

UiO : **Institutt for informatikk**

Det matematisk-naturvitenskapelige fakultet

Jørn Braa

Open Source and Capacity in the HISP Network

17.09.2018



Action and research in the HISP network

0. Research in informatics
1. Background South Africa & HISP network
2. HIS & use of data - Standardisation & Integration
 - Examples Malaria and Indonesia
3. Why things are difficult: 'Social systems'
4. Connectivity, development & challenges
5. DHIS2 / HISP: Research & Development challenges

Action (&) Research in Informatics

- APPLIED Research Dilemma: Do technical / practical work and
 - Work as a consultant and write a consultancy report, or
 - reflect 'scientifically' and make a Masters theses

WHAT IS THE DIFFERENCE?

- Partly Scientific method & partly applied research

 3 TYPES / AREAS of research methods and approaches

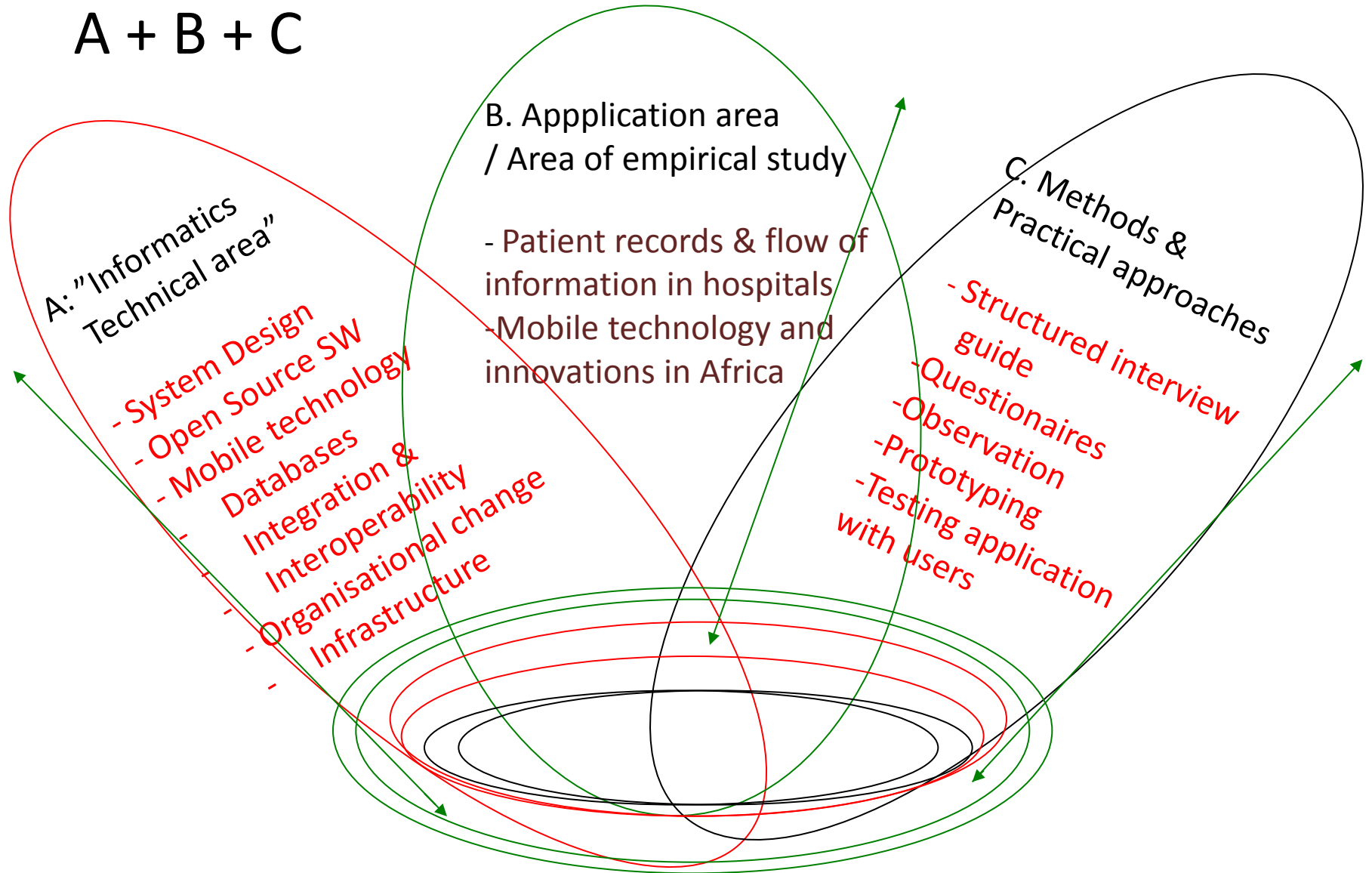
- A. Informatics / profession specific methods: software, standardisation, mobil technology, networks, database technology, organisational change.
- B. Application area specific – Context of empirical work – problem area (Mobile technology in Africa; hospitals and patient data; OR oil industry)
- C. Research methods – "general"; reflective – gather and analyse data
 - 'science' – what is shared by all academic areas at the university

- A + B = Consultancy / technician; A + B + C = Research & Masters theses

Flower model research approach

“Appropriate” combination of

A + B + C



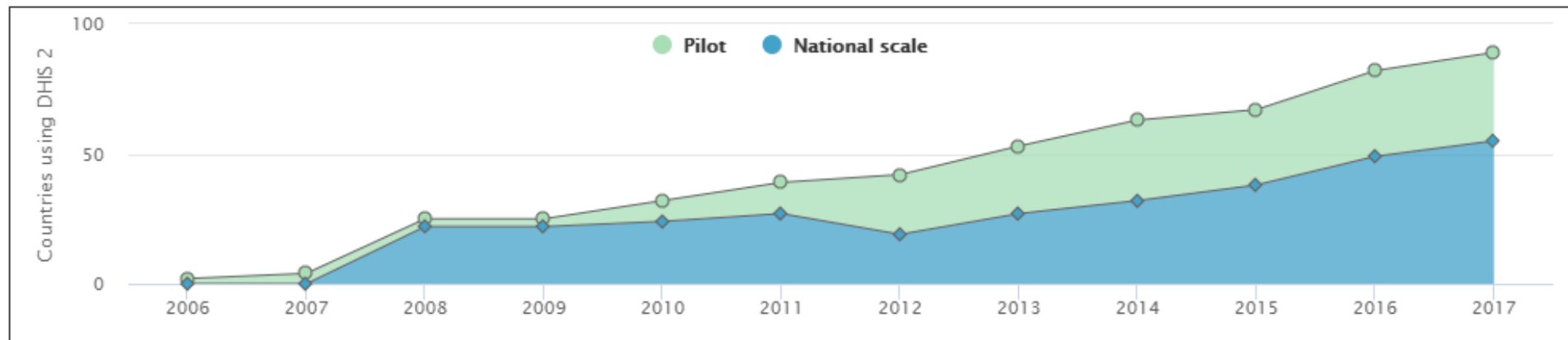
Health Information Systems Program

HISP & DHIS 2: Past, Current, Future

- HISP : global network for HIS development, Open Source Software, education and research
- DHIS 2 open source software : reporting, analysis and dissemination of health data & tracking individuals
- Started in South Africa in the 1990's - Now 40+ countries using DHIS 2
- Inspired by Scandinavian tradition:
 - Participatory design & focus on users
 - empowerment & development of
- Development agenda
- Partners: WHO, Global Fund, GAVI, UNICEF



DHIS2 Country Adoption



DHIS – District Health information Software
HISP – Health Information Systems Program

Background:

- HISP started 1994 in “New” post apartheid South Africa
- Development DHIS started 1997 & 2002 National Standard
- DHIS v1 & HISP to India from 2000
- DHIS v1 spread to many countries in Africa from 2000
- 2000-2013 - Develop Masters Programs in Mozambique, South Africa, Malawi, Tanzania, Ethiopia & **Sri Lanka**
- PhD program, 40 students from Asia and Africa
..... who are later running the Masters programs

Background in 'NEW' post apartheid South Africa 1994-2000

HISP approach – from South Africa:

- Local use of information;
- Maximise end-user control;
- Local empowerment &
- bottom-up design and system development

Focus: Integration and use of data

- 1) standardisation of primary health care data &
 - 2) 'flexible' – easy to change and adapt new data sets
- 1998/99: implementation in two provinces
 - 1999/2000 - onwards: National implementation

HISP / DHIS timeline (2):

From ‘Stand alone’ MS Access – to DHIS2 Web & global footprint

- 2004 – 2010: New technological paradigm:
 - Web based open source – Java frameworks
 - 2006 Kerala; 2009 Sierra Leone
- 2011 – 2013: ‘Cloud’ and online
 - ‘Cables around Africa’:
 - Kenya, Ghana, Uganda, Rwanda, ...
- 2014 – 2016: 40+ countries in Asia and Africa use DHIS2 as national HIS

HISP Approach to information systems – Background

- Information for decision making
 - Data use – culture of information
- ‘Power to the users’ – Empower health workers, local levels, communities
 - Training & education
 - Participatory design
- Focus on important data & indicators:
 - Data standardisation, harmonisation of data sets
 - ‘Less is better’

3 components of the HISP 'Network of Action'

Health Information Systems

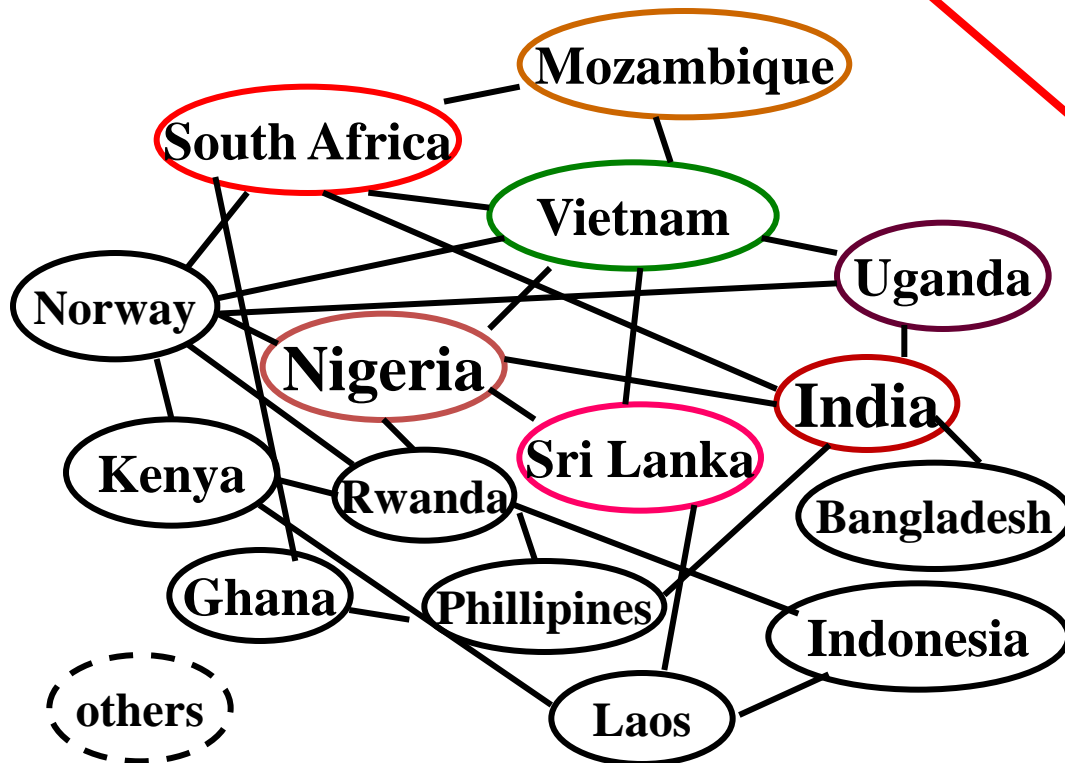
Integration, standards, architecture
Use of information for action
Health management

Free & Open Source Software

Distributed DHIS2 development
– Sharing across the world
knowledge & support

Building Capacity, Academies, Education, Research

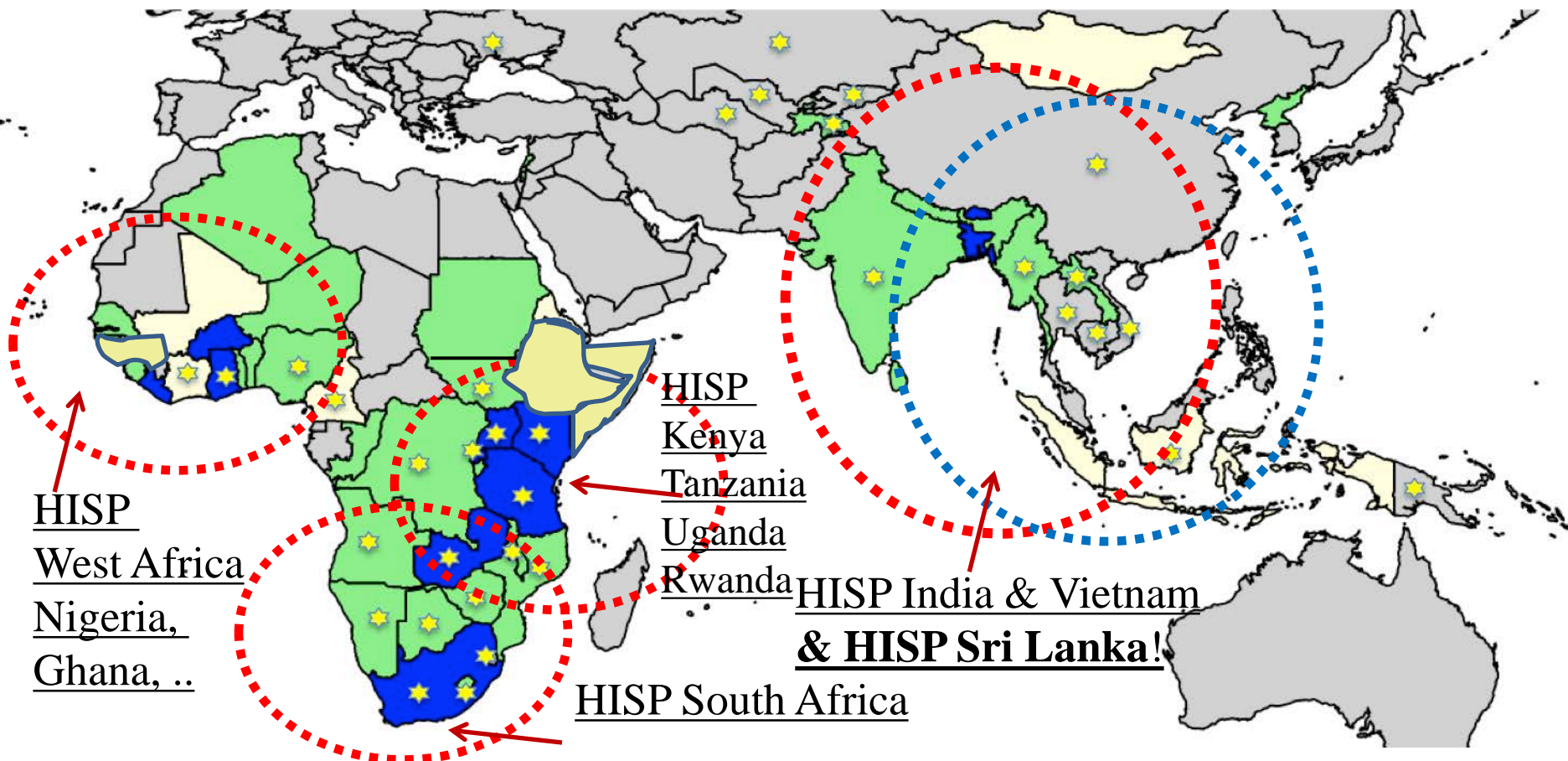
Training of health workers
Graduate courses, Masters, PhD
Sharing teaching /courses



