepts were discussed and refined as in Table 1.1.

Subsequently, we conducted a second workshop session with SME from TPC-OHCIS to establish a precise definition and relationship of TPC-OHCIS and PhIS new concepts into MyHRDM models in MIMOS, KL from 2nd ,3rd and 7th December 2015. *See Appendix 4 for details of workshop participants*. The participants were first presented with the concepts definition given in the first MyHRDM Workshop. The participants were actively encouraged to participate in reviewing the concepts and to ensure the concepts also have the same understanding as in TPC-OHCIS as well as integration to PhIS. Subsequently, upon completing and confirmation of the first MyHRDM workshop concepts definition and relationship, the participants were guided by Dr. Khadzir (PIK) and Mark Fuller (consultant) on the approach in identifying new concepts for the integration of TPC-OHCIS and PhIS to MyHRDM data model. A total of 20 new concepts were identified and defined during the second MyHRDM workshop. During the second workshop, the relationships of the new concepts were not defined yet. A subsequent workshop is planned for establishing the relationships of the new concepts. However, in order to help establish the visualisation of the relationships of the new concepts, the committee pre-established the new concepts relationships (highlighted in red) into the MyHDRM data model. The details of the concepts and diagram were given in Section 2 and Section 3 respectively. The listing of the agreed concepts and new concepts for the integration of TPC-OHCIS and PhIS are as in Table 1.2.

In addition, a set of use cases or questions with new concepts on Episode of Care and Episode of Health Condition has been formulated with SME to help clarify these concepts.

Table 1.1: List of Concepts from MyHRDM Workshop 1/2015.

Concepts Defined and Agreed	Concepts Removed
Standard Assessment	Admission
Client	Discharge
Clinical Observation	Incident
Discipline	Dead Person
Donor	
Encounter	
Health service Event	
Intervention	
Newborn	
Next of Kin	
Organisation	
Person	
Place	
Programme	
Provider	
Service	
Speciality	
Visit	

Table 1.2: List of agreed concepts and new concepts from MyHRDM Workshop 2/2015

Concepts Defined and Agreed	New Concepts Defined
Standard Assessment	Emergency Contact
Client	Referral
Clinical Observation	Diagnostic And Imaging
Discipline	Immunisation
Donor	Lab Test
Encounter	Medication Prescribed
Health service Event	Medication Dispensed
Intervention	Maternal Health
Newborn	Provider Screening
Next of Kin	Nutritional Status
Organisation	Health Status
Person	Child Health Status
Place	Pre-school Health Status
Programme	School-going Health Status
Provider	Adolescent Health Status
Service	Adult Health Status
Speciality	Elderly Health Status
Visit	Episode
	Episode of Health Condition
	Episode of Care
	Rehabilitation (KIV)

1.3. Development Approach of Concepts

The approach to concept development is illustrated and described below.
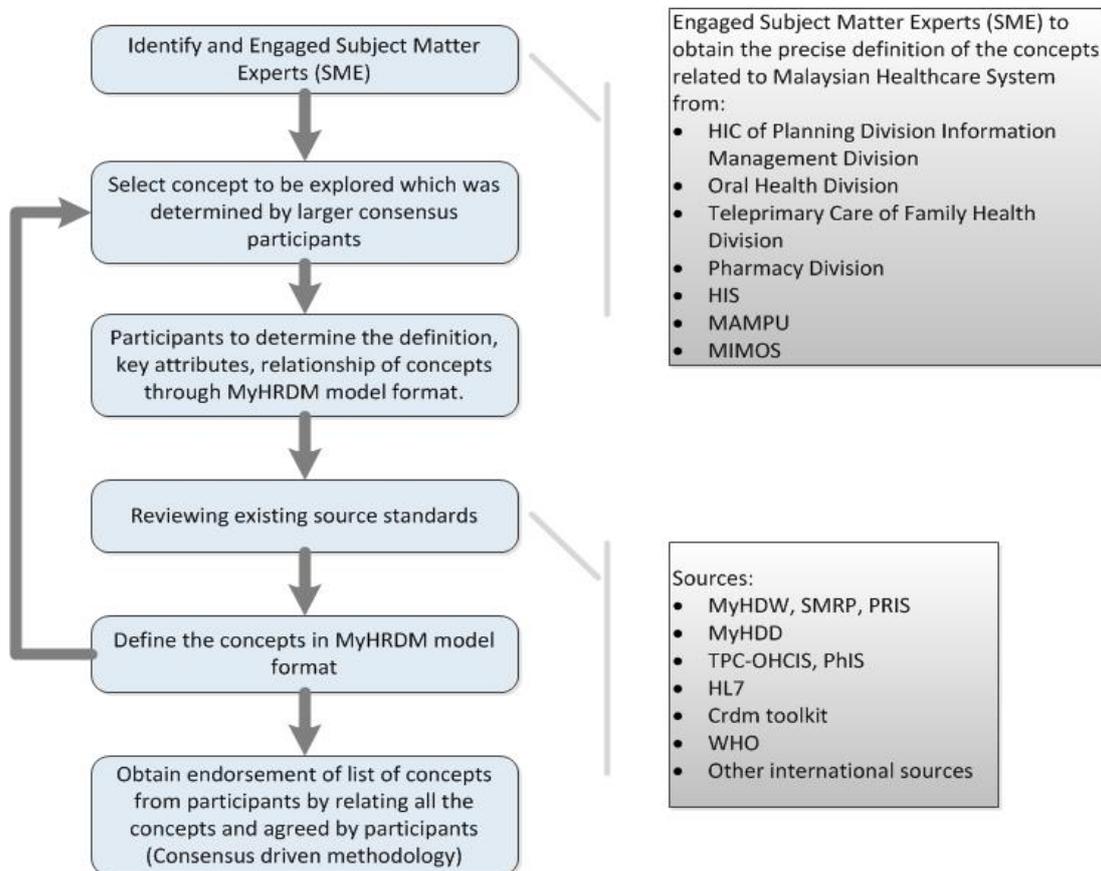
Figure 1.2: Development Approach of concepts

Concept selection is based on the following criteria:

- How many business areas use the concept?
- Is the concept significant? Is it associated with a priority area?

Subject matter experts (SMEs) from across MOH business areas provide their business requirements for the concept. External research was also conducted on how the concept was developed in MyHDD, WHO, CIHI, and others.

These were used to model the concept and draft the concept name, definition, relationships and associated metadata.

The SMEs were then consulted to confirm if the concept meets the needs of the business areas. The concept is refined based on input from the SMEs.

Once the SMEs have confirmed that the concept and associated metadata meet their needs then the concept is promoted for approval by the SMEs.

1.4. Overview of MyHRDM document

Malaysian Health Reference Data Model (MyHRDM) consists of:

- Concepts - synonymous with Entity from E/R Modelling
- Relationships between the concepts

In addition, there is also metadata associated with MyHRDM that includes:

- **Concepts** - synonymous with Entity from E/R Modelling
- **Definition of Concepts**
- **Definition in MyHDD and additional source standards** – validate against other standards such as MyHDD, CIHI, WHO, etc whether there exists similar concept
- **Remark** – to help user further understand the concept by having use cases or examples
- **Synonyms** – similar concept definition but different concept name, eg: Concept client is synonymous with Patient.
- **Key attributes** – key information about each concept such as Identification for Person concept.
- **Relationships** – states the relationship between the concepts
- **Table Type** – There are two categories of table type:
  - o Master Data concepts (labelled as "Masters") were colored blue in the MyHRDM. Master data is synonymous with reference data
  - o Transactional concepts (labelled as "Transactional") were colored pink in the MyHRDM. Transactional Data is data about business events (often system transactions) that have historic significance or were needed for analysis by other systems

MyHRDM metadata is detailed in the MyHRDM Data Dictionary section of this document.

