



MALAYSIAN HEALTH DATA WAREHOUSE (MyHDW): Ministry of Health Malaysia Experience



Note. This presentation is jointly prepared by Dr. Md. Khadzir b. Sheikh Ahmad (Deputy Director Health Informatics Centre - HIC), Zainuddin b. Ahmad (Senior Principal Assistant Director) and Sabrina bt. Sabri (Senior Principal Assistant Director). HIC is responsible to lead the development of MyHDW.





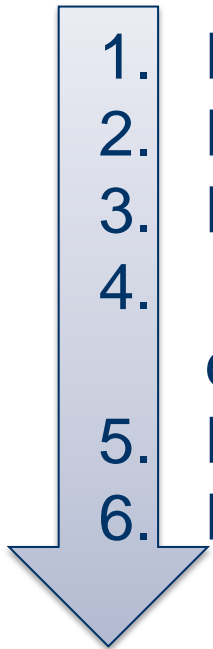
Outline

1. Challenges
2. MyHDW
 - Health Informatics Standard
 - Portal MyHDW
 - Dashboard
 - SMRP version 2
 - PRIS
3. Information to Share
4. Way forward

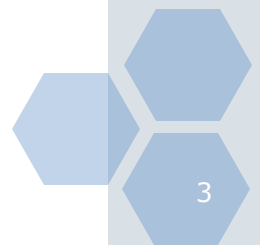




CHALLENGES AND GAP ANALYSIS

- 
1. Limited information and data governance mechanisms
 2. Non-compliance to health informatics standards
 3. Limited data collection abilities
 4. Existence of various level of data, completeness and data quality
 5. Limited of technologies and tools
 6. Lack of human resources, skill and capacity

**MALAYSIA HEALTH DATA WAREHOUSE
(MyHDW)**





Principle

- A trusted source of truth of comprehensive healthcare data structured for query and analysis purposes.

Objectives

- Reduce workload/ human resources
- Optimized for analysis & reporting
- Multidimensional
- Web base
- 'Build once use many'

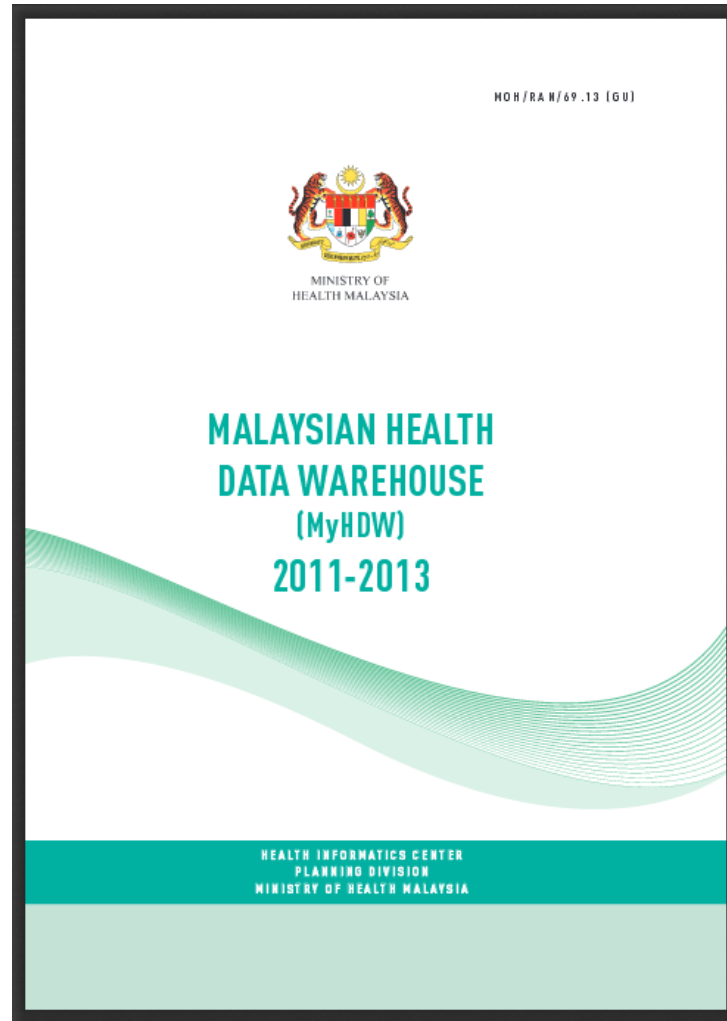
Benefits

- Effective management
- Security & privacy
- Integrated & comprehensive
- Overarching system governance