Regional approach:

Implementing DHIS2 through HISP nodes

- Early phase / pilots / preparation
- Under implementation / many states in India
- Nation-wide
- PEPFAR



DHIS2 Innovation Ecosystem

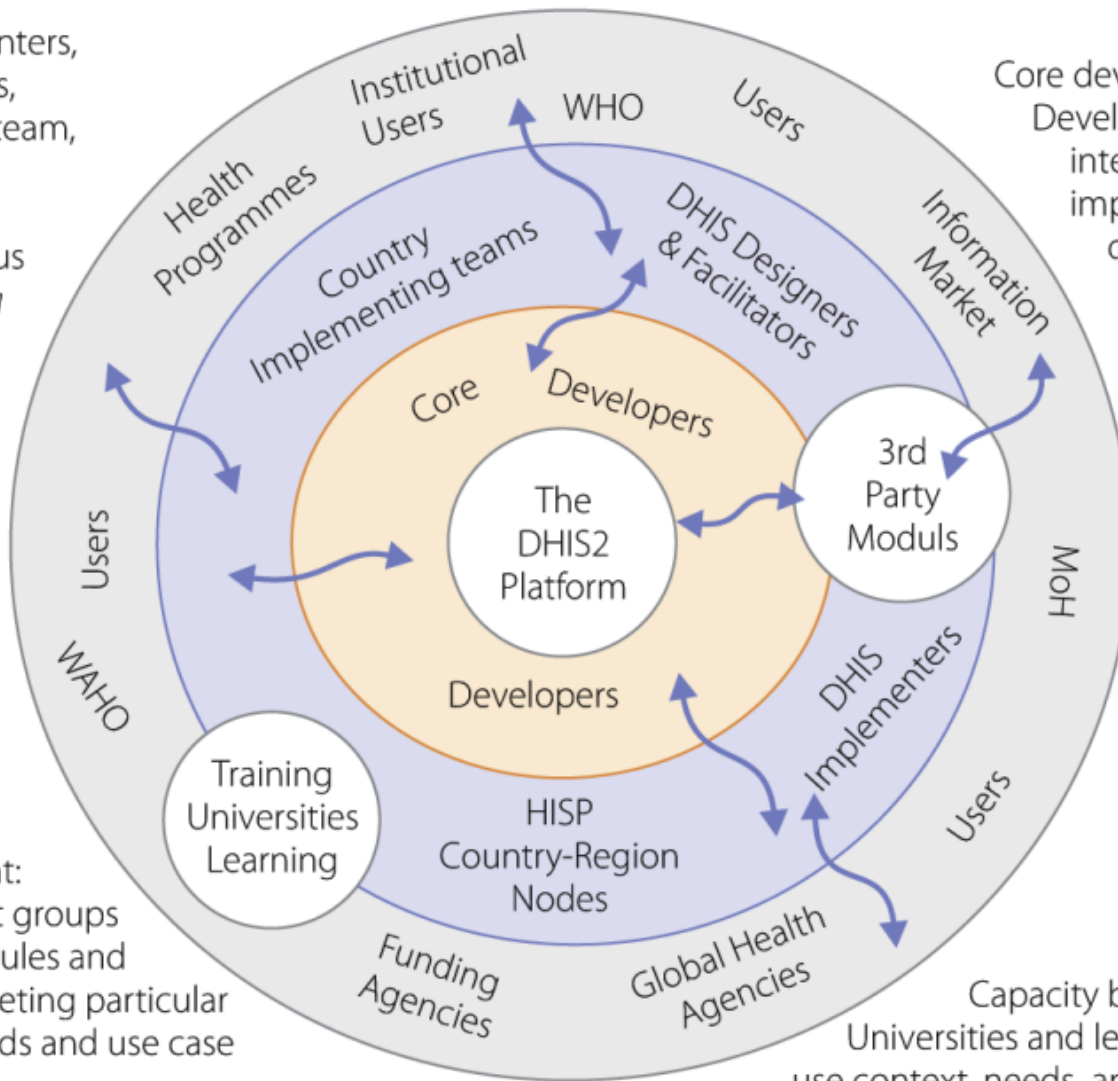
DHIS implementers, DHIS Designers, Country DHIS team, HISP nodes, Super users: are all, at various levels, *building* Systems using the platform and, *mediating* Requirements from users to core developers

Core developers
Develop the platform in interaction with DHIS implementers and designers

Institutional users, agencies Health programmes etc, are the Consumers, Users and Market for Information and Defining the Needs for Information and functionality

3rd party Development: Independent groups making modules and plug-ins targeting particular markets, needs and use case

Capacity building, Universities and learning: bridging use context, needs and practical solution



HISP – DHIS2 Community: principles

- **Free and Open Source Software & training / educational materials, etc.**
- Development and implementation of **sustainable & integrated Health Information Systems**
- **Empower communities, healthcare workers and decision makers** to improve the coverage, quality and efficiency of health services
- **Developmental approach to capacity building & research**
 - Research based development
 - Engage HISP groups and health workers in action research!



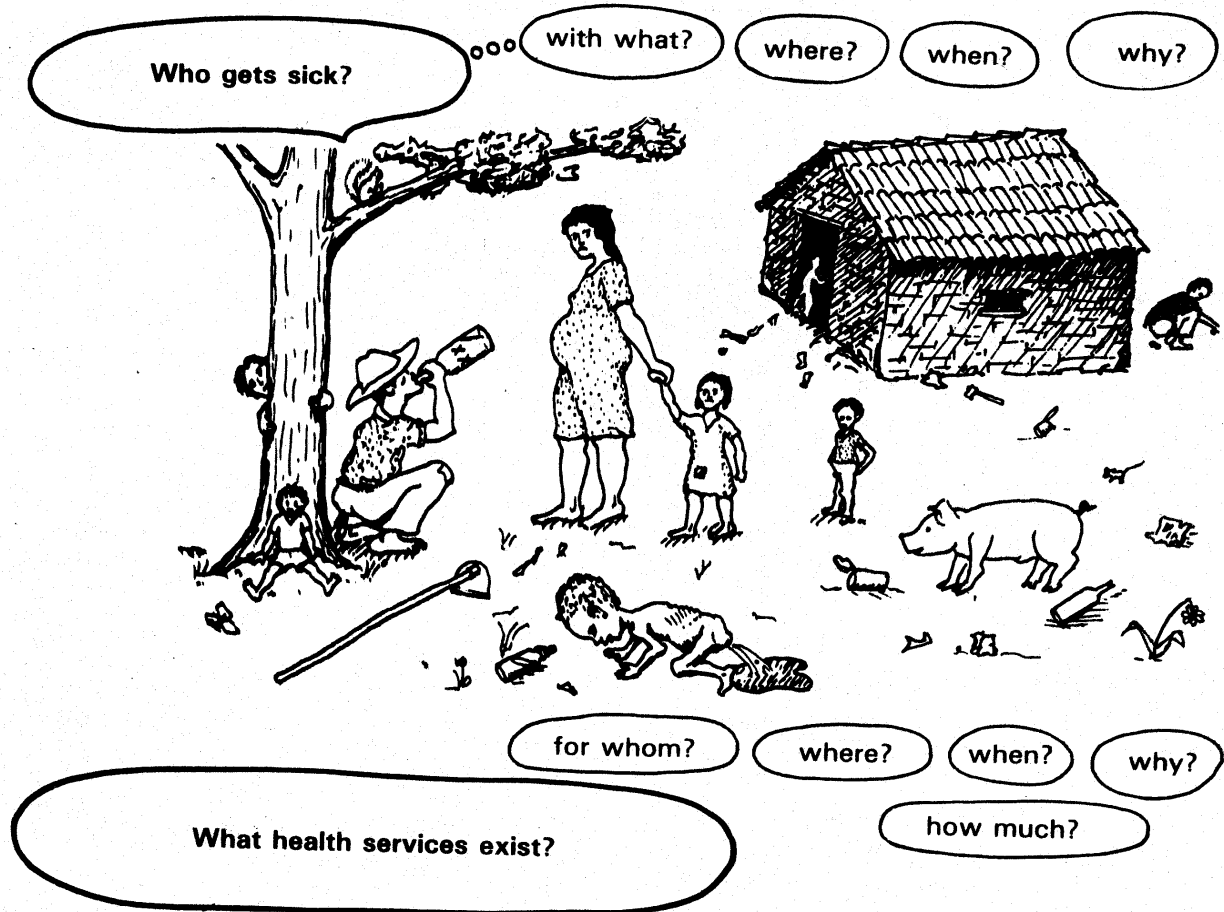
Data Use, for what

Data:

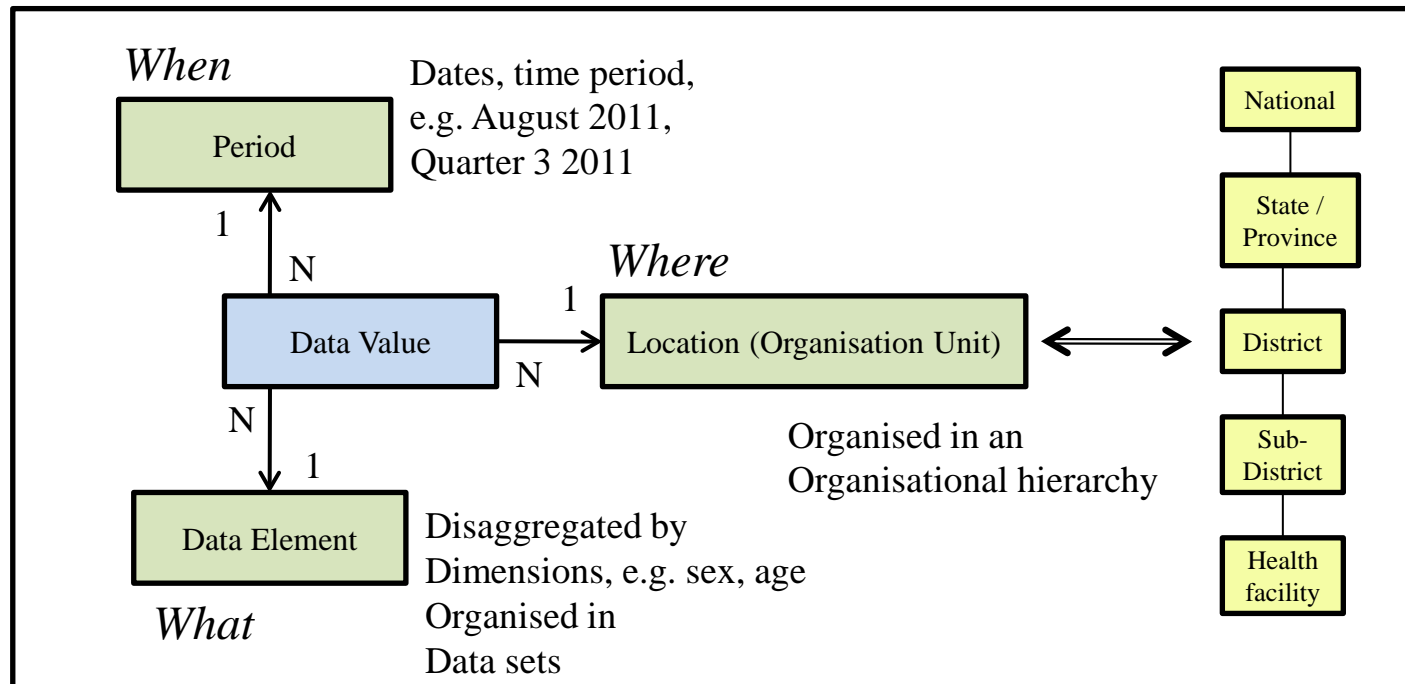
- Where?
- What?
- When?

Analysis & decisions:

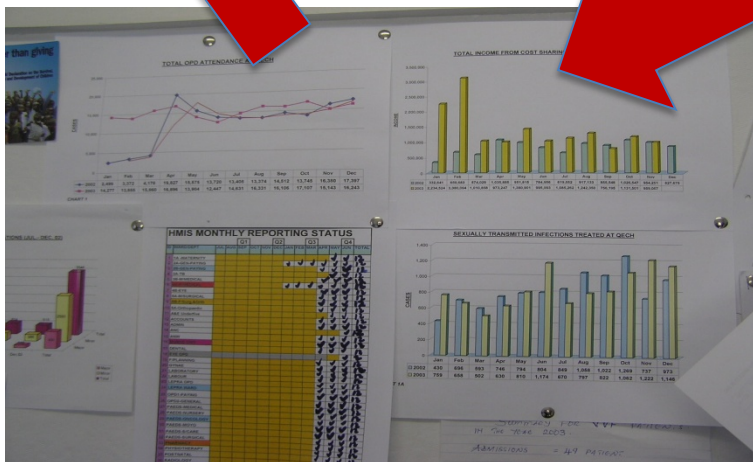
- Why?
- How to?