2. MyHRDM Content

This section contains MyHRDM model and related views of the model. Figure 2.1 illustrates the overall view of MyHRDM v1.1.
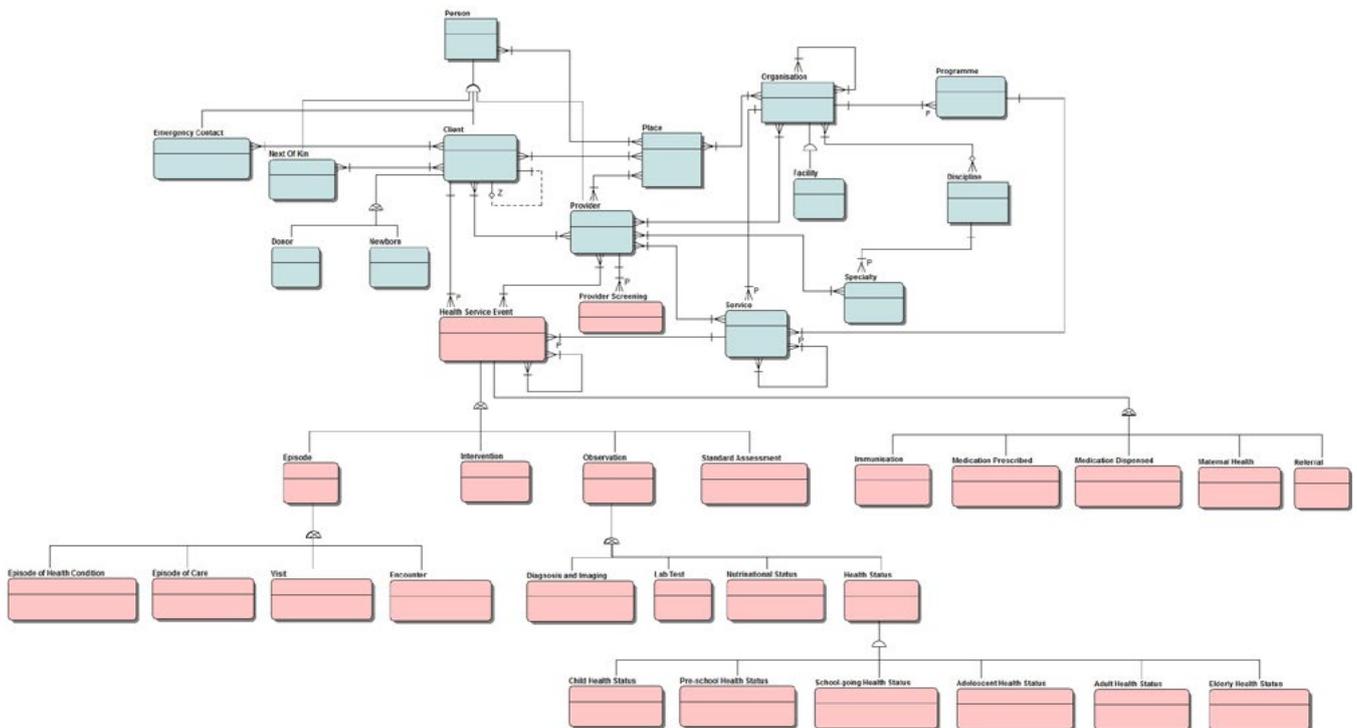
Figure 2.1: MyHRDM Version 1.1

2.1. Client View

This view illustrates the core concepts and relationships associated with Client.
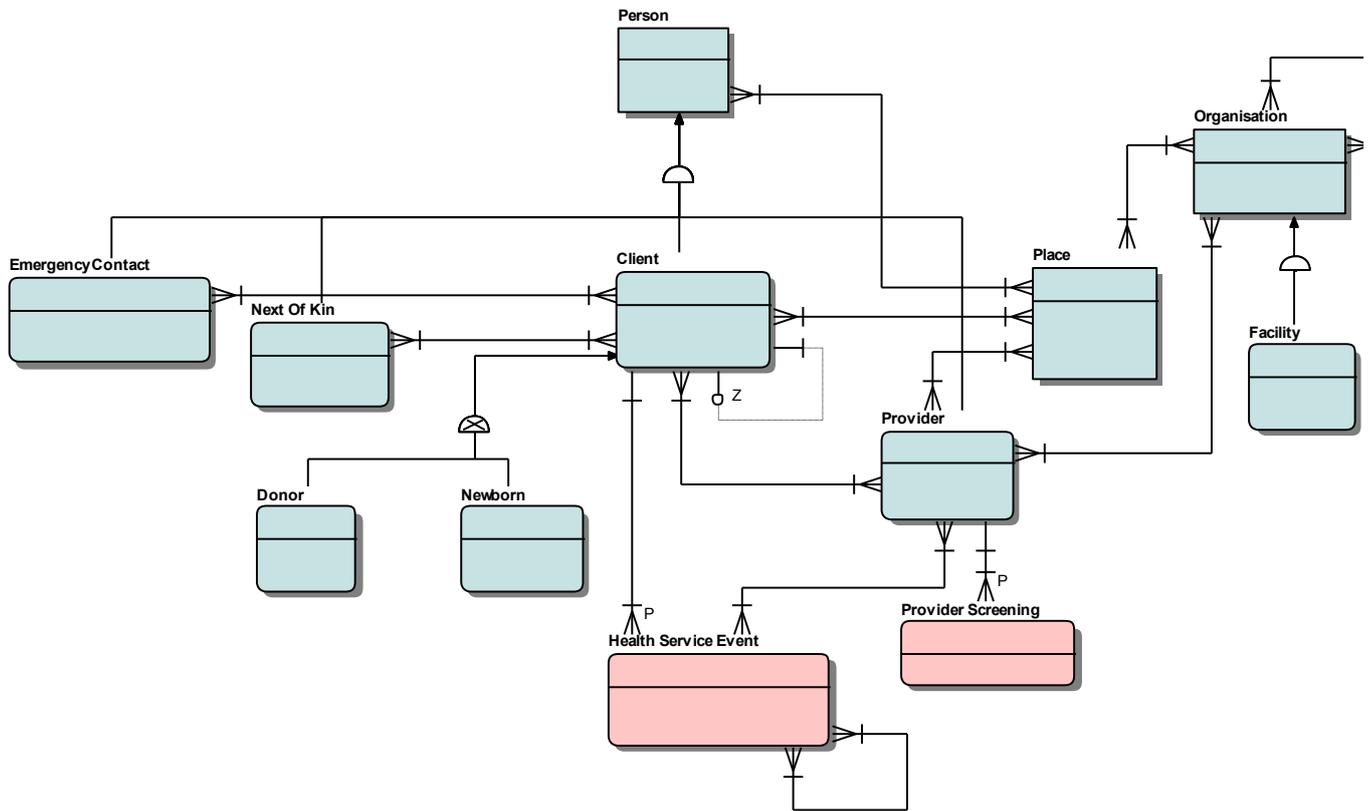
Figure 2.2: Client View