Blue print



<http://www.moh.gov.my/images/gallery/publications/myhdw>





Project Governance Structure





Development Phase

MyHDW

Phase I (2015 – 2016)

Phase II (2017 – 2018)

SMRP ver2

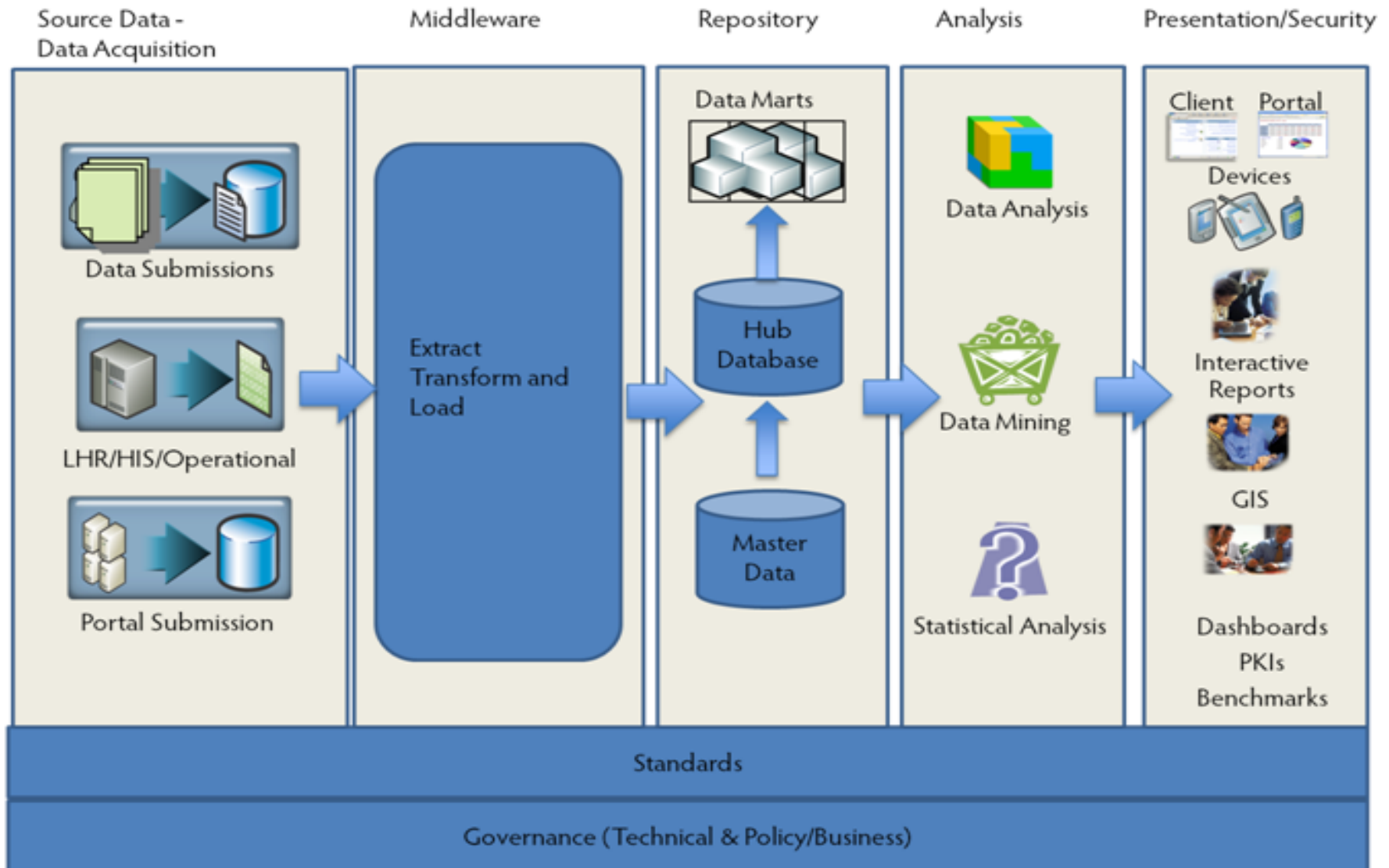
PRIS

Phase I & II
(2015 to 2017)