'When, What, Where': Basis for DHIS2 data model



Data collection, analysis, action



MINISTRY OF HEALTH AND SOCIAL WELFARE
ZANZIBAR

REPRODUCTIVE AND CHILD HEALTH SERVICES

Name of Health Facility CH. MASINGINIDistrict: NORTH A.Month: MAYNo. of Working Days: 26

Family Planning Services

Method	No. of New Clients		No. of Continuing Users		No. of new clients	1 term dispensed
	15-24 yrs	≥ 24 yrs	15-24 yrs	≥ 24 yrs		
Oral Pills	0	0	0	3	No. of Continuing User	18
Injection	0	0	1	13		
IUCD	0	0	0	0	No. of CBDs	0
Norplant	0	0	0	0		
Tubal Ligation	0	0	0	0	No. of Clients served by CBSs	0
Condoms	0	0	0	0		
Other Methods	0	0	0	0		0

Pregnant Mothers Attendance

No. of First Visits	Prime Gravida	Multi Gravida
Before 20 weeks	1	5
After 20 weeks	0	7
Total First Visits	1	12
	Prime Gravida	Multi Gravida
Re-attendance	5	23
Intermittent Presumptive Treatment (IPT)		
IPT at 20 - 28 weeks		14
IPT at 30 - 36 weeks		14

No. of Mothers at Risk

Problem	Total	Referred
EPH Gestosis / Pre-Eclampsia	0	0
Anemia	0	0
Malaria	0	0
Syphilis	0	0
Pregnancy below 18 years	0	0
Pregnancy above 35 years	2	0
Pregnancy ≥ 4 gravida	5	0
Pregnancy before 3 years	7	0

Daily Delivery Services

No. of Deliveries	Prime	Multi	Total	No. of Live Births	
Attended by Skilled Personnel	0	0	0		3
Attended by TBA	1	2	3		0
				No. of Still Birth Fresh	0
				No. of Still Births Macerated	0
				No. Weighed ≤ 2500gms	0

Infant / Maternal Deaths

No. of Maternal Deaths	No. of Children died	1 - 28 days	1 - 11 Months	1 - 5 Years
		0	0	0

Postnatal Services

No. of Mothers attending Postnatal care	7 th Day	14 th Day	28 th Day	42 nd day
	6	2	1	0

Growth Assessment / Nutritional Status for Children under 5 years

Age (Month)	Total Attendance (Male)		146		Total Attendance (Female)		136	
	Green		Grey		Red			
	Male	Female	Male	Female	Male	Female		
0 - 11	52	48	16	12	0	0		
12 - 23	32	32	7	6	0	0		
24 - 35	24	20	2	6	0	0		
36 - 60	9	10	2	2	0	0		
Total	117	110	29	26	0	0		

Name of Service Provider: K. MachamDesignation: PHNISSignature: [Signature]Date: 21/5/07

1985 EYOKWINDLA/MARCH

No	Age	Sex	Name	Address	Treatment	Outcome
1	79	F	Holomise	12 TUESDAY	BCG	Burqa
2	19	M	Belangene	...	...	...
3	14	M	Maknai	...	...	...
4	14	M	Maknai	...	...	...
5	9	M	Mabandu	...	...	...
6	14	F	Bawa	...	...	...
7	4	M	Baala	...	...	...
8	1/2	M	Ameliga	...	...	...
9	7	M	Mhlaniso	...	...	...

14-05-04

F	16	M	Mhlanga	...	Mucos 2 DPT	Khulu
F	12	F	Suzo	...	...	...
F	12	F	Enile	...	...	...

Record of patients seen

DORA NGINZA HOSPITAL STATISTICS

DEPARTMENT: BURNS WARD: BURNS C-2-3

MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
PATIENTS	1	2	4	5	10	11	12	11	12	11	12	12	124
ADMISSIONS	1	2	4	5	10	11	12	11	12	11	12	12	124
TRANSFERS IN	-	-	-	-	-	-	-	-	-	-	-	-	0
TRANSFERS OUT	-	-	-	-	-	-	-	-	-	-	-	-	0
DEATHS	-	-	-	-	-	-	-	-	-	-	-	-	0
PAT DEATHS	1	1	1	1	1	1	1	1	1	1	1	1	12

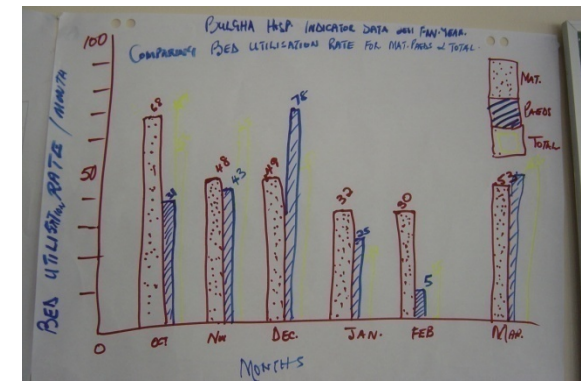
EXTENT OF BURNS ON ADMISSION

PERCENTAGE	31-30	31-40	41-50	51-60	61-70	71-80	TOTAL
PATIENTS	3	27	10	1	5	22	68

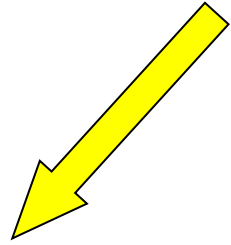
STAFF STRUCTURE

CLASS	DAY	NIGHT	OFF	SICK
DOC	1	1	2	-
SPN	1	1	1	-
PHN	1	1	1	-
SEN	1	1	1	-
SEN	1	1	1	-
ENH	1	1	1	-
ENH	1	1	1	-

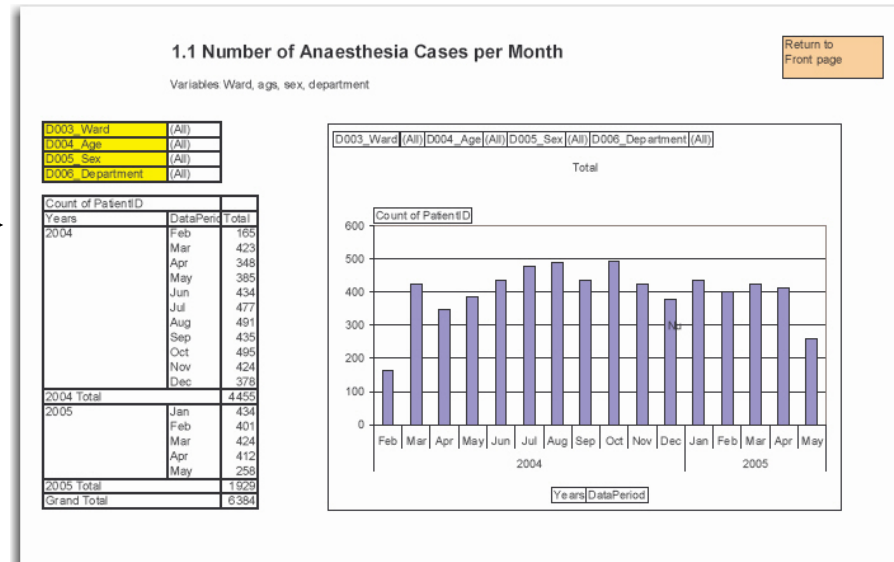
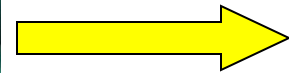
Summary of key information



Data analysis and use



Data entry into database



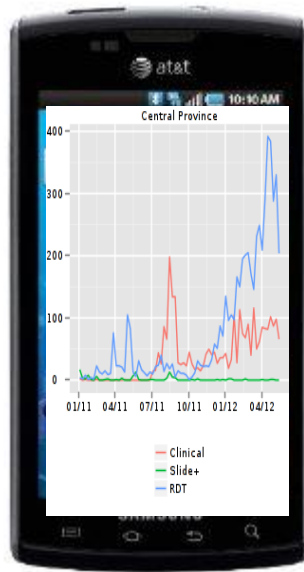
All devices integrated in



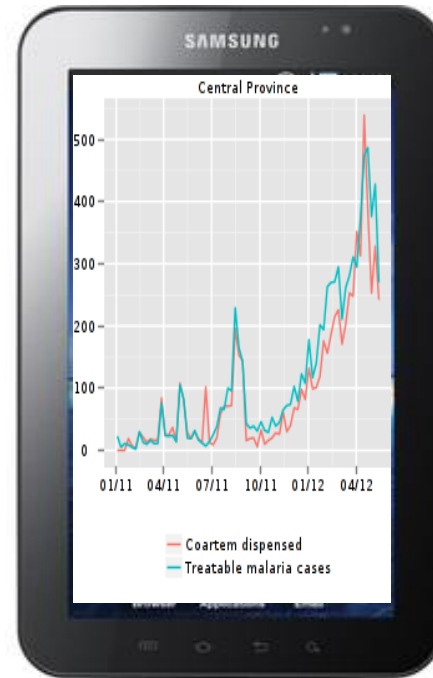
SMS

A screenshot of a web browser interface on a small screen. The title is "16-24 months after birth". It contains several form fields: "Child hospitalized due" with a "Select Option" dropdown, "DPT Booster [yyyy-MM-dd]", "OPV Booster [yyyy-MM-dd]", "Weight [kg] (grm)", and "MMR Vaccine [yyyy-MM-dd]". A large orange diagonal stamp with the text "More flexible" is overlaid on the form.

Lightweight
Browser



Android app
or browser



Tablet



PC/laptop



Information use cycle

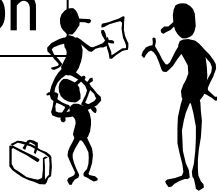
Data Collection/ data generation

- Paper based tools / registers
- Aggregate data
- Individual data - transactions



Use of Information

- Regular review of data
- Planning & Budgeting
- Monitor service coverage & quality



Processing

- Collation – generate aggregates
- Data quality checks
- Data validation



Interpretation

- Making sense of information
- Possible interpretation
- Explore



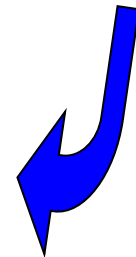
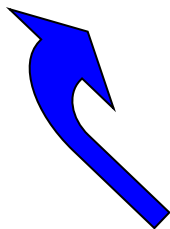
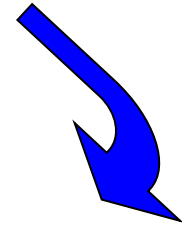
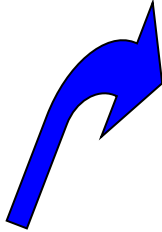
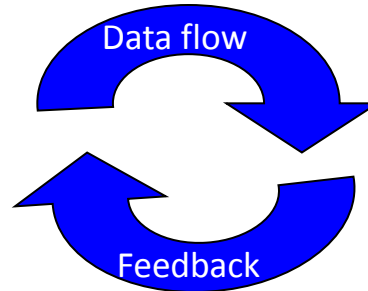
Presentation