2.2. Provider and Organisation View

This view illustrates the core concepts and relationships associated with Provider and Organisation.
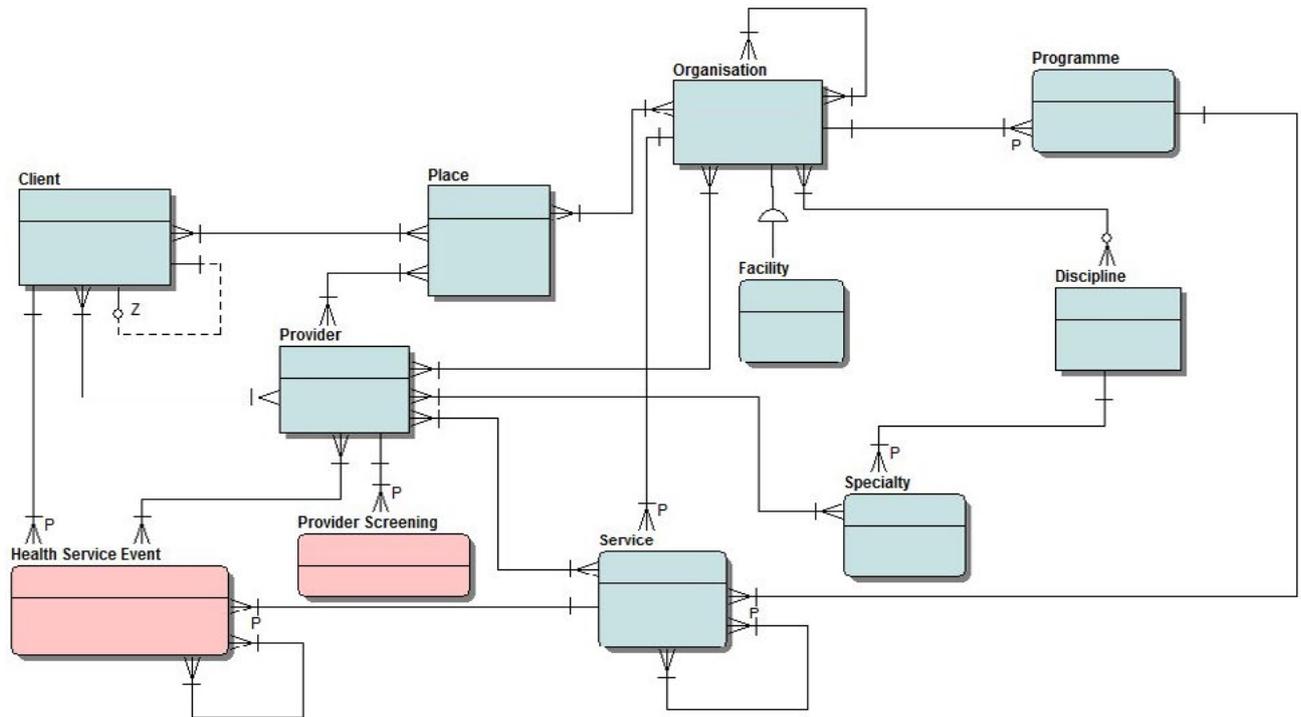
Figure 2.3: Provider and Organisation View

2.3.   Health Service Event View

This view illustrates the core concepts around Health Service Event. Visit, Encounter, Intervention, Observation and Standard Assessment were subtypes of Health Service Event.
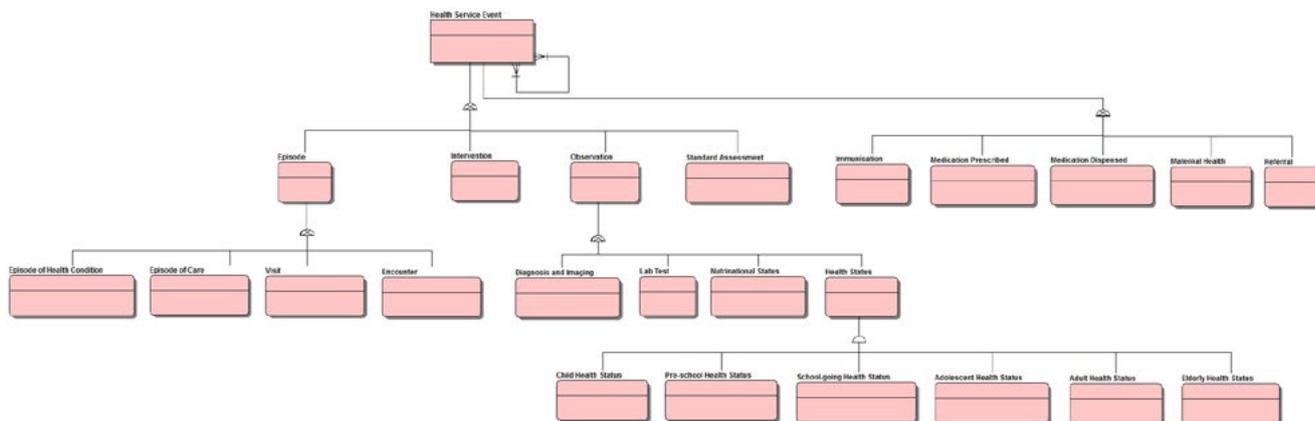
Figure 2.4: Health Service Event View

3. MyHRDM Data Dictionary

This section includes all the associated metadata for the MyHRDM. The following explains the metadata for each concept:

- **Concepts** - synonymous with Entity from E/R Modelling
- **Definition of Concepts**
- **Definition in MyHDD and additional source standards** – validate against other standards such as MyHDD, CIHI, WHO, etc whether there exists similar concept
- **Remark** – to help user further understand the concept by having use cases or examples
- **Synonyms** – similar concept definition but different concept name, eg: Concept client is synonymous with Patient.
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3.1 Client

Table 3.1: Client Concept

Concept	Client
Definition of Concept	A PERSON who receives health service
Definition in MyHDD	None
Additional source standards for definition	**CIHI** *"A person that has received, is receiving, or is eligible for health care related services or goods."*
Remark	PERSON is a supertype of CLIENT, PROVIDER, NEXT OF KIN, etc
Synonyms	None
Key Attributes	• Identification Documents(ID)
Relationship	Each CLIENT • is a PERSON • may be a DONOR or NEWBORN • may have one or many NEXT OF KIN • may be associated with one or more PLACE • may be the recipient of services and/or goods from one or more PROVIDER • may be a participant in one or more HEALTH SERVICE EVENT • may be associated with more than one client
Table Type(Master or Transaction)	Master

3.2 Diagnostic And Imaging

Table 3.2: Diagnostic and Imaging Concept

Concept	Diagnostic And Imaging
Definition of Concept	A series of diagnostic and imaging activities by the PROVIDER for the CLIENT which cover the capturing and interpretation of images.
Definition in MyHDD	None
Additional source standards for definition	**CIHI** *"The type of diagnostic imaging test ordered by the Provider for the Client."*
Remark	None
Synonyms	None
Key Attributes	None
Relationship	DIAGNOSTIC AND IMAGING • is a subtype of OBSERVATION
Table Type(Master or Transaction**)**	Transaction

3.3 Discipline

Table 3.3: Discipline Concept

Concept	Discipline
Definition of Concept	A SPECIALTY delivered through an ORGANISATION.
Definition in MyHDD	None
Additional source standards for definition	None
Remark	Examples of Discipline such as Medical, Surgical, Neurosurgical, Oral Health. Sub-specialty is not universal implemented.
Synonyms	None
Key Attributes	• Type of discipline (such as paediatric) • Type of specialty (such as neonatal, paediatric-nephrology) • Programme (such as medical)
Relationship	Each DISCIPLINE • may be associated with one or more ORGANISATION • may be associated with one or more SPECIALTY
Table Type(Master or Transaction)	Master

3.4   Donor

Table 3.4: Donor Concept

Concept	Donor
Definition of Concept	A CLIENT who has consented to donate or has donated cells, tissues or organs for the purpose of transplantation.
Definition in MyHDD	None
Additional source standards for definition	WHO *"A human being, living or decease, who is a source of cells, tissues or organs for the purpose of transplantation.* *- type: pledged, deceased or living donor."*
Remark	IC as Donor ID
Synonyms	None
Key Attributes	• Donor type • Specimen type • Status Donated or Pledge • Donor ID
Relationship	Each DONOR • is a CLIENT
Table Type(Master or Transaction)	Master