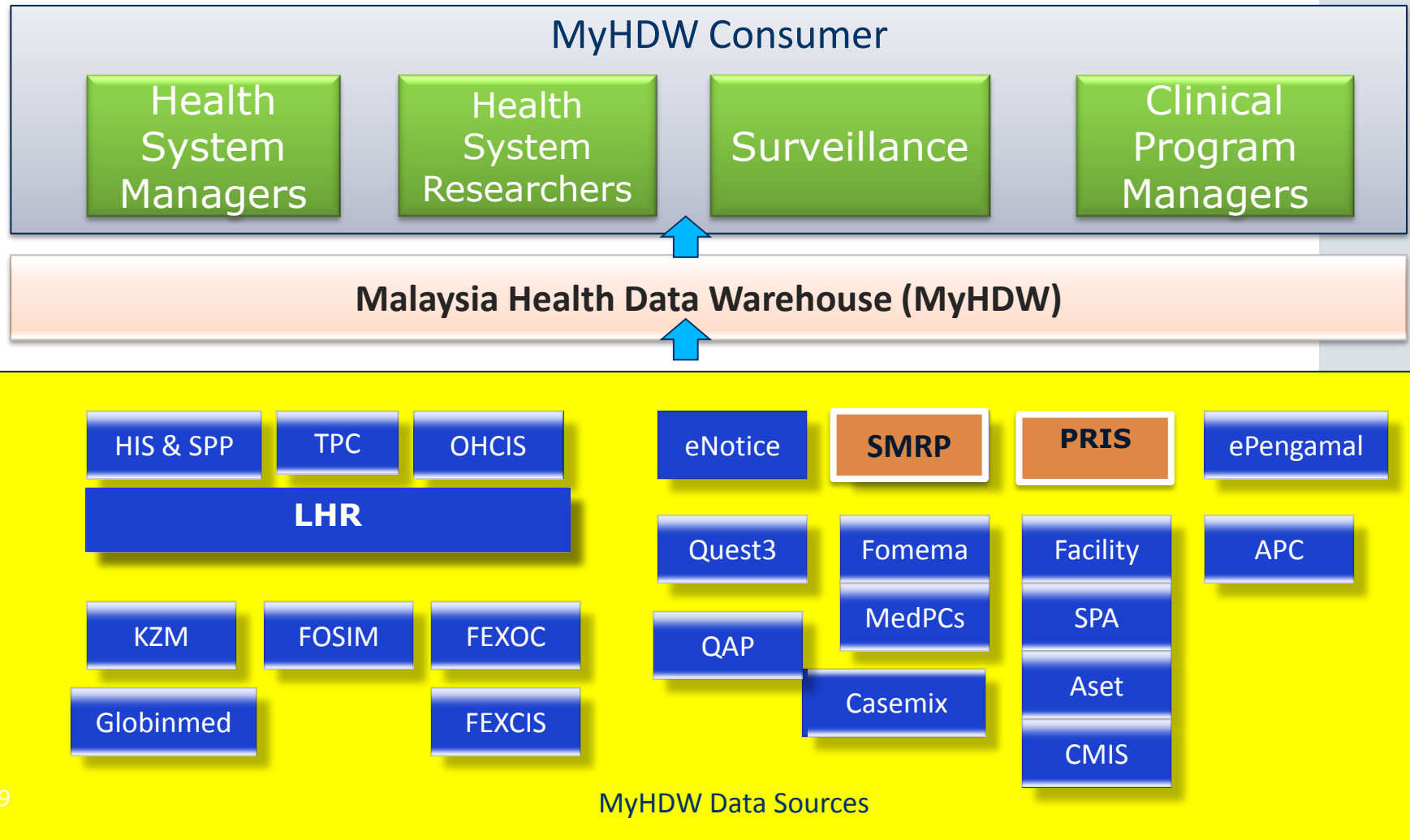


Proposed HDW Reference Model





CONSUMER & POTENTIAL DATA SOURCES





Portal MyHDW

Portal

**Intelligent
News Update**

GIS Map

**Data Request
Management**

**National
Release Centre**

Dashboards (KPI, OECD indicators, Trend of diseases)

KPI: Readmission Count & Rate for Heart Disease
Dengue Analysis Statistic
Non-Communicable Diseases Statistic
Non-Communicable Diseases Trend

Principal Causes of Death Statistic
Patient Encounters
Non-Communicable Diseases
Monthly Breakdown Statistic
ICD10 Diseases Statistics