- Dashboards
- Feedback mechanisms
- Format of tables, graphs & reports



Analysis

- Indicators
- Timelines

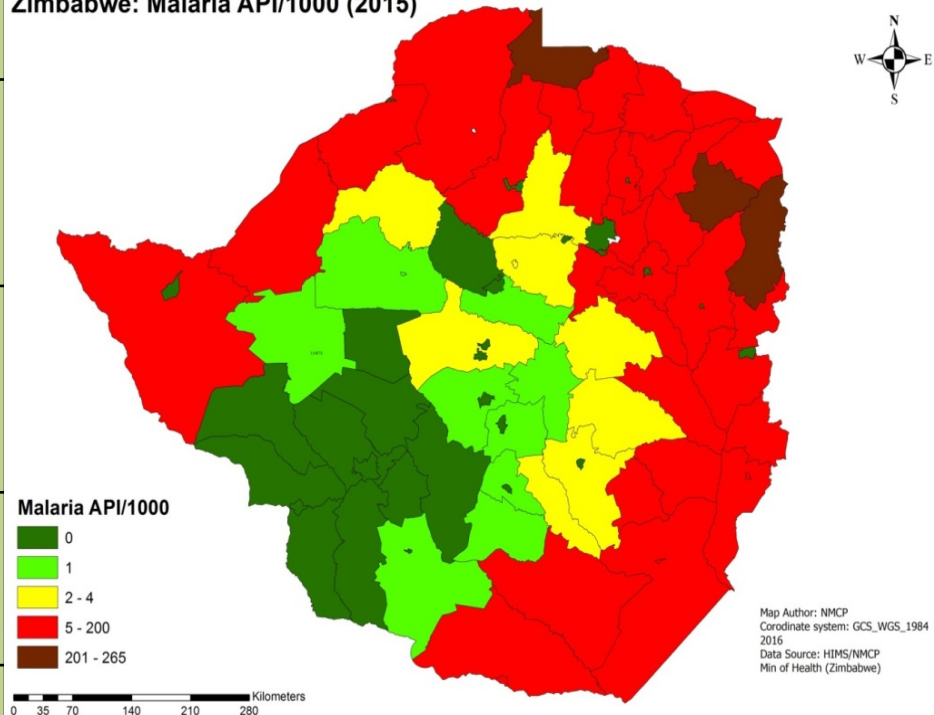


Example: Malaria in Zimbabwe

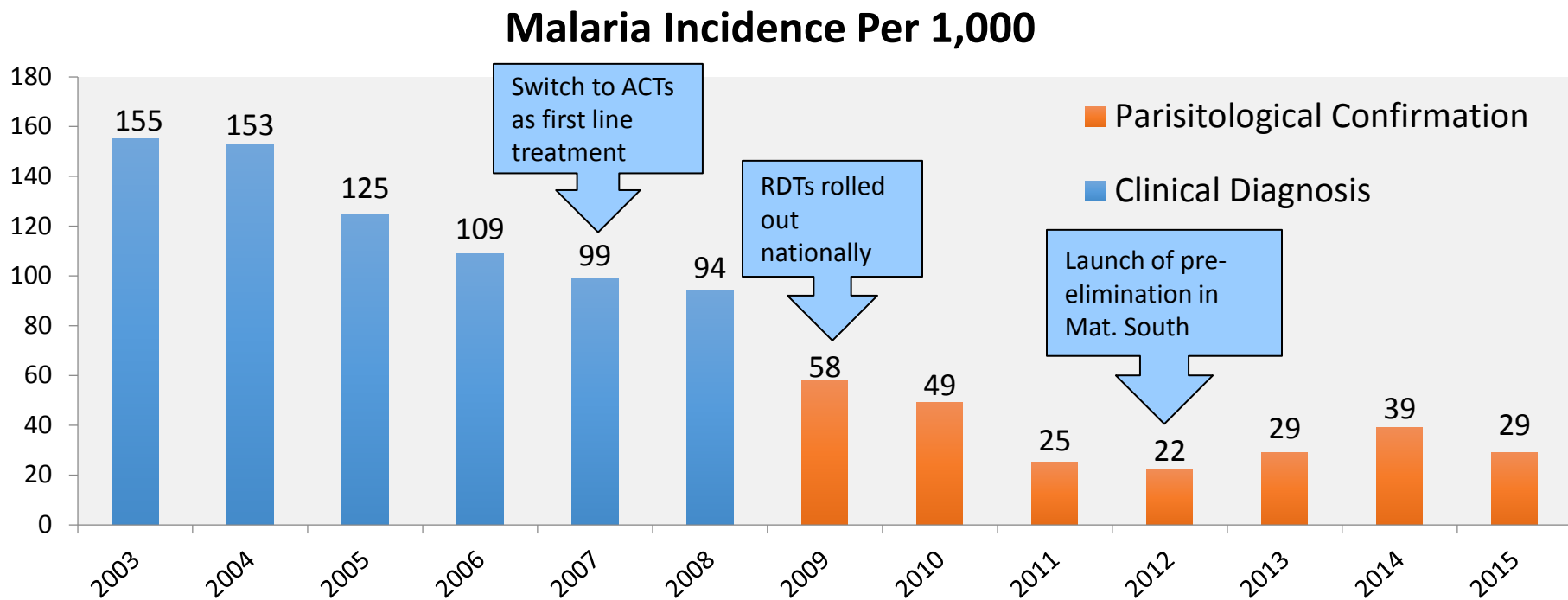
- elimination: case by case
- Start where case load is low

Total population (2012 Census)	13.1 million (1.1% growth rate)
Total confirmed malaria cases (2015)	300,733
Total confirmed malaria deaths (2015)	473
Main parasite	Plasmodium falciparum (98% of all cases)
Main vectors	<i>An. Arabiensis</i> ; <i>An. funestus</i>

Zimbabwe: Malaria API/1000 (2015)



Temporal progression of malaria incidence in Zimbabwe



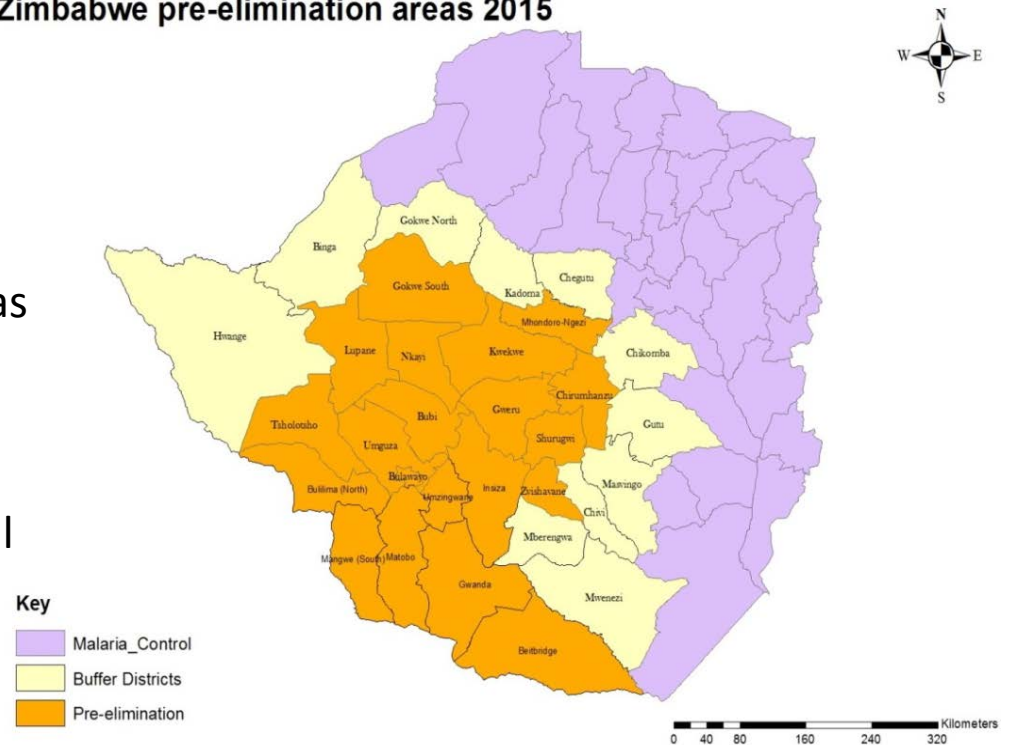
Malaria Pre-Elimination Context

20 Districts have been selected for elimination

10 Districts have been designated as buffer zones between elimination and control

The remainder of the country is still under control status

Zimbabwe pre-elimination areas 2015



From Paper to DHIS2 Android in elimination areas

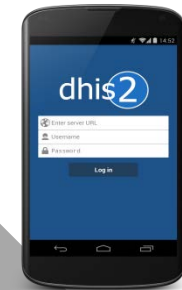
Malaria Case Investigation Form

MINISTRY OF HEALTH AND CHILD WELFARE
NATIONAL MALARIA CONTROL PROGRAMME

Province: _____ Province Code: _____ District: _____ District Code: _____ Case Investigation Date: _____
Name of facility: _____ Facility No.: _____ GPS of Facility: Latitude: _____ Longitude: _____
Hospital No: _____ Notification No: _____

First Name: _____ Surname: _____
Age: _____ Date of Birth: _____ Male Female: _____ Pregnant? Yes/No
National ID/Passport/Driver's License No: _____
Physical Address: _____
Ward: _____ City/Town/Village: _____
Head of household name: _____ Contact telephone/mobile number (Area: _____)
GPS coordinates at home: Latitude: _____ Longitude: _____

MPE 02



2012

Paper-based surveillance
(7 Districts)

2014

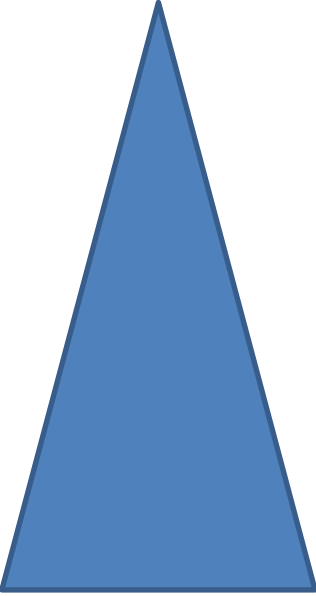
1st transition to electronic system
(7 Districts)

2016

DHIS2 Tracker rollout
(20 Districts – 4 provinces; 288 users)

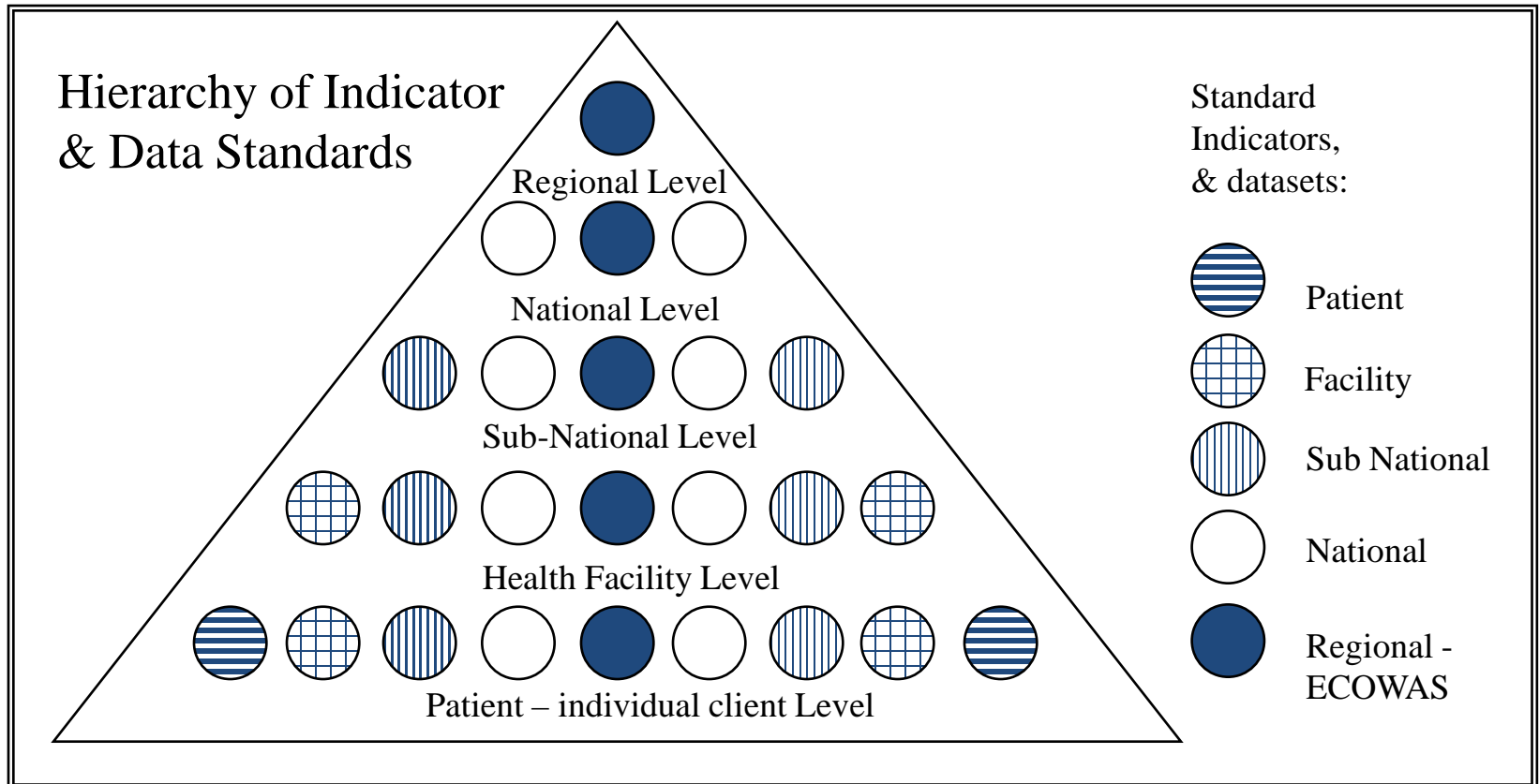
Different levels of the health system

– different needs for information

Level of health system	Quantity of data Data granularity	Information needs
Global/Region	 <p>Less data</p>	Summary indicators General, e.g. MDG
Countries/ Health Programs		Indicators National /program
District		Indicators district management
Facility		Facility management
Patient		Patient records, tracking & care
		More data

Hierarchy of data standards:

- Balancing national need for **standards** with local need for **flexibility** to include additional data & indicators
- All levels – province, district, facility – can define their own standards as long as they adhere to the standards of the level above

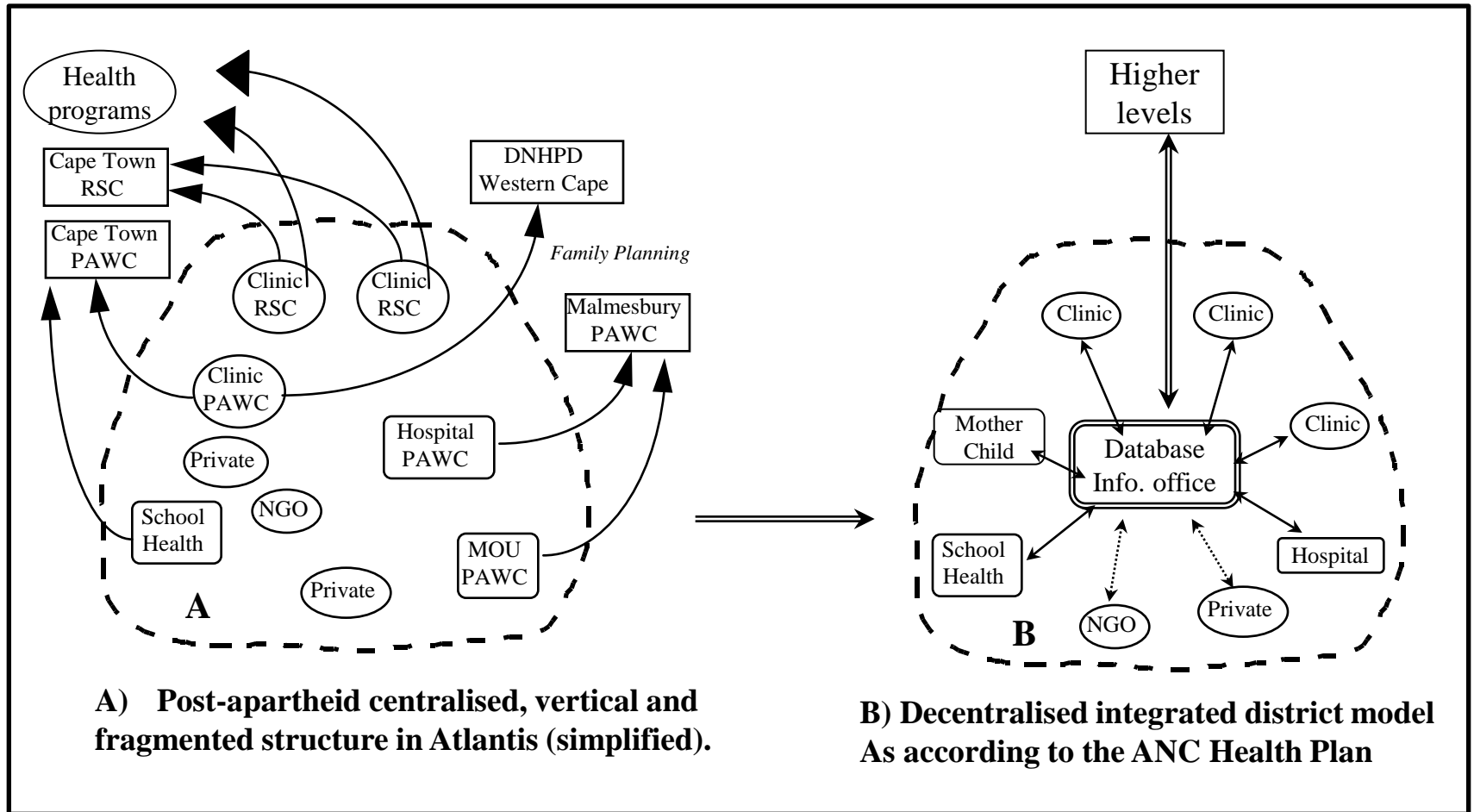


Motivation for ‘Standardisation’ & integration: South Africa 1994 /95 – Problems & challenges:

- **Inequity** between blacks & whites, rural & urban, urban & “peri-urban”, former “homelands”, etc.
- **“Equity” main target**
 - Need data to know whether targets are achieved
- **Need standard data from across the country on**
 - Health status & Health services provision
- **Problem:** No coordinated data system – no standards
- HISP key actor in developing the new unified Health Information System in South Africa

Example South Africa, Atlantis District 1994:

First Architecture approach: From fragmentation to integration;



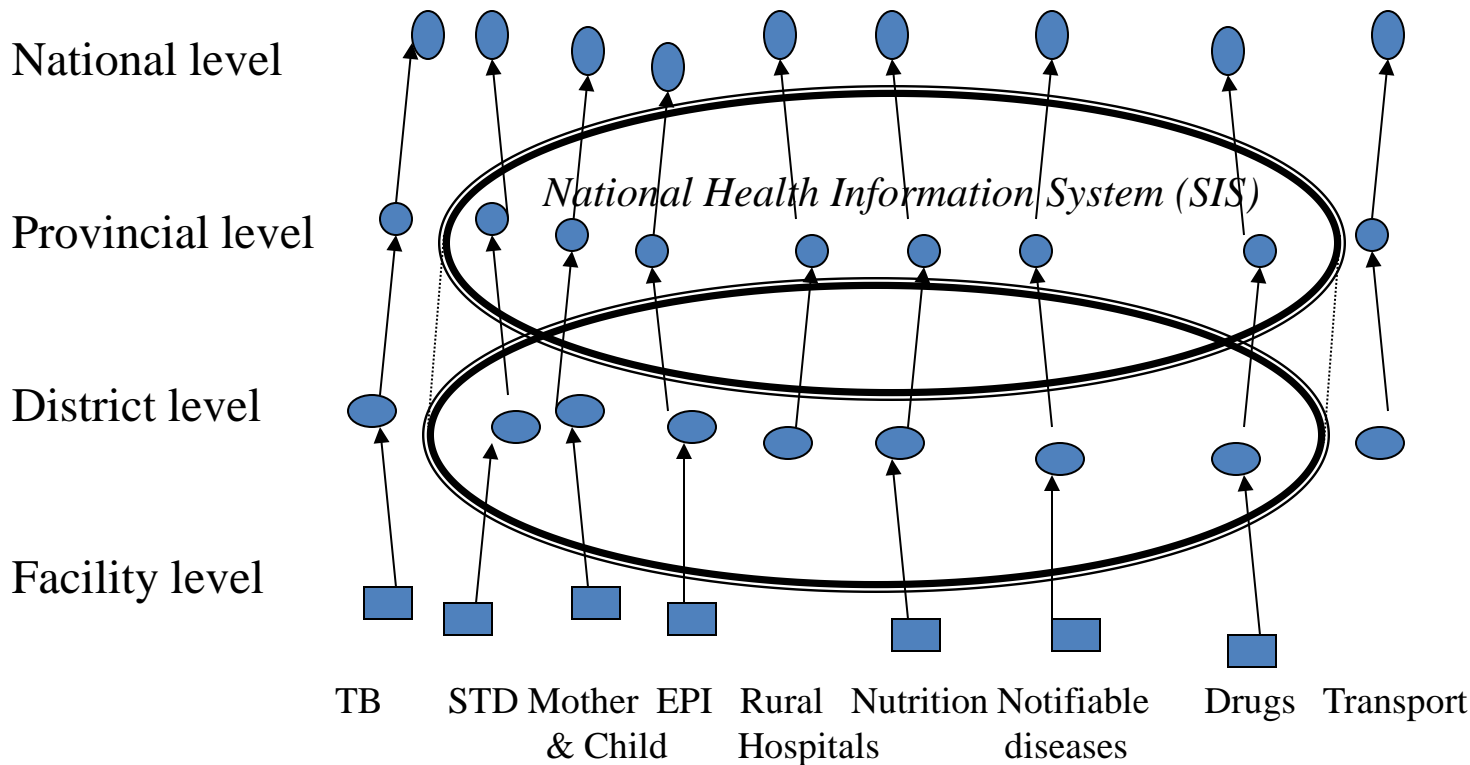
Intergation: Still the same challenge !!

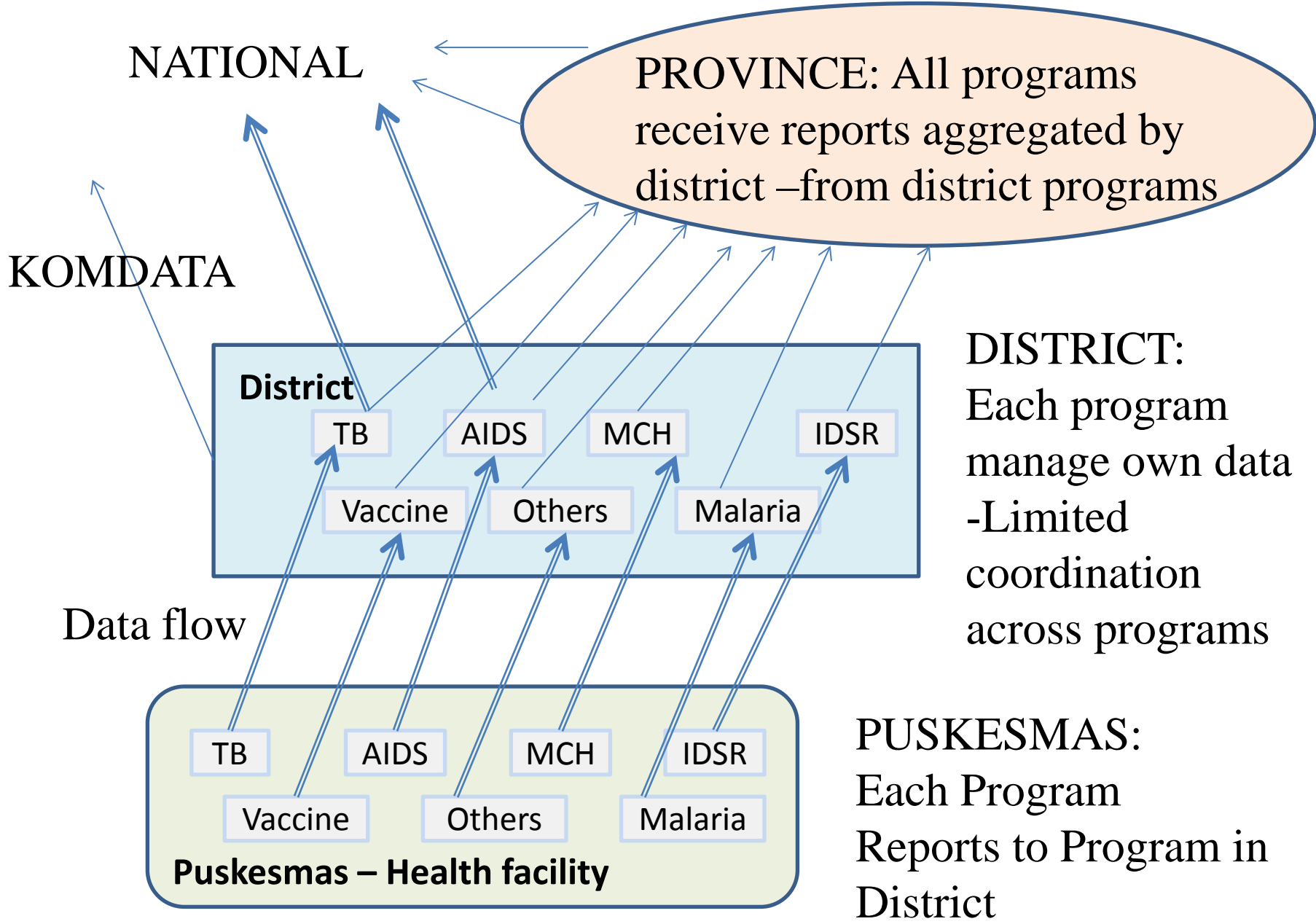
Silo systems & Information flows within various structures & health programs

Health Information Infrastructure



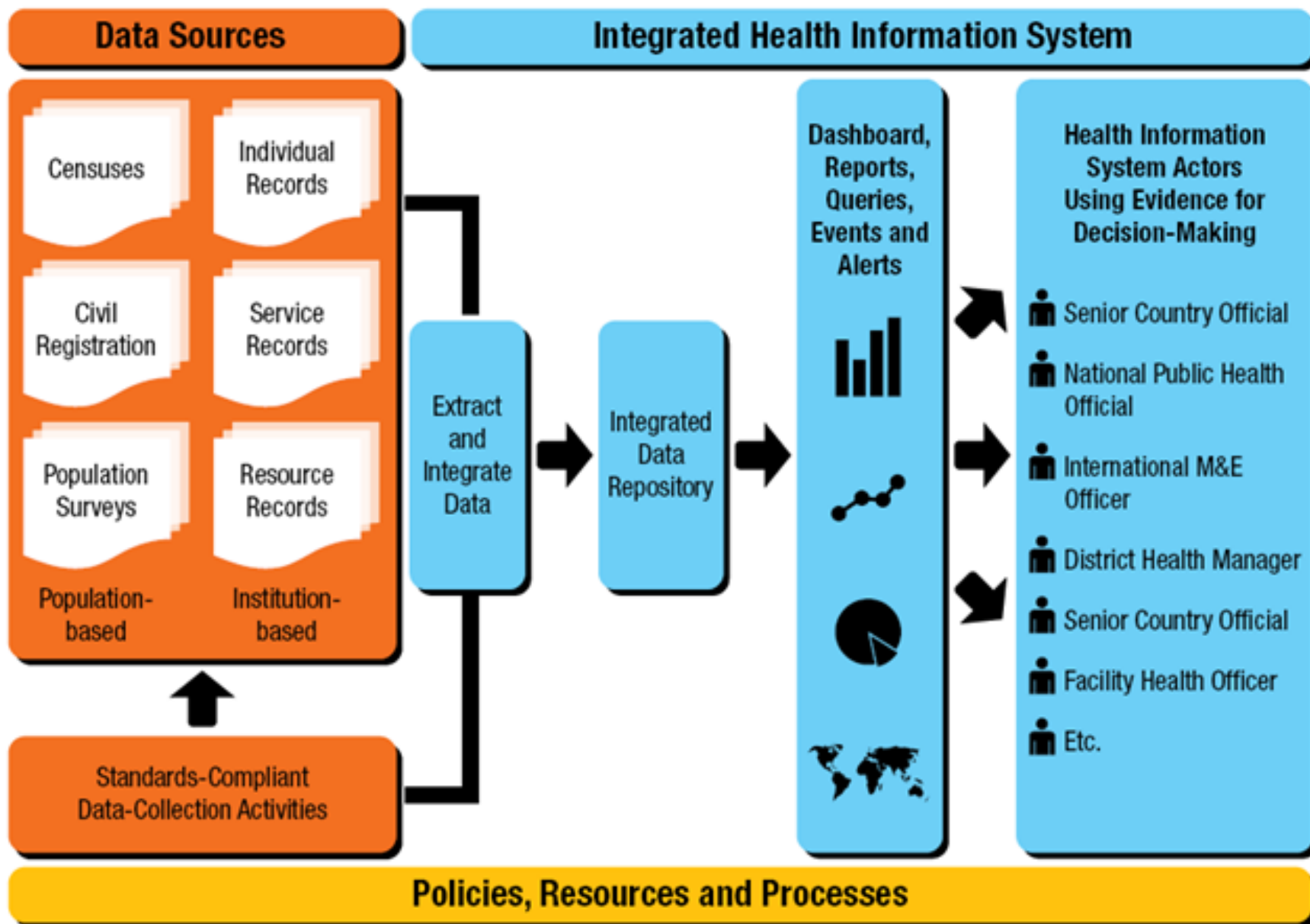
flow of information reflection & mapping of the health sector
- institutions, services, health programs
Vertical - centralist - top-down -structure