3.5 Emergency Contact

Table 3.5: Emergency Contact

Concept	Emergency Contact
Definition of Concept	A PERSON who is related to a CLIENT who can be contacted in situation of emergency
Definition in MyHDD	None
Additional source standards for definition	None
Remark	None
Synonyms	None
Key Attributes	• Type of Relationship
Relationship	Each EMERGENCY CONTACT • is a PERSON • may be associated with one or more CLIENT
Table Type(Master or Transaction)	Master

3.6 Encounter

Table 3.6: Encounter Concept

Concept	Encounter
Definition of Concept	An interaction between a CLIENT and one or more PROVIDERs.
Definition in MyHDD	None
Additional source standards for definition	**CIHI** *"An interaction between a Client and one or more Providers.* *Note 1: The start and end of an Encounter currently varies with level of care."*
Remark	In contrast to a VISIT, an ENCOUNTER is associated with a PROVIDER.
Synonyms	None
Key Attributes	• When: Admission/Discharge date &Time • Where: Location • What: Type of Activities (e.g. Consultation, Examination, Investigation, Procedures, Counselling, Wellness) • Who: Client/Provider
Relationship	An ENCOUNTER • is a HEALTH SERVICE EVENT
Table Type(Master or Transaction)	Transaction

3.7 Episode

Table 3.7: Episode Concept

Concept	Episode
Definition of Concept	A collection of HEALTH SERVICE EVENTs related to health conditions, type of care, VISITs, ENCOUNTERs and other factors.
Definition in MyHDD	None
Additional source standards for definition	None
Remark	
Synonyms	None
Key Attributes	None
Relationship	An EPISODE • Is a subtype of HEALTH SERVICE EVENT
Table Type(Master or Transaction**)**	Transaction

3.8   Episode of Care

Table 3.8: Episode of Care Concept

Concept	Episode of Care
Definition of Concept	Collection of VISITs and ENCOUNTERs related to one particular instance of a SERVICE or collection of SERVICEs. Often this is related to a particular ORGANISATION.
Definition in MyHDD	None
Additional source standards for definition	None
Remark	To relook into definition using Health Service Event
Synonyms	None
Key Attributes	None
Relationship	An EPISODE OF CARE • Is a subtype of EPISODE
Table Type(Master or Transaction**)**	Transaction

3.9 Episode of Health Condition

Table 3.9: Episode of Health Condition Concept

Concept	Episode of Health Condition
Definition of Concept	Collection of VISITs and/or ENCOUNTERs related to one particular instance of a health condition or collection of health conditions
Definition in MyHDD	None
Additional source standards for definition	None
Remark	Health condition includes illness, risk factors (e.g. obesity, smoking) and preventive programmes (e.g. wellness)
Synonyms	None
Key Attributes	None
Relationship	An EPISODE OF HEALTH CONDITION • Is a subtype of EPISODE
Table Type(Master or Transaction**)**	Transaction

3.10 Health Service Event

Table 3.10: Health Service Event Concept

Concept	Health Service Event
Definition of Concept	A past, current, planned or requested healthcare act.
Definition in MyHDD	None
Additional source standards for definition	**CIHI** *"A past, current, planned or requested act."*
Remark	Setting type to be decided.
Synonyms	None
Key Attributes	• Setting Type • Service Event date & Time
Relationship	Each HEALTH SERVICE EVENT • must involve one or many CLIENT • may be a VISIT or an ENCOUNTER • may involve an INTERVENTION, OBSERVATION or STANDARD ASSESSMENT • must have one or more PROVIDER • must have one SERVICE
Table Type(Master or Transaction)	Transaction

3.11 Health Status

Table 3.11: Health Status Concept

Concept	Health Status
Definition of Concept	The summary of CLIENT's health condition as a result of OBSERVATION and STANDARD ASSESSMENT performed by PROVIDER
Definition in MyHDD	None
Additional source standards for definition	**CIHI (Health Concern)** *"The Client's relevant conditions, diagnosis and associated past medical history"*
Remark	Health Status with subtypes, e.g. Child, Pre-school, School-going, Adolescent, Adult, Elderly
Synonyms	None
Key Attributes	None
Relationship	A HEALTH STATUS • is a subtype of OBSERVATION
Table Type(Master or Transaction**)**	Transaction

3.11.1 Adolescent Health Status

Table 3.11a: Adolescent Health Status Concept

Concept	Adolescent Health Status
Definition of Concept	The HEALTH STATUS of a CLIENT who is defined as being of adolescent age.
Definition in MyHDD	None
Additional source standards for definition	**CIHI (Health Concern)** *"The Client's relevant conditions, diagnosis and associated past medical history"*
Remark	Currently adolescent age is defined as 10-19 years old.
Synonyms	None
Key Attributes	None
Relationship	An ADOLESCENT HEALTH STATUS • is a subtype of HEALTH STATUS
Table Type(Master or Transaction**)**	Transaction

3.11.2 Adult Health Status

Table 3.11b: Adult Health Status Concept

Concept	Adult Health Status
Definition of Concept	The HEALTH STATUS of a CLIENT who is defined as an adult.
Definition in MyHDD	None
Additional source standards for definition	**CIHI (Health Concern)** *"The Client's relevant conditions, diagnosis and associated past medical history"*
Remark	Currently age group for adult is defined as 19 to 59 years old.
Synonyms	None
Key Attributes	None
Relationship	An ADULT HEALTH STATUS • is a subtype of HEALTH STATUS
Table Type(Master or Transaction**)**	Transaction

3.11.3 Child Health Status

Table 3.11c: Child Health Status Concept

Concept	Child Health Status
Definition of Concept	The HEALTH STATUS of a CLIENT who is defined as a child.
Definition in MyHDD	None
Additional source standards for definition	**CIHI (Health Concern)** *"The Client's relevant conditions, diagnosis and associated past medical history"*
Remark	Currently age group for child is defined as 0-7 years old. Non-exclusive sub-type of HEALTH STATUS May overlap with PRE-SCHOOL HEALTH STATUS
Synonyms	None
Key Attributes	None
Relationship	A CHILD HEALTH STATUS • is a subtype of HEALTH STATUS
Table Type(Master or Transaction**)**	Transaction

3.11.4 Elderly Health Status

Table 3.11d: Elderly Health Status Concept

Concept	Elderly Health Status
Definition of Concept	The HEALTH STATUS of a CLIENT who is defined as an elderly person.
Definition in MyHDD	None
Additional source standards for definition	**CIHI (Health Concern)** *"The Client's relevant conditions, diagnosis and associated past medical history"*
Remark	Currently age group for elderly is defined as 60 years old and above.
Synonyms	None
Key Attributes	None
Relationship	An ELDERLY HEALTH STATUS • is a subtype of HEALTH STATUS
Table Type(Master or Transaction**)**	Transaction

3.11.5 Pre-school Health Status

Table 3.11e: Pre-school Health Status Concept

Concept	Pre-school Health Status
Definition of Concept	The HEALTH STATUS of a CLIENT who is defined as being of pre-school age.
Definition in MyHDD	None
Additional source standards for definition	**CIHI (Health Concern)** *"The Client's relevant conditions, diagnosis and associated past medical history"*
Remark	Currently pre-school age is defined as 5-6 years old.
Synonyms	None
Key Attributes	None
Relationship	A PRE-SCHOOL HEALTH STATUS • is a subtype of HEALTH STATUS
Table Type(Master or Transaction**)**	Transaction