Business Intelligent

**Fixed
Format
Reports**

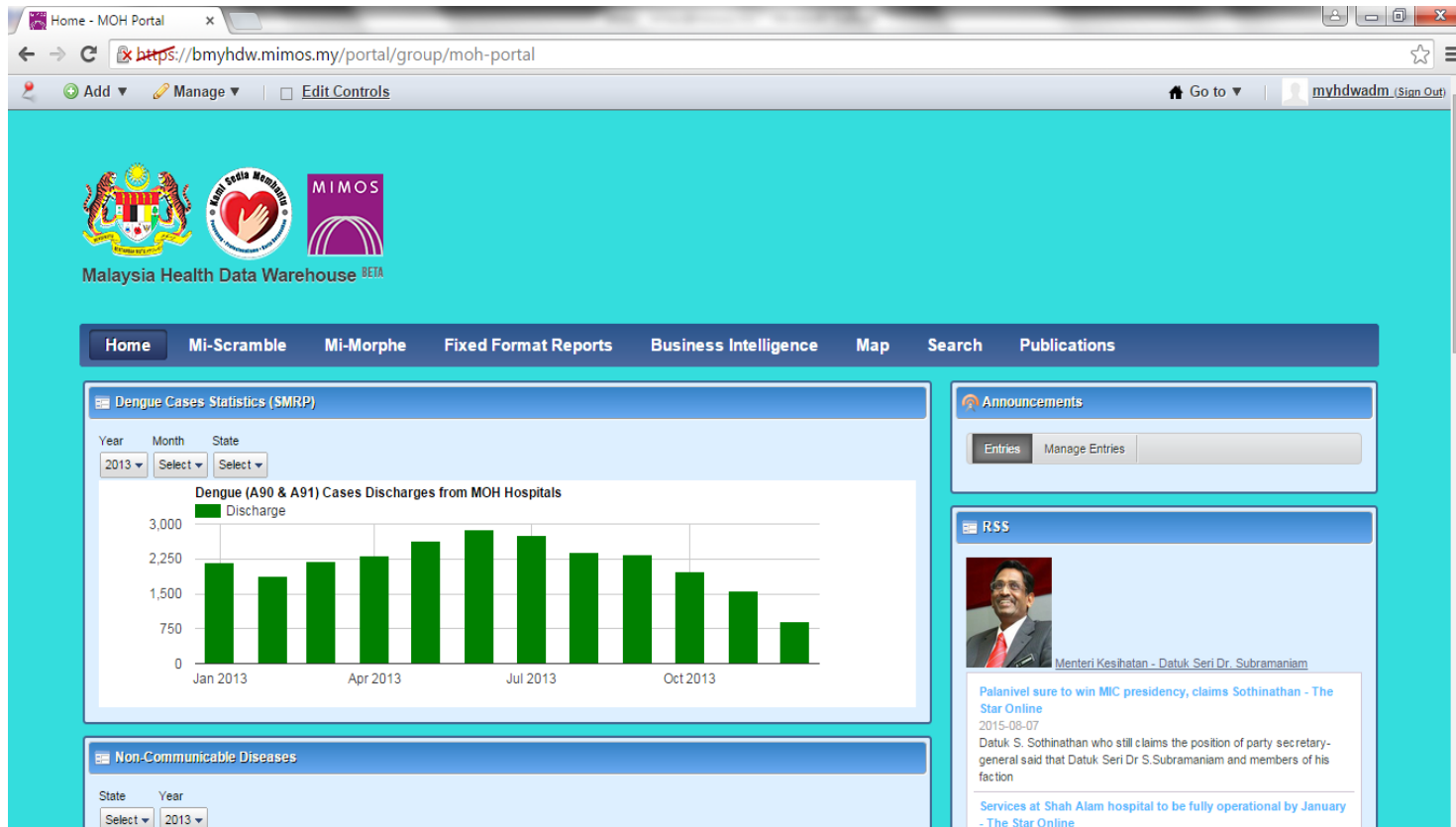
**Pre-defined
Queries (SQL)**

**Free-form
Queries
(Cubes)**

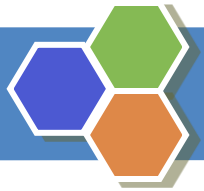
**Statistical and
Predictive
Analytics**



Dashboard



- Displayed in MyHDW Portal upon log in.
- More advanced Business Intelligence features, such as drill-down are one click away from the landing page.