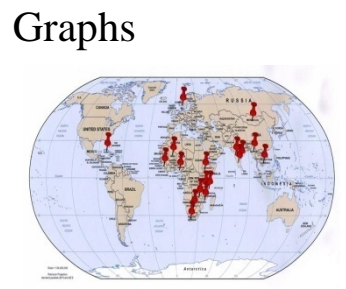
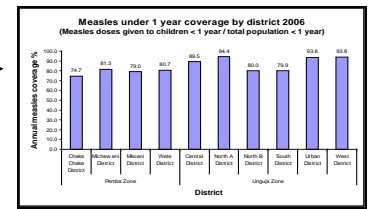
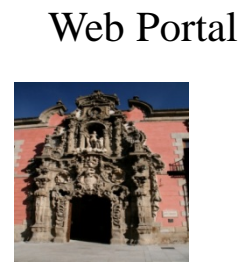
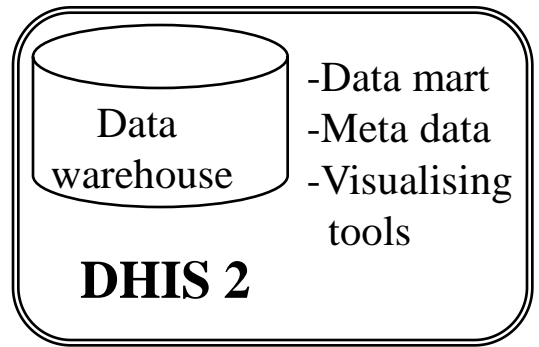
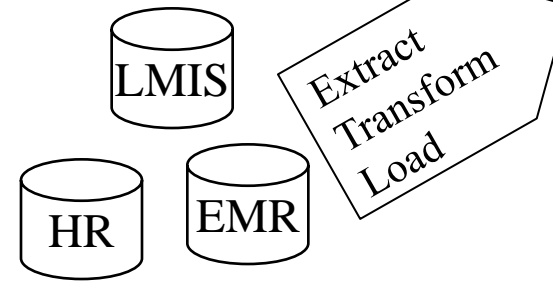
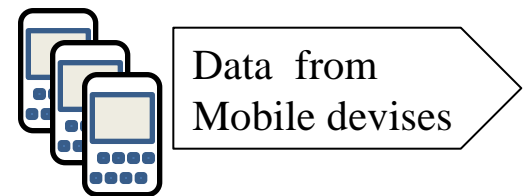
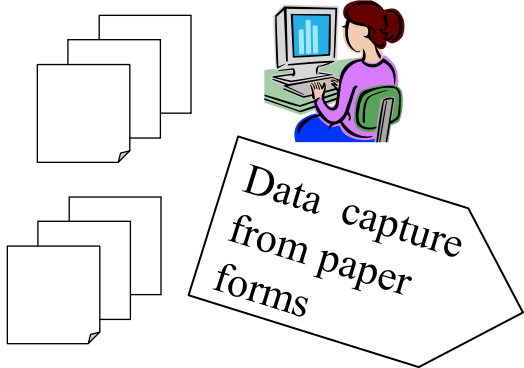
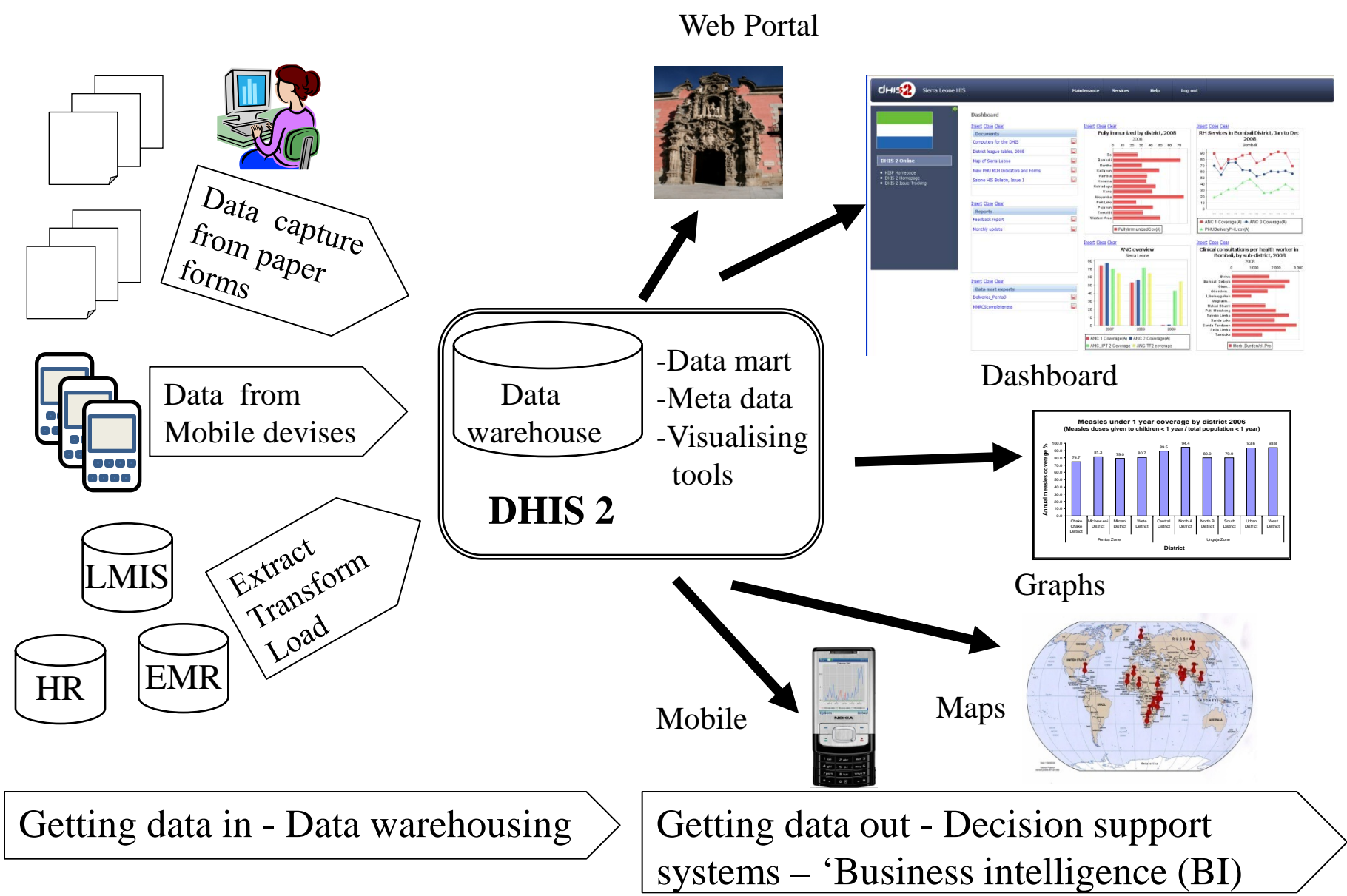


INDONESIA – DATA FLOW

HMN architecture (2007) – Integrated National data warehouse:



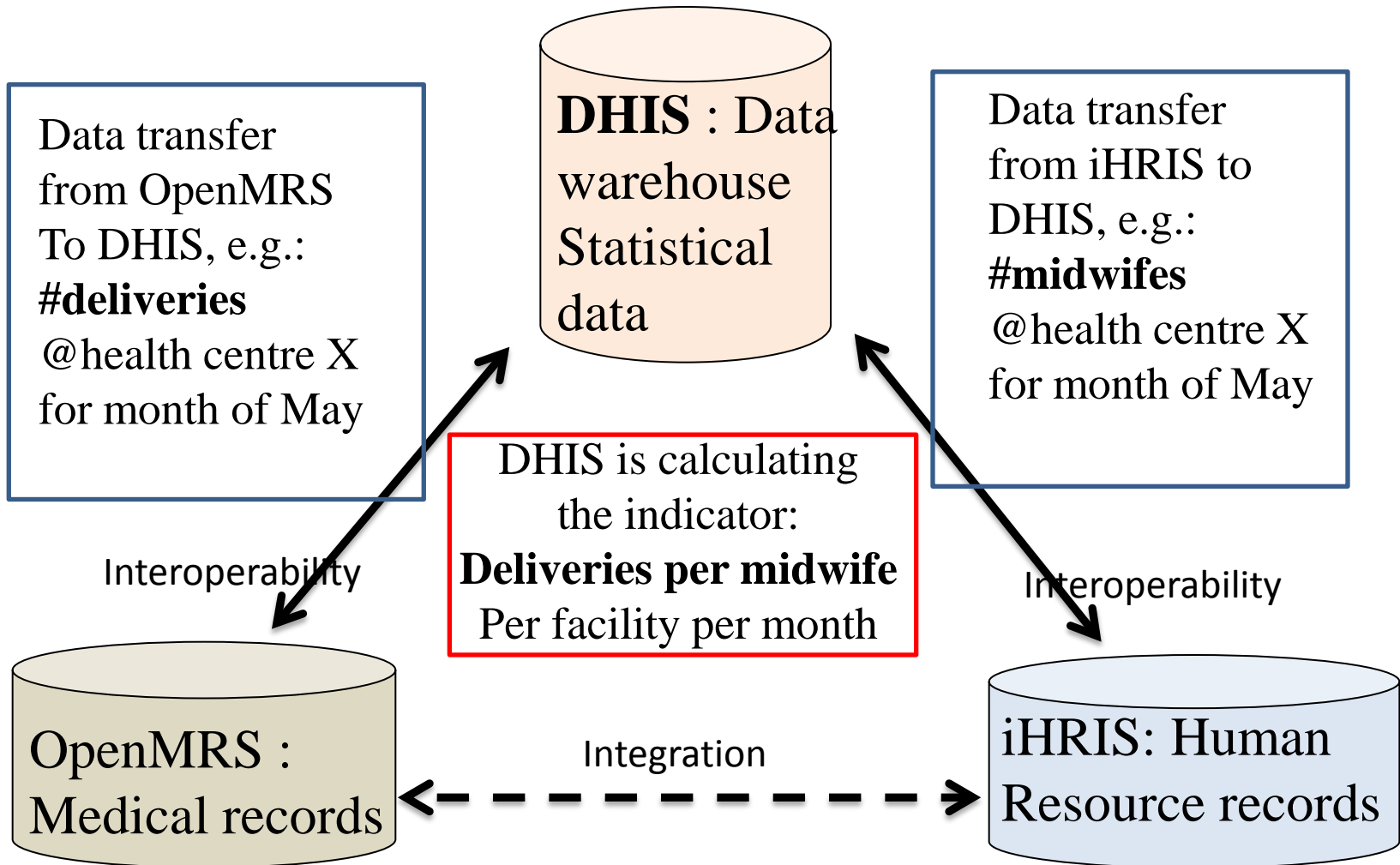
DHIS2 Country platform: Integrating health programs & data sources



Getting data in - Data warehousing

Getting data out - Decision support systems – ‘Business intelligence (BI)’

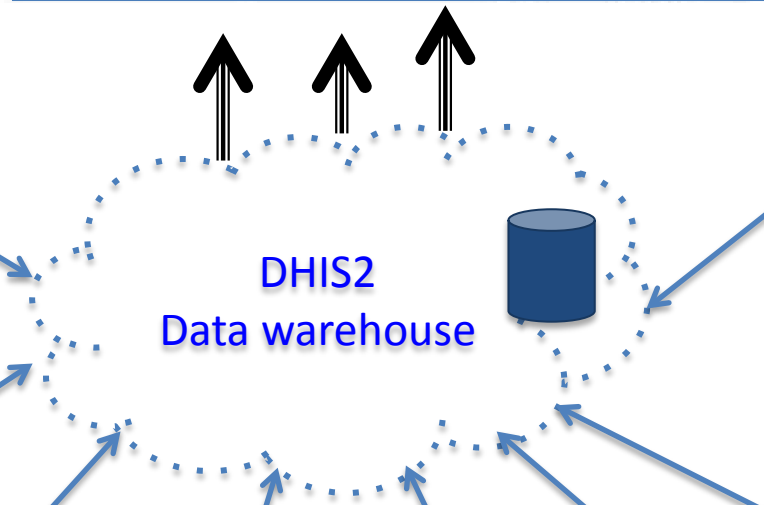
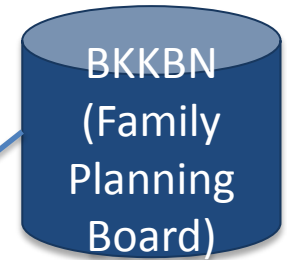
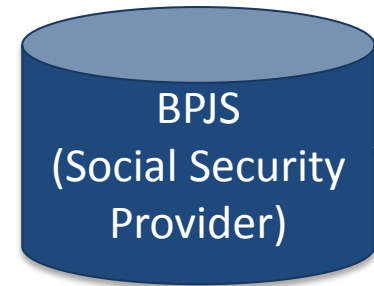
Integration and interoperability