3.11.6 School-going Health Status

Table 3.11f: School-going Health Status Concept

Concept	School-going Health Status
Definition of Concept	The HEALTH STATUS of a CLIENT who is defined as being of school-going age.
Definition in MyHDD	None
Additional source standards for definition	**CIHI (Health Concern)** *"The Client's relevant conditions, diagnosis and associated past medical history"*
Remark	Currently school-going age is defined as 7-18 years old.
Synonyms	None
Key Attributes	None
Relationship	A SCHOOL-GOING HEALTH STATUS • is a subtype of HEALTH STATUS
Table Type(Master or Transaction**)**	Transaction

3.12 Immunisation

Table 3.12: Immunisation Concept

Concept	Immunisation
Definition of Concept	Administration of a vaccine by the PROVIDER to CLIENT for the purpose of preventing the spread of infectious disease.
Definition in MyHDD	None
Additional source standards for definition	**CIHI** *"The vaccine administered to the Client within and beyond the PHC setting, including current and past vaccination history"* **WHO** *"Is the process whereby a person is made immune or resistant to an infection disease by the administration of a vaccine."*
Remark	Note: The vaccine administered to CLIENT by the PROVIDER which includes current and past vaccination history
Synonyms	None
Key Attributes	None
Relationship	An IMMUNISATION • is a HEALTH SERVICE EVENT
Table Type(Master or Transaction**)**	Transaction

3.13 Intervention

Table 3.13: Intervention Concept

Concept	Intervention
Definition of Concept	An activity(s) that is intended to observe, monitor, assess and/or change the state of the health of a CLIENT.
Definition in MyHDD	None
Additional source standards for definition	**CIHI** *"An activity that is intended to observe, monitor, assess and/or change the state of the health of a Client.* *Note 1: Definition includes planned, current and historic Interventions for a Client."*
Remark	Example: Counselling is a form of Intervention
Synonyms	Procedure, Treatment, Consultation, Prescribing
Key Attributes	TBD
Relationship	An INTERVENTION • is a HEALTH SERVICE EVENT
Table Type(Master or Transaction**)**	Transaction

3.14   Lab Test

Table 3.14: Lab Test Concept

Concept	Lab Test
Definition of Concept	A series of lab testing activities by the PROVIDER for the CLIENT which cover the capturing and interpretation of biological samples.
Definition in MyHDD	None
Additional source standards for definition	None
Remark	None
Synonyms	None
Key Attributes	None
Relationship	A LAB TEST • is a subtype of OBSERVATION
Table Type(Master or Transaction**)**	Transaction

3.15 Maternal Health

Table 3.15: Maternal Health Concept

Concept	Maternal Health
Definition of Concept	A care provided to a female CLIENT from conception till 6 weeks post-delivery associated with antenatal, intranatal and postnatal.
Definition in MyHDD	None
Additional source standards for definition	None
Remark	Information regarding delivery and maternal death are subsumed under MATERNAL HEALTH
Synonyms	None
Key Attributes	None
Relationship	A MATERNAL HEALTH • is a HEALTH SERVICE EVENT
Table Type(Master or Transaction**)**	Transaction

3.16 Medication Dispensed

Table 3.16: Medication Dispensed Concept

Concept	Medication Dispensed
Definition of Concept	The medications dispensed by PROVIDER to a CLIENT
Definition in MyHDD	None
Additional source standards for definition	**CIHI** *"The medications dispensed by PROVIDER to a CLIENT"*
Remark	None
Synonyms	None
Key Attributes	None
Relationship	A MEDICATION DISPENSED • is a HEALTH SERVICE EVENT
Table Type(Master or Transaction)	Transaction

3.17   Medication Prescribed

Table 3.17: Medication Prescribed Concept

Concept	Medication Prescribed
Definition of Concept	The medications ordered by PROVIDER for a CLIENT
Definition in MyHDD	None
Additional source standards for definition	**CIHI** *"The medications prescribed for the Client"*
Remark	None
Synonyms	None
Key Attributes	None
Relationship	A MEDICATION PRESCRIBED • is a HEALTH SERVICE EVENT
Table Type(Master or Transaction**)**	Transaction

3.18   Newborn

Table 3.18: Newborn Concept

Concept	Newborn
Definition of Concept	A CLIENT aged less than or equal to 28 days of life.
Definition in MyHDD	None
Additional source standards for definition	None
Remark	None
Synonyms	None
Key Attributes	TBD
Relationship	Each NEWBORN • is a CLIENT
Table Type(Master or Transaction)	Master

3.19 Next Of Kin

Table 3.19: Next Of Kin Concept

Concept	Next Of Kin
Definition of Concept	A PERSON who is a relative of a CLIENT
Definition in MyHDD	None
Additional source standards for definition	None
Remark	For operation system we need to revisit the definition of the concepts to include a more precise legal definition.
Synonyms	None
Key Attributes	• Type of Relationship
Relationship	Each NEXT OF KIN • is a PERSON • may be associated with one or more CLIENT
Table Type(Master or Transaction)	Master

3.20 Nutritional Status

Table 3.20: Nutritional Status Concept

Concept	Nutritional Status
Definition of Concept	The summary of CLIENT's health condition related to nutrition
Definition in MyHDD	None
Additional source standards for definition	None
Remark	Note: Subtype of HEALTH STATUS BMI
Synonyms	None
Key Attributes	None
Relationship	A NUTRITIONAL STATUS • is a subtype of OBSERVATION
Table Type(Master or Transaction**)**	Transaction

3.21 Observation

Table 3.21: Observation Concept

Concept	Observation
Definition of Concept	Information derived from performance of a health related activity to a CLIENT.
Definition in MyHDD	None
Additional source standards for definition	**CIHI** *"Information derived from performance of a health related activity.* *Note 1: An Observation consists of a type and a result. The type and result of an Observation must be considered in combination to determine the meaning of the Observation, e.g. Initial Diagnosis (Type) = I01.1 (Result)."*
Remark	Example of Subtype: Diagnosis
Synonyms	None
Key Attributes	• Observation Type Code (eg ICD 10, LOINC, ICD-O, SNOMED-CT) • Observation Coded Value System Code • Observation Value
Relationship	An OBSERVATION • is a HEALTH SERVICE EVENT
Table Type(Master or Transaction**)**	Transaction

3.22 Organisation

Table 3.22: Organisation Concept

Concept	Organisation
Definition of Concept	A social unit of PERSONs that is structured and managed to meet a need or pursue a collective goal.
Definition in MyHDD	None
Additional source standards for definition	**CIHI** *"A group of persons with a common purpose or function.* *Note 1: May include public, private or voluntary sector Organizations whose activities may encompass the funding, provision or regulation of health care and support services. Examples: Ministries of Health, Regional Health Authorities, Emergency Department, Units"*

Remark	Example of SMRP subtypes: Hospital, Clinic
	Example of other subtypes: Research Institute, Blood Bank, Lab
	Type of Organisation in SMRP: Hospital, Clinic
	    Category Hospital: MOH, University, Military, Private
	    Category Clinic: Klinik Kesihatan, Klinik Desa, Klinik Pergigian, Klinik Bergerak
	PLACE information may be implemented specifically in the sub types of the relationship entities, e.g. HOSPITAL
	DECISION: FACILITY is a subtype of ORGANISATION, combining hospital and clinic.