Examples of Dashboards

1. KPI

- Readmission Count & Rate for Heart Disease

2. OECD/WHO indicators

3. Trend of diseases

- Dengue Analysis Statistic
- Non-Communicable Diseases Statistic
- Non-Communicable Diseases Trend
- Principal Causes of Hospitalisation Statistic
- Principal Causes of Death Statistic
- Patient Encounters by Age Group, Gender, Ethnicity & Nationality
- Non-Communicable Diseases by Fixed Diseases Monthly Breakdown Statistic
- ICD10 Diseases Statistics





Mi Scramble-Anonymizing

Data Scrambling										
Home > Preview Scramble Record										
NEW_ID	NO_DAFTAR	NAMA PESAKIT	KOD_HOSPITAL	KOD_NEGERI	ALAMAT1	ALAMAT2	ALAMAT3	POSKOD	NEGERI	DISP
445	306413	ROSMAWATI MAT YUSSEN	1737	14	KG GELANGGANG		SEMPORNA	91307	14	
250	304494	ROSMAWATI MAT YUSSEN	1737	14	KG NUSA TENGAH		SEMPORNA	91307	14	
151	304000	HASHIAH BINTI MOSTARI	1737	14	PULAU MABUL		SEMPORNA	91307	14	
205	303812	HASHIAH BINTI MOSTARI	1737	14	KG SIMUNUL		SEMPORNA	91307	14	
97	303655	MASTURA BT ISMAIL	1640	14	Kampung Desa Bajau	Jalan Tengah Nipah	LHDATU	91110	14	

NO_DAFTAR	NAMA PESAKIT
ww0EBwMC03pSRtTMb8p00jUBS6XV3ACq+eIn38Zta	ww0EBwMCzWQHtt9X41Zs0jUBeqNxMxJBZcogWiTmw3k7DvT6qXSlSOGKYFWRuXFTctaM
ww0EBwMC064L373uoRVm0jUBkXHI1kKNh8Rn	ww0EBwMCzWQHtt9X41Zs0jUBeqNxMxJBZcogWiTmw3k7DvT6qXSlSOGKYFWRuXFTctaM
ww0EBwMC0841Qp+f5FV40jUBFTV3nnELaFX6	ww0EBwMCJSrzkrp1Rk9t0jUB924J6thwPeByiArIwC81diLyhykv9Q600Uj22Lv4pTtIA
ww0EBwMC08rdwm1nASp+0jUBz3sHhWTJp6w5r	ww0EBwMCJSrzkrp1Rk9t0jUB924J6thwPeByiArIwC81diLyhykv9Q600Uj22Lv4pTtIA
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ww0EBwMC0bxmDPw3/8J90jUBxCifIS+jT9eKG/R	ww0EBwMCg06UFVadpoh30jUBUnPUn1S4+oRPUvKpe/l5diz2xbN63tikorylchzOdZep

Complexity is 2^{126}



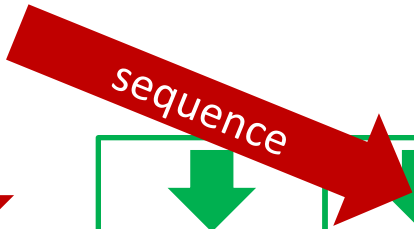
Health Informatics Standard & ICD10 Code generator





Health Informatics Standard

HL7/CDA identifies which fields are variables and values, and determines the sequence of variables



sequence

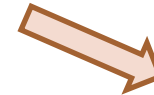
MyHDD/DDSA determines the properties of each variable and values related to it e.g. naming convention, data type, field size

Variable	Nama	No. ID	Jantina	Umur	Diagnosis
Value	Nor	1234	Wanita	30	CA Breast
	Ah Moi	3456	Female	31	Kanser Payudara
	Devi	5678	Perempuan	32	Carcinoma Mammae

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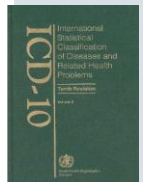
SNOMED-CT/LOINC uniforms the meaning of terminologies entered into each field. In this example, 'jantina' and 'diagnosis'

254837009



C50.9

ICD classifies the uniformed meaning for analysis. In this example, **ICD10** which is WHO's diagnosis classification standard .





MI-HARMONY

Mi-Harmony is intended to harmonise data by codifying textual data with SNOMED CT codes, and to perform semantic-based query over the SNOMED CT codified data.