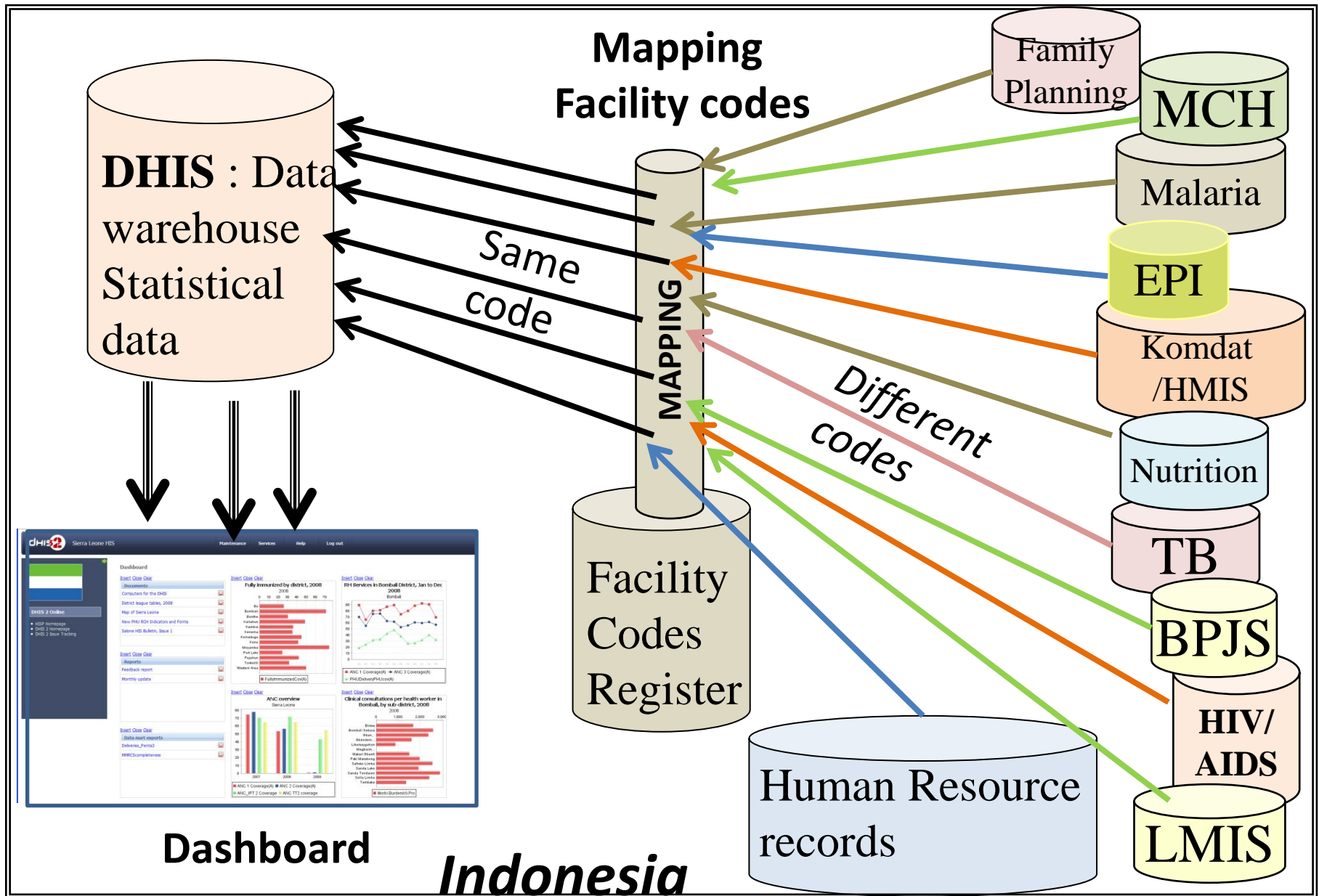
Indonesia Data Warehouse & Dashboard

*National level:
Electronic data
sources*

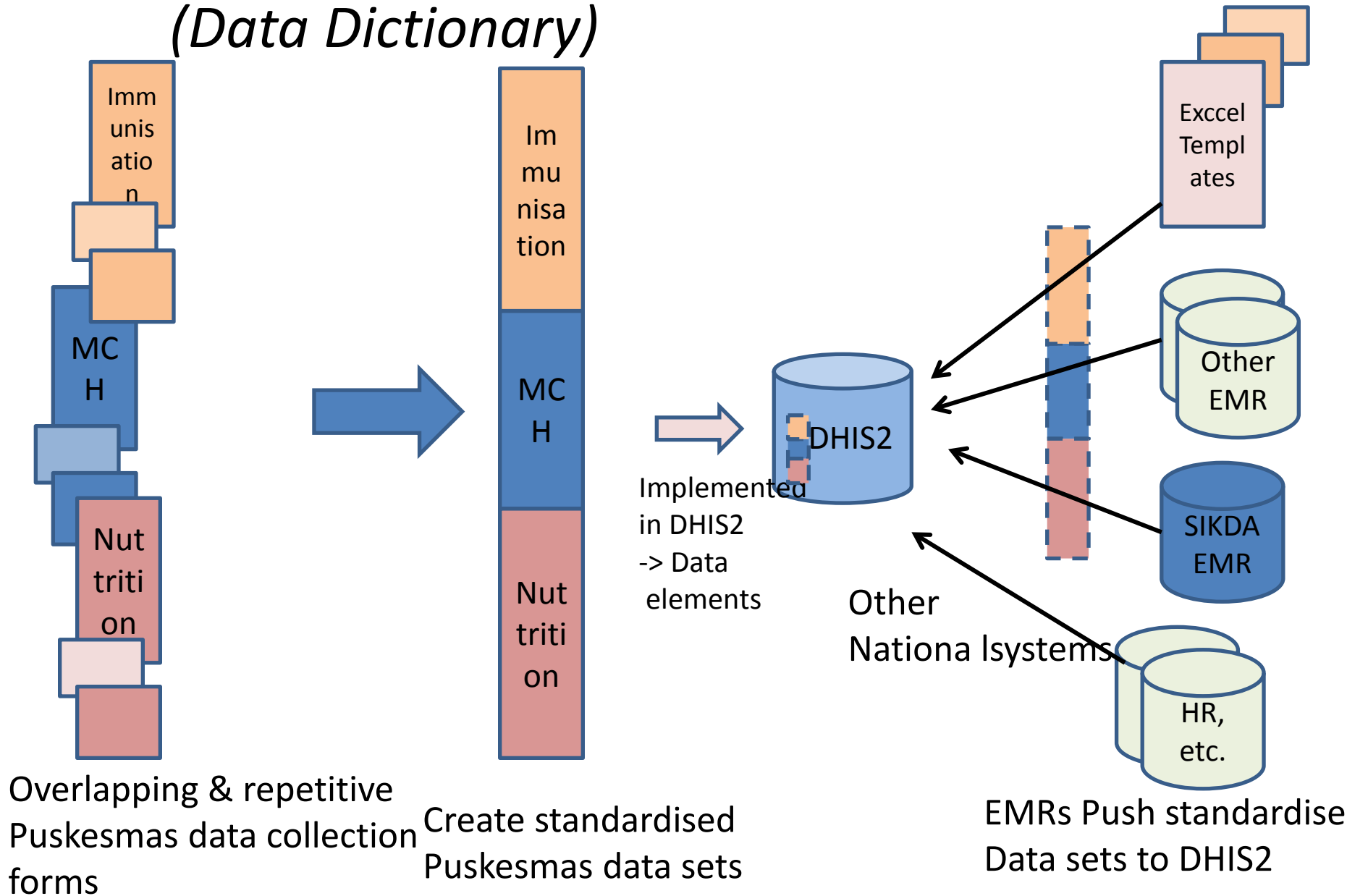
Dashboard



Shared Facility codes ↔ Integrating data sources

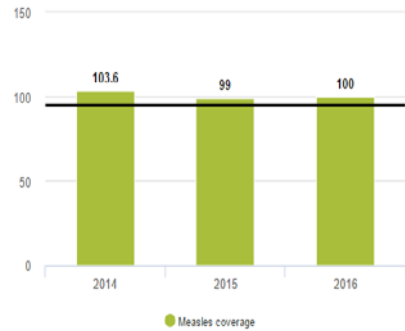


Standardised data sets: Key to Integration (Data Dictionary)

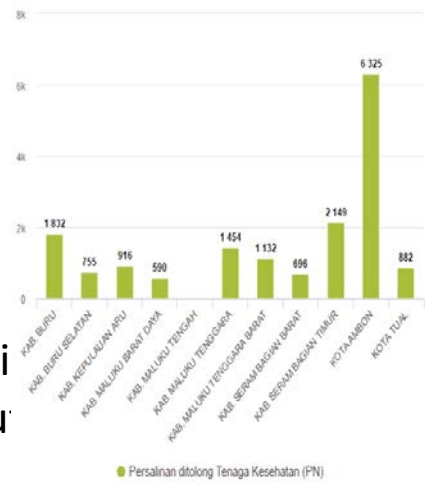


Data Integration, visualization and dissemination at district level

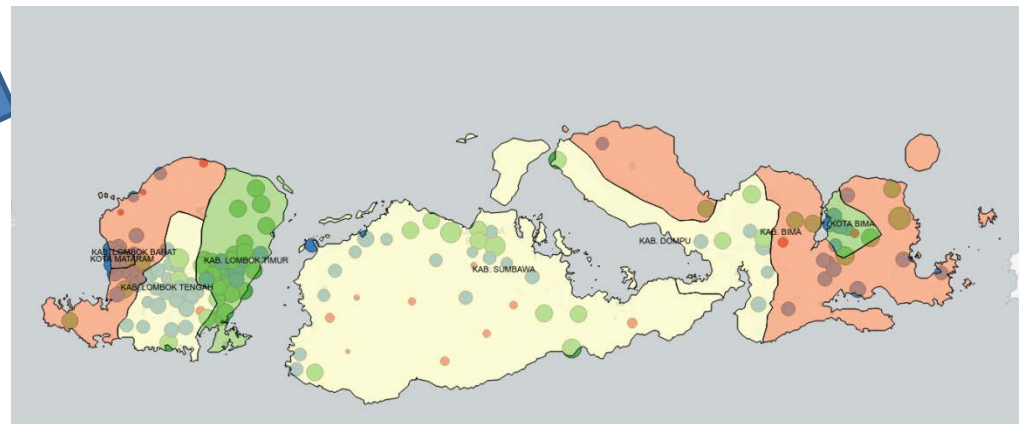
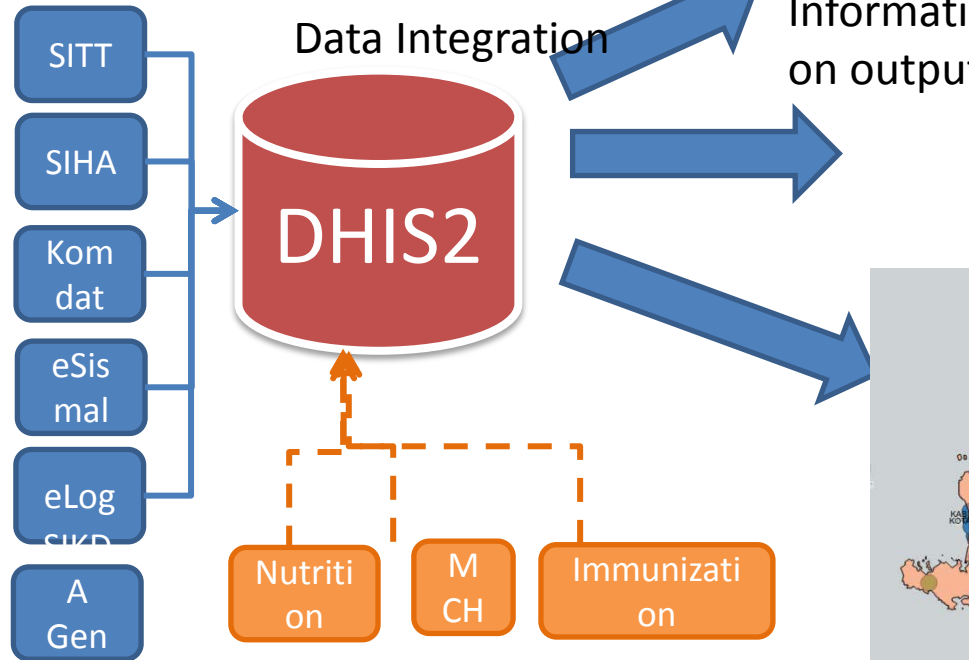
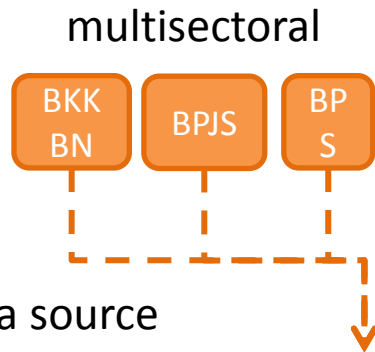
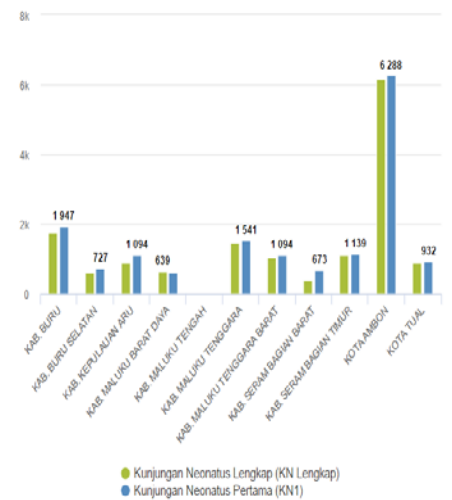
Cakupan Pemberian Imunisasi Campak pada Balita Tahun 2014 - 2016
KOTA MAKASSAR



Jumlah Persalinan ditolong Nakes Per Kabupaten di Provinsi Maluku Tahun 2016



Grafik Kunjungan KN lengkap dan KN I Per Kabupaten/Kota Provinsi Maluku Tahun 2016