Synonyms	None
Key Attributes	• Organisation name • Type of organisation • Organisation ID • Organisation Start Date • Organisation End Date

Relationship	Each ORGANISATION
	• may be a FACILITY
	• must be located at one PLACE at one point in time
	• may be associated with one or more SERVICE
	• may be associated with one or more other ORGANISATION
	• may have one or more PROGRAMME
	• may have one or more PROVIDER
	• may have zero, one or many DISCIPLINE
Table Type(Master or Transaction**)**	Master

3.23 Person

Table 3.23: Person Concept

Concept	Person
Definition of Concept	An individual
Definition in MyHDD	None
Additional source standards for definition	**None**
Remark	PERSON is a supertype of CLIENT, PROVIDER, NEXT OF KIN, etc
Synonyms	None
Key Attributes	• Identification Documents(ID)
Relationship	Each PERSON • may be a CLIENT • may be a PROVIDER • may be a NEXT OF KIN • may be associated with one or more PLACE
Table Type(Master or Transaction)	Master

3.24 Place

Table 3.24: Place Concept

Concept	Place
Definition of Concept	A physical point or area in space.
Definition in MyHDD	None
Additional source standards for definition	**CIHI** *"A physical point or area in space.* *Note 1: A Place may be of varying levels of* *Note 2: A Place can exist independent of a Service, Provider or Organization* *Note 3: A place represents a physical place and does not represent a virtual place (e.g.phone, numbers, email, IP address) or anatomical place"*
Remark	PLACE information may be implemented specifically in the sub types of the relationship entities, e.g. hospital
Synonyms	None
Key Attributes	• Address • Geo Location
Relationship	Each PLACE • must be the location of one or more ORGANISATION • may be the location of one or more PERSON • may be the location of one or more CLIENT
Table Type(Master or Transaction**)**	Master

3.25 Programme

Table 3.25: Programme Concept

Concept	Programme
Definition of Concept	A collection of activities delivered through a SERVICE in an ORGANISATION designed to meet a healthcare need.
Definition in MyHDD	None
Additional source standards for definition	None
Remark	Examples of programme: Antenatal Programme, Oral Cancer Programme, Toddler Programme, Tobacco Cessation Programme, Vaccination Programme, Water Fluoridation Programme, P&ST, Medical Care Programme.
Synonyms	None
Key Attributes	TBD
Relationship	Each PROGRAMME • must be associated with an ORGANISATION • must be associated with one or more SERVICE
Table Type(Master or Transaction)	Master

3.26 Provider

Table 3.26: Provider Concept

Concept	Provider
Definition of Concept	A PERSON who has delivered, is delivering, or has the potential to deliver health care related services or goods.
Definition in MyHDD	None
Additional source standards for definition	CIHI *"An individual who has delivered, is delivering, or has the potential to deliver health care related services or goods.* *Note 1: CIHI only considers persons as Providers. Organizations were not considered Providers in the CIHI definition of Provider. CIHI has chosen to consider an Organization as a separate entity. This deviates from other definitions of Provider.* *Note 2: Family members who deliver health care related services to a Client are not considered Providers by CIHI.* *Note 3: An individual who is registered with a health care licensing Organization but is unemployed may be a Provider with the potential to deliver health care related services or goods (e.g. a physician who is registered with the College but is not currently practicing medicine). Note 4: A Provider may have zero Clients and may participate in zero Health Service Events at zero Places."*
Remark	A provider may practice independent of an organisation. Hence, the place can be independent from an organization
Synonyms	None
Key Attributes	• Registration Number such as MMC Number(Doctors), MDC, RPh, RN, LPP Number • type of provider (Medical Practitioner, Pharmacist, Dental Practitioner, Allied Health Professional.) • Gazette number

Relationship	Each PROVIDER • is a PERSON • may practise in one or more ORGANISATION • may be gazetted in one or more SPECIALTY • may provide services to one or more CLIENT • may participate in one or more HEALTH SERVICE EVENT • may be associated with one or more PLACE
Table Type(Master or Transaction)	Master

3.27 Provider Screening

Table 3.27: Provider Screening Concept

Concept	Provider Screening
Definition of Concept	A screening PROGRAMME for PROVIDERS associated with CLIENT and PROVIDER safety.
Definition in MyHDD	None
Additional source standards for definition	None
Remark	Need more use cases to test the aspect of having the provider screening
Synonyms	None
Key Attributes	None
Relationship	Each PROVIDER SCREENING • may be associated with one or more PROVIDER
Table Type(Master or Transaction**)**	Transaction

3.28 Referral

Table 3.28: Referral Concept

Concept	Referral
Definition of Concept	A request from one PROVIDER to another PROVIDER or ORGANISATION to deliver one or more health services to a CLIENT
Definition in MyHDD	None
Additional source standards for definition	**CIHI** *"The type of service or specialty required for the Client requested by the PHC Provider (for example, cardiology)"*
Remark	None
Synonyms	None
Key Attributes	None
Relationship	A REFERRAL • is a HEALTH SERVICE EVENT
Table Type(Master or Transaction)	Transaction

3.29 Service

Table 3.29: Service Concept

Concept	Service
Definition of Concept	A grouping or collection of healthcare activities delivered directly or indirectly through an ORGANISATION to a CLIENT
Definition in MyHDD	None
Additional source standards for definition	**CIHI** *"A branch of healthcare, specialty or administrative category representing a potential activity that may consume resources and is intended to directly or indirectly affect the health state of a Client.* *Note 1: Service is essentially an administrative concept whereas Health Service Event represents the activities that may result from the delivery of a Service.* *Note 2: A Service may include a collection of Health Service Events.* *Note 3: Services that are delivered are based on the needs as determined by the condition and/or goal of care.* *Note 4: Services can contain Services."*
Remark	Daycare, Inpatient, Outpatient, Community Service, Home Care, Nursing Care, Palliative, Clinical Support Service, T&CM. Use: total number of cases, relate to the billings for the ward – tie to resources. There may be services delivered to Organisations, which we may develop separate concept for this. A provider can deliver one or many services. Services may be associated with one or many provider
Synonyms	None
Key Attributes	• health service type

Relationship	Each SERVICE • must be provided by one and only one ORGANISATION • may be associated with one or more other SERVICE • must be associated with one or more PROGRAMME • may be associated with one or more HEALTH SERVICE EVENT • may be associated with one or many PROVIDER
Table Type (Master or Transaction)	MASTER

3.30 Specialty

Table 3.30: Speciality Concept

Concept	Specialty
Definition of Concept	A specialised medical area which a PROVIDER is gazetted to practise.
Definition in MyHDD	None
Additional source standards for definition	None
Remark	Medical areas include dental. Example of specialty includes Internal Medicine, paediatric, obstetric and gynaecology, orthodontic, family medicine.
Synonyms	None
Key Attributes	• type of specialty
Relationship	Each SPECIALTY • may be associated with one or more PROVIDER • is associated with a DISCIPLINE
Table Type(Master or Transaction)	Master

3.31 Standard Assessment

Table 3.31: Standard Assessment Concept

Concept	Standard Assessment
Definition of Concept	An authorized tool used to collect a set of constituent OBSERVATIONs and INTERVENTIONs.
Definition in MyHDD	None
Additional source standards for definition	**CIHI** *"An authorized tool used to collect a set of constituent observations and interventions."*
Remark	None
Synonyms	None
Key Attributes	TBD
Relationship	A STANDARD ASSESSMENT • is a HEALTH SERVICE EVENT
Table Type(Master or Transaction**)**	Transaction

3.32 Visit

Table 3.32: Visit Concept

Concept	Visit
Definition of Concept	An interaction between a CLIENT and one or more SERVICEs.
Definition in MyHDD	None
Additional source standards for definition	None
Remark	A client inpatient services, outpatient services. A visit to outpatient services, and encounter to nurse, doctors, and others.
Synonyms	Attendance
Key Attributes	TBD
Relationship	A VISIT • is a HEALTH SERVICE EVENT • may have one or more ENCOUNTERs
Table Type(Master or Transaction)	Transaction