**Multiple
Terminologies**

Eg. Healthcare

Acute asthma = Lelah = Acute bronchitis
Fatigue = Letih = Tiredness
Symptoms = Tanda-tanda = Disorder
Gender = Jantina = Sex





Number of female patient diagnose with Breast Cancer?

Nama	No. ID	Jantina	Diagnosis
Nor	1234	Wanita	Kanser Payudara
Ali	4423	Lelaki	Athma
Ah Moi	3456	Female	Breast Cancer
Devi	5678	Perempuan	CA Breast
Lisa	3215	Female	Diabetes

→ 1 patient

Mi-Harmony

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Nama	No. ID	Jantina	Diagnosis
Nor	1234	Wanita	Kanser Payudara
Siti	4423	Perempuan	Athma
Ah Moi	3456	Female	CA Breast
Devi	5678	Perempuan	Breast Cancer
Lisa	3215	Female	Diabetes

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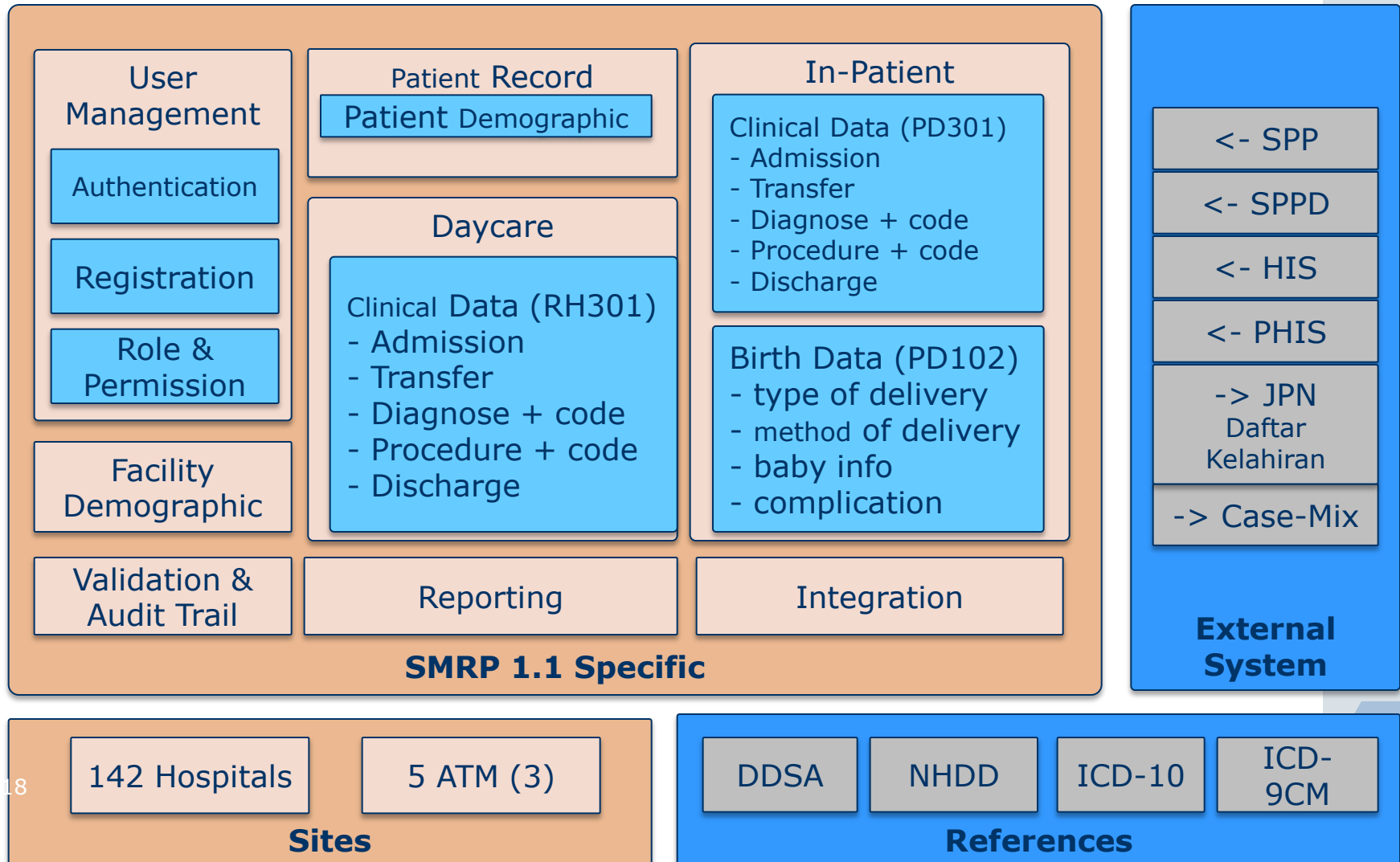
→ 3 patients