4. Appendices

4.1. Appendix 1 (MyHRDM Workshop 1/2015 List of Participants)

Bengkel Malaysian Health Reference Data Model (MyHRDM) Bil 1/2015 Malaysian Health Data Warehouse (MyHDW), Sistem Maklumat Rawatan Perubatan (SMRP) and Patient Registry Information System (PRIS)

Date : 4th -6th November 2015

Venue : Bilik Kayangan 3, Level 1, AnCasa Hotel, KL

ATTENDEES:

No.	Name	Position/Grade	Organisation
1	Dr. Md Khadzir bin Sheikh Ahmad [1]	Timbalan Pengarah	PIK
2	En. Wan Zawawi Md Zin [1]	Project Director	MIMOS
3	Pn. Noriati binti Baharum	Perunding ICT, Khas C	MAMPU
4	Pn. Siti Nurliza binti Mokhtar	Pakar ICT, F52	MAMPU
5	Cik Noor Hasliza binti Mohd Hassan	Ketua Penolong Pengarah, F48	MAMPU
6	Pn. Rapi'ah binti Ibrahim	Pakar ICT, F44	MAMPU
7	En. Mohd Amru Saifullah bin Alias	Penolong Pengarah, F41	MAMPU
8	Pn. Sabrina binti Sabri	Perangkawan, E52	PIK
9	Dr. Syirahaniza binti Mohd Salleh	Ketua Penolong Pengarah, U48	PIK
10	Dr. Nur Shaema binti Darus	Ketua Penolong Pengarah, UD48	PIK
11	Pn. Noor Aieda binti Abu Bakar	Pegawai Teknologi Maklumat (Kanan), F44	PIK
12	Dr. Nur Athirah binti Imran	Penolong Pengarah Kanan, UD44	PIK
13	Dr. Noor Sarah binti Zainol	Penolong Pengarah Kanan, UD44	PIK
14	En. Mohd Rosli bin Mahmood	Penolong Pengarah Kanan, E44	PIK
15	Cik Norsuhada binti Sulaiman	Pegawai Tadbir Kanan (Rekod Perubatan), N44	PIK
16	Pn. Ayu Fissabieummisukasih binti Parman	Penolong Pegawai Tadbir (Rekod Perubatan), N29	PIK

No.	Name	Position/Grade	Organisation
17	En. Adam Malik bin Sahar	Ketua Penolong Setiausaha, F48	BPM
18	Pn. Norzaidah Binti Mohammad Nor	Penolong Setiausaha Kanan, F44	BPM
19	Pn. Noor Shabirah Mohd Shamsuri	Penolong Setiausaha Kanan, F44	BPM
20	Pn. Hamidah binti Mat	Penolong Setiausaha, F41	BPM
21	En. Mohd Firdaus Bin Mohamed Khairi	Penolong Setiausaha, F41	BPM
22	Pn. Noorizam binti Kassim [3]	Ketua Penolong Pengarah Kanan, F54	BPM
23	Puan Rosnani binti Shuib [3]	Penolong Setiausaha Kanan, F44	BPM
24	Dr. Fazilah Shaik Allaudin	Timbalan Pengarah, UD54	Bahagian Telekesihatan
25	Dr. Nor Azhariah Noordin	Ketua Penolong Pengarah Kanan, UD54	Bahagian Telekesihatan
26	Dr. Lily Laura binti Azmi	Ketua Penolong Pengarah Kanan, U52	Bahagian Kesihatan Pergigian
27	Dr. Tuan Yuswana Binti Tuan Soh	Ketua Penolong Pengarah Kanan, U52	Bahagian Kesihatan Pergigian
28	En. Mohd Hadafi bin Mohd Yasim	Penolong Pengarah Kanan, U44	Bahagian Perkhidmatan Farmasi
29	Mr. Mark Fuller	Consultant	MIMOS
30	En. Jauhari Abdul Ghafar	Project Manager	MIMOS
31	En. David Lew Chia Chyi	Project Lead	MIMOS
32	En. Kenneth Chiam Thow Way	Solution Architect	MIMOS
33	Dr. Teo Wil Ly [2]	Project Lead	MIMOS
34	Dr. Seah Boon Keong [4]	Data Modeller	MIMOS
35	En. Vinay Kumar Ramidi	Data Modeller	MIMOS
36	En. Luqman Razak	ETL Developer	MIMOS
37	Pn. Rahayu Abdullah Sani	BI Developer	MIMOS
38	Pn. Fauziah Hanim Jahidin	BI Developer	MIMOS

[1] Meeting Co-Chairman

[2] Meeting Minutes Writer

[3] TPC/OHCIS project

[4] Workshop Presenter and Data Modeler for MyHRDM

4.2   Appendix 2 (MyHDW Framework)

Proposed HDW Reference Model

Proposed Start-up MyHDW Reference Model

*Future usage for message base collection
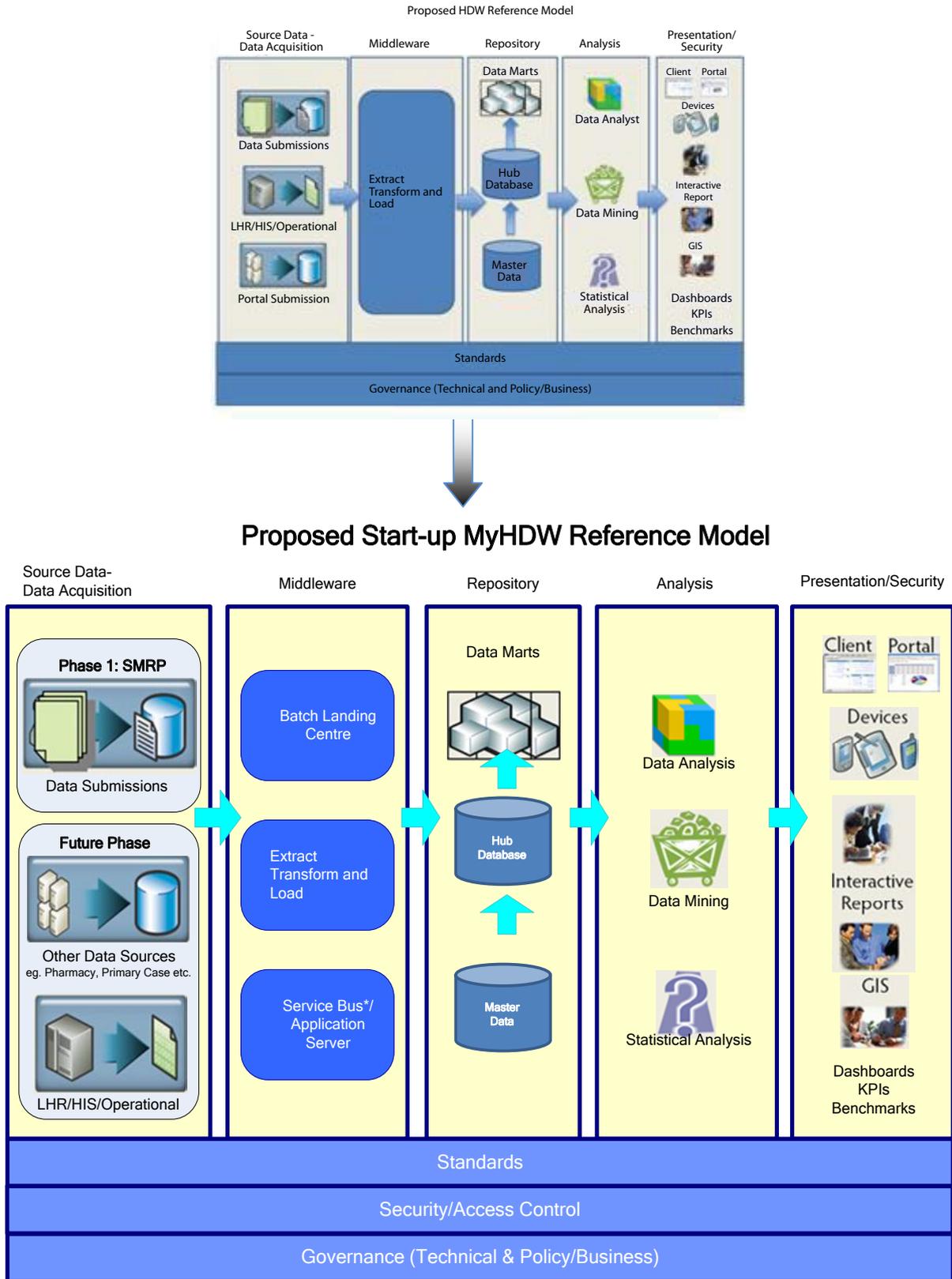
Figure 4.1: MyHDW Framework