Sistem Maklumat Rawatan Perubatan (SMRP) Ver 2.0

MODULES





SMRP 1.1 -SUMMARY

From Jan 2012 - July 2015

145

**142 MOH Hospitals
3 ATM Hospitals**

1,120

**2 Super users
160 Admin users
568 PD users
390 RH users**

7,889,660

**Inpatient
encounters**

3,213,613

Daycare encounters

1,067,222

Birth records

**Integration
records**



Patient Registry Information System (PRIS)

Definition:

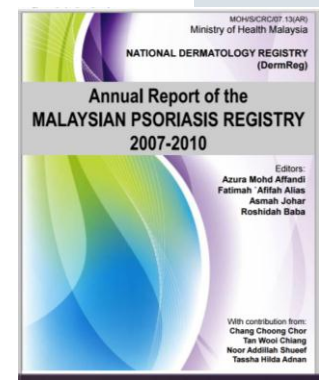
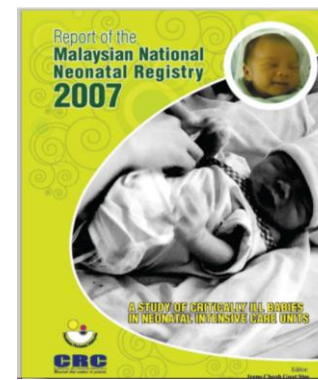
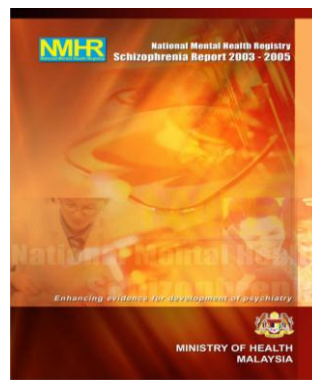
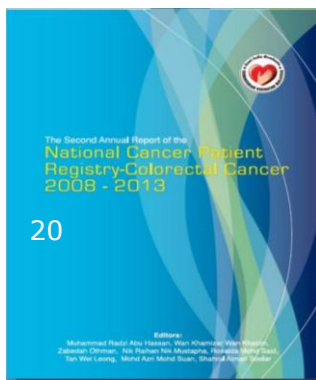
The WHO definition of “patient registry” is “a file of documents containing uniform information about individual persons, collected in a systematic and comprehensive way, in order to serve a pre-determined scientific, clinical or policy purpose”.

Information collect:

Demography, Screening, Family, Treatment, Medical History, Co-Morbidity, Notification, Outcome etc.

Example of patient registry:

Cancer Registry, Diabetes Registry, Neonatal Registry, Eye Registry, Dermatology Registry, Mental Health etc.





Is MyHDW on track?

- Weekly meeting and discussion with vendor - Wednesday.
- Weekly teleconference with consultant.
- Up-to-date documentation – minutes of meeting and reports.





WAY FORWARD





HEALTH INFORMATICS CENTRE (future)

Malaysian Health Data Warehouse (MyHDW)

Health Informatics Standard

*Terminology
Standard*

MyHDD/DDSA

ICD

*Messaging
Standard*

ISO/TC 215

HISE

*Benchmarking
Criteria*

Health Information Management

Production/
Disseminati
on of
Health
Information

SNOMED CT

LOINC

ICD10

ICD9CM

ICD-O

HL7

CDA

DICOM

SMRP

e-Reporting

Patient Registry

**Facility & Personnel
Information System**

**Data governance &
ownership/UACP**

Data Migration

**Request of
Information**

Publication

GIS





Information to Share

- MIMOS technology – local technology, local and foreign expertise
- Mr. Mark Fuller- a consultant from CIHI, assisting the development of MyHDW
- Primary and secondary data use
- 20% structured data and 80% unstructured data – technology used to process unstructured data and produce information.
- Build-in predictive analysis (ARIMA)
- ICD10 Code Generator
- Mi-Harmony





THANKS TO ALL