4.3 Appendix 3 (MyHDW Phases)
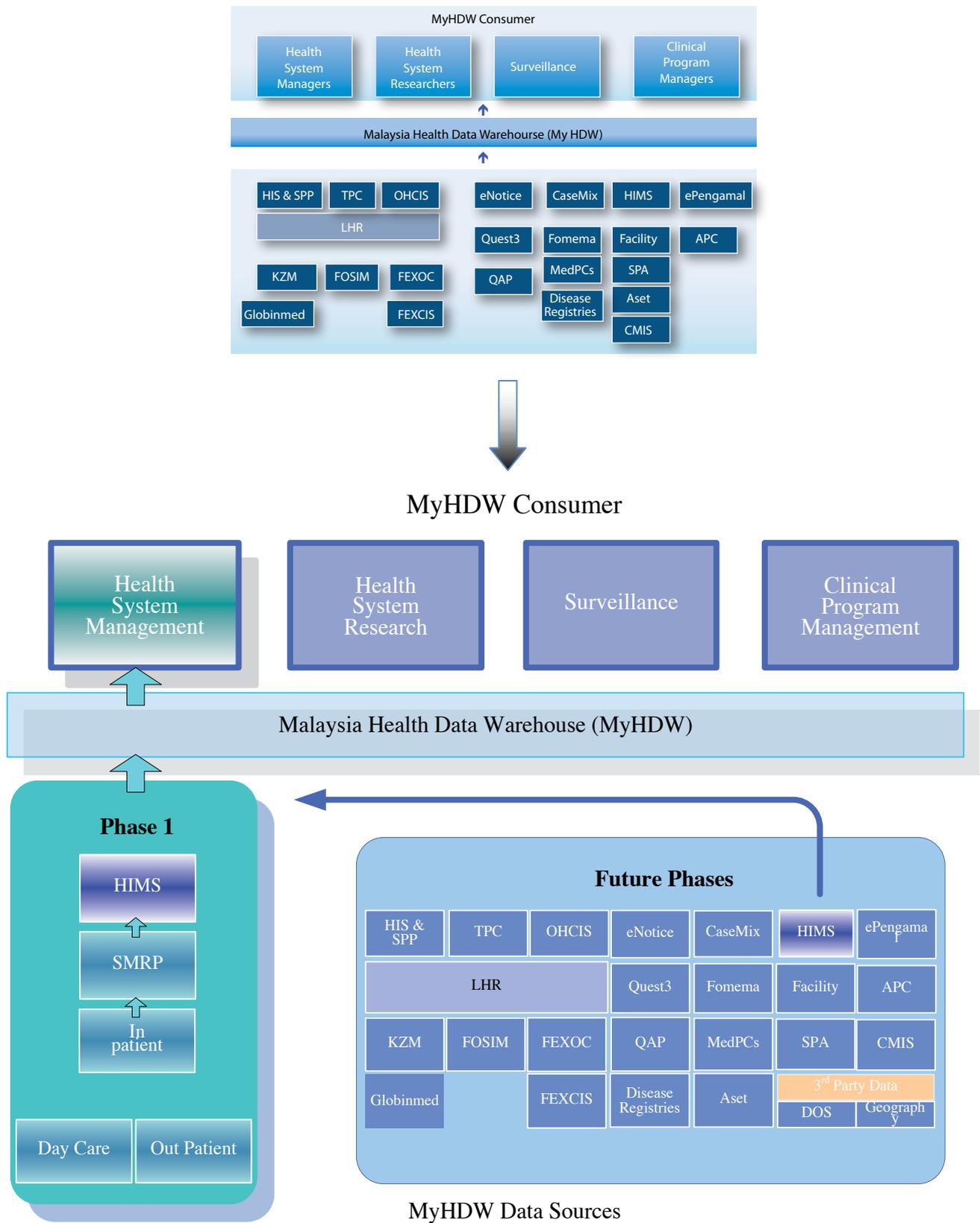
Figure 4.2: MyHDW Phases

4.4   Appendix 4 (MyHRDM Workshop 2/2015 List of Participants)

Bengkel Malaysian Health Reference Data Model (MyHRDM) Bil 2/2015 Malaysian Health Data Warehouse (MyHDW), Sistem Maklumat Rawatan Perubatan (SMRP), Patient Registry Information System (PRIS), TPC-OHCIS, PhIS

Date   : 2th, 3rd and 7th December 2015
Venue : SEMINAR ROOM 1, MIMOS, TPM, KL

ATTENDEES:

1.   Dr. Md Khadzir bin Sheikh Ahmad   Chairman

Pusat Informatik Kesihatan (PIK),
Bahagian Perancangan, KKM
1.   Dr. Nur Athirah binti Imran
2.   Dr. Noor Sarah binti Zainol

Bahagian Pengurusan Maklumat (BPM), KKM
3.   Pn. Noorizam binti Kassim
4.   Pn. Rosnani binti Shuib

Bahagian Pembangunan Kesihatan Keluarga (BPKK), KKM
5.   Dr. Asnida binti Anjang Ab. Rahman
6.   Dr. Fauziah binti Zainal Ehsan
7.   Pn. Syafirafizah binti Shafie
8.   Pn. Radziah binti Idris

Bahagian Kesihatan Pergigian (BKP), KKM
9.   Dr. 'Ainun Mardhiah binti Meor Amir Hamzah
10.   Dr. Faizah binti Kamaruddin
11.   Pn. Hayati binti Mohd Yasin
12.   Pn. Julaiha binti Mohd Sarif

MAMPU
13.   Pn. Noriati binti Baharum

MIMOS

14. En. Wan Zawawi bin Md Zin
15. Pn. Azuraini binti Abu Bakar
16. Pn. Che Umi Kalsom binti Che Mustaffa
17. En. David Lew Chia Chyi
18. Pn. Fauziah binti Hanim Jahidin
19. En. Lee Chee Kiam
20. En. Luqman bin Razak
21. En. Mallesham Balagoni
22. En. Mohd Nazrul bin Ishak
23. En. Muhammad Adib bin Ahirrudin
24. En. Muhammad Aiman bin Mazlan
25. Pn. Nurdinah binti Abdul Latib
26. Pn. Rahayu binti Abdullah Sani
27. En. Rayhanul bin Islam
28. Pn. Raja Mariam Ruzila binti Raja Ahmad Sufian
29. En. Roszaini bin Mustafa
30. Dr. Seah Boon Keong   (Presenter and Data Modeler)
31. En. Sudesh Padmanathan
32. Dr. Teo Wil Ly
33. En. Vinay Kumar Ramidi
34. Cik Shoba Subramanian (Minutes Taker)

By invitation

En. Mark Fuller   Consultant

Acknowledgement

Malaysian Health Reference Data Model (MyHRDM)

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