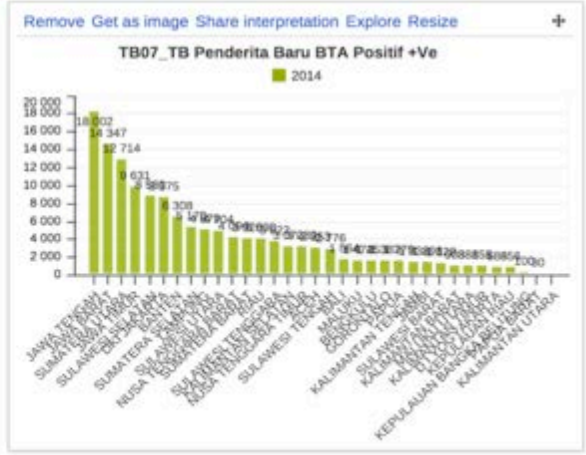
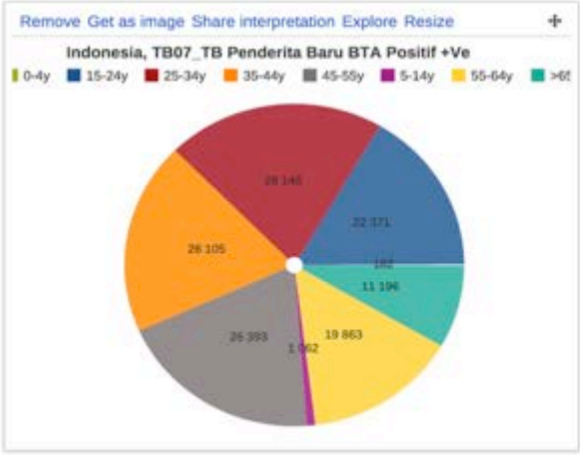
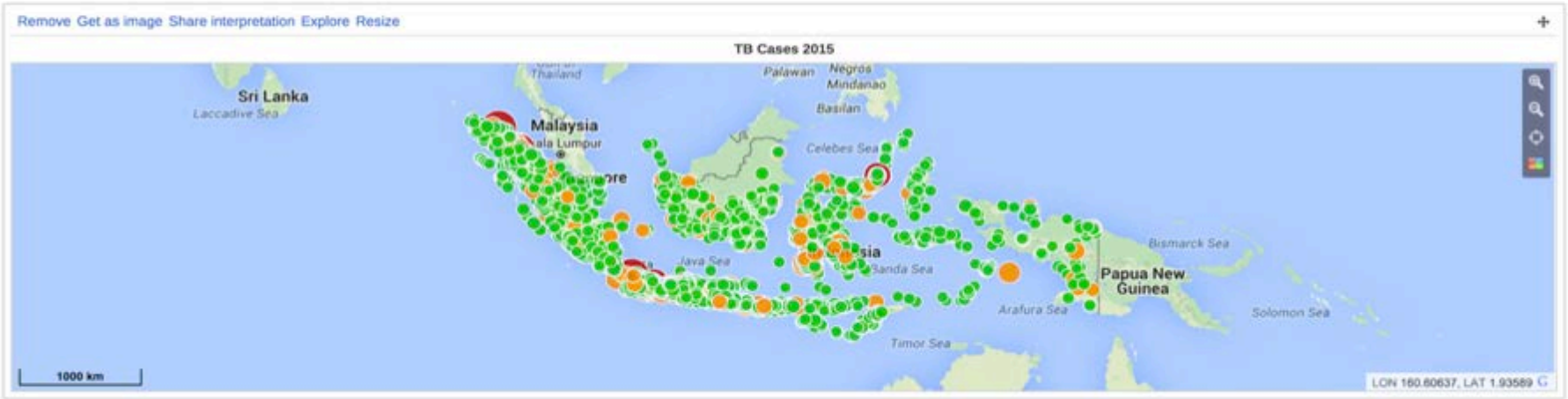


National TB Dashboard

Lewis John (update profile!) • [Write feedback](#) • 4 unread messages • [Share interpretation](#)

Profile Messages Interpretations

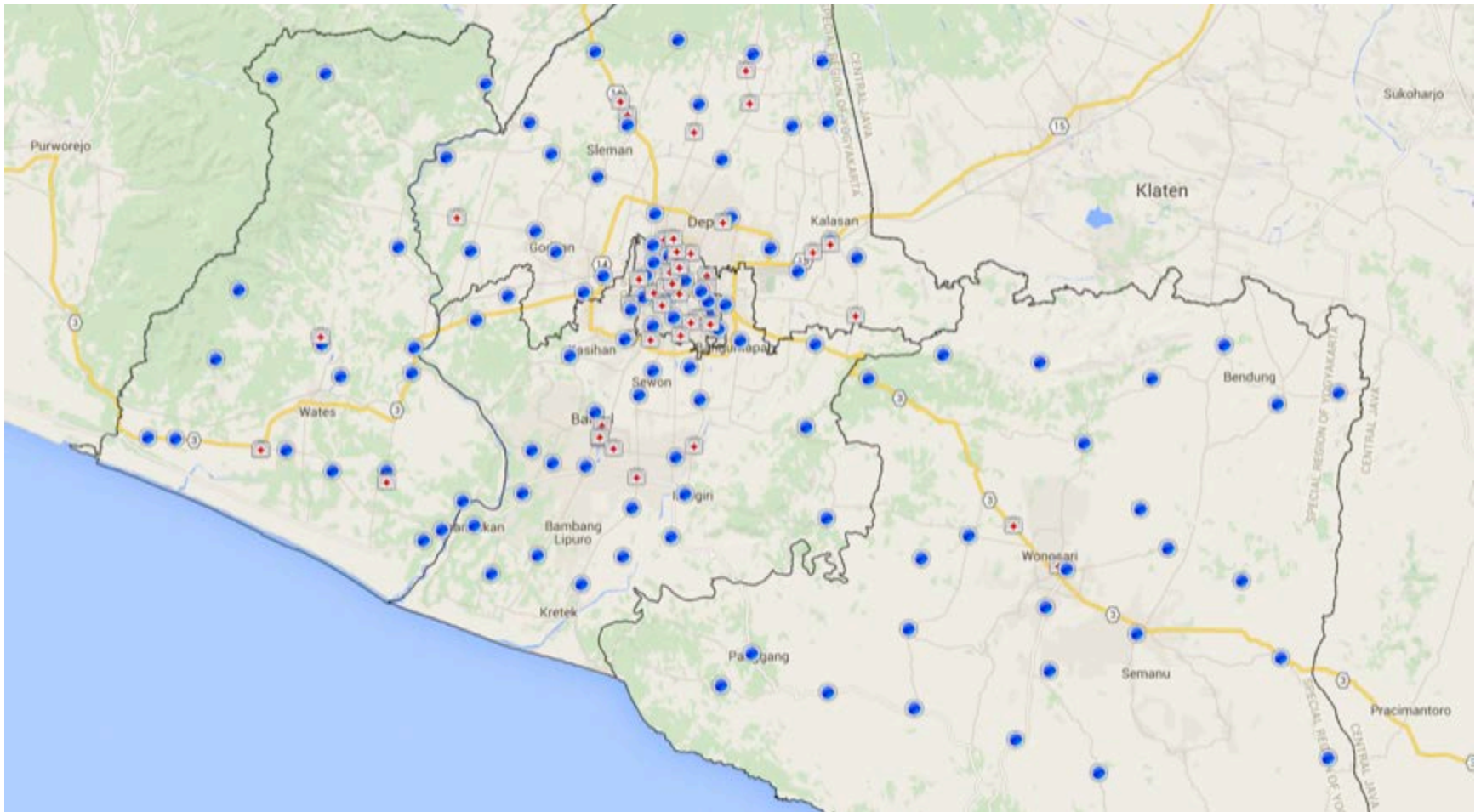
- Add Manage Share < >
1. Integrated Dashboard HTM HIV Malaria TB



Location of Hospital and Health Centres



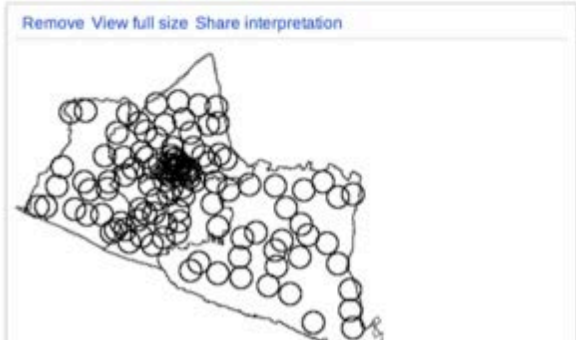
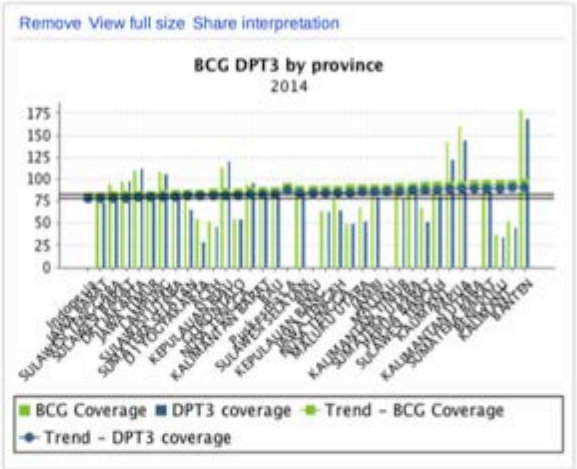
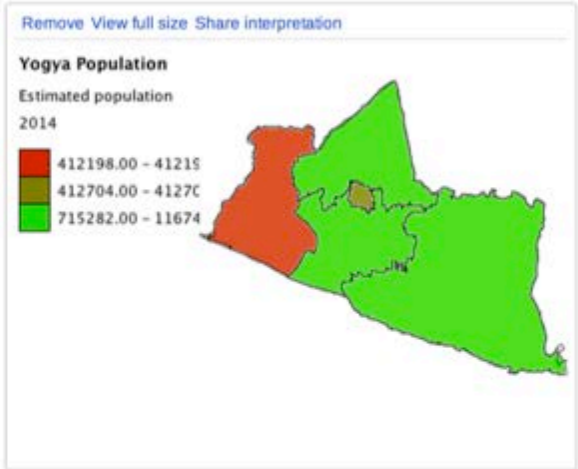
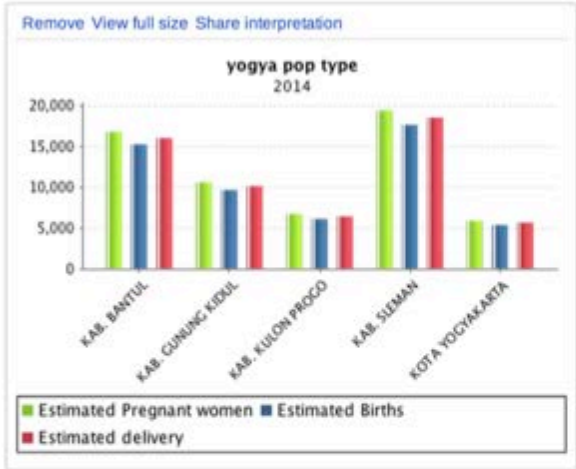
Yogyakarta Hospital and Puskesmas



Yogyakarta Dashboard

Profile Messages Interpretations Groups Search for users, charts, maps, reports and resources Search

Add Manage Share < > East Jawa MCH East JAWA TB test yogya



Challenges interoperability & scale (Indonesia)

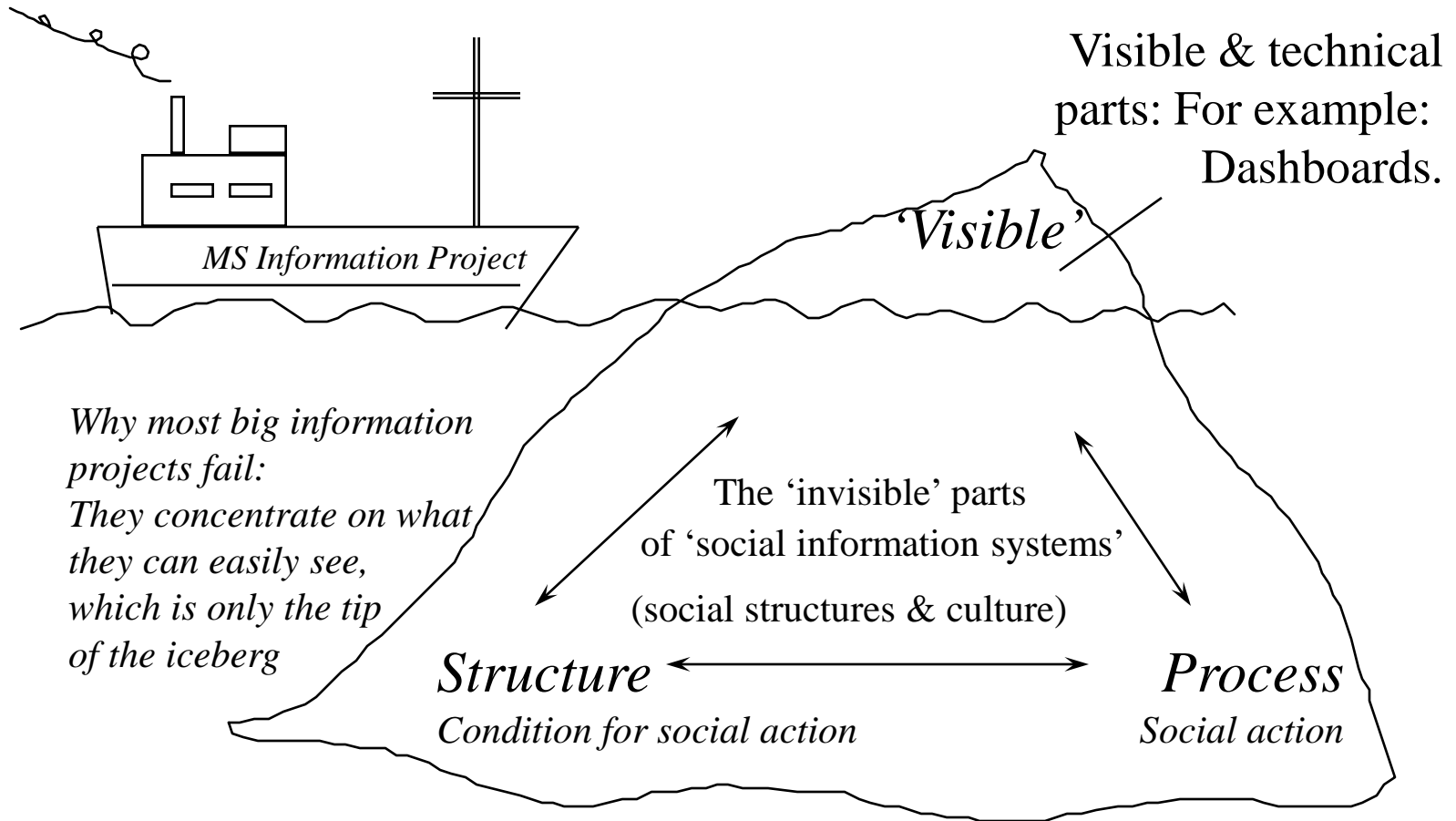
- Organisational politics still the key:
 - access to data - Push data through DHIS2 web api
 - Via event/Tracker -or direct aggregate reports
- Real data update (e.g. national TB system updating records)
- Lot of Excel based system
- Many different & non-standardised database systems at national and sub-national levels

Scale & central data warehouse

- Server management – problem everywhere
- Big data: PEPFAR uses 30 servers - MoHs cannot handle
- Current philosophy: easy download and install – ‘real’ big data will require cloud services & multiple services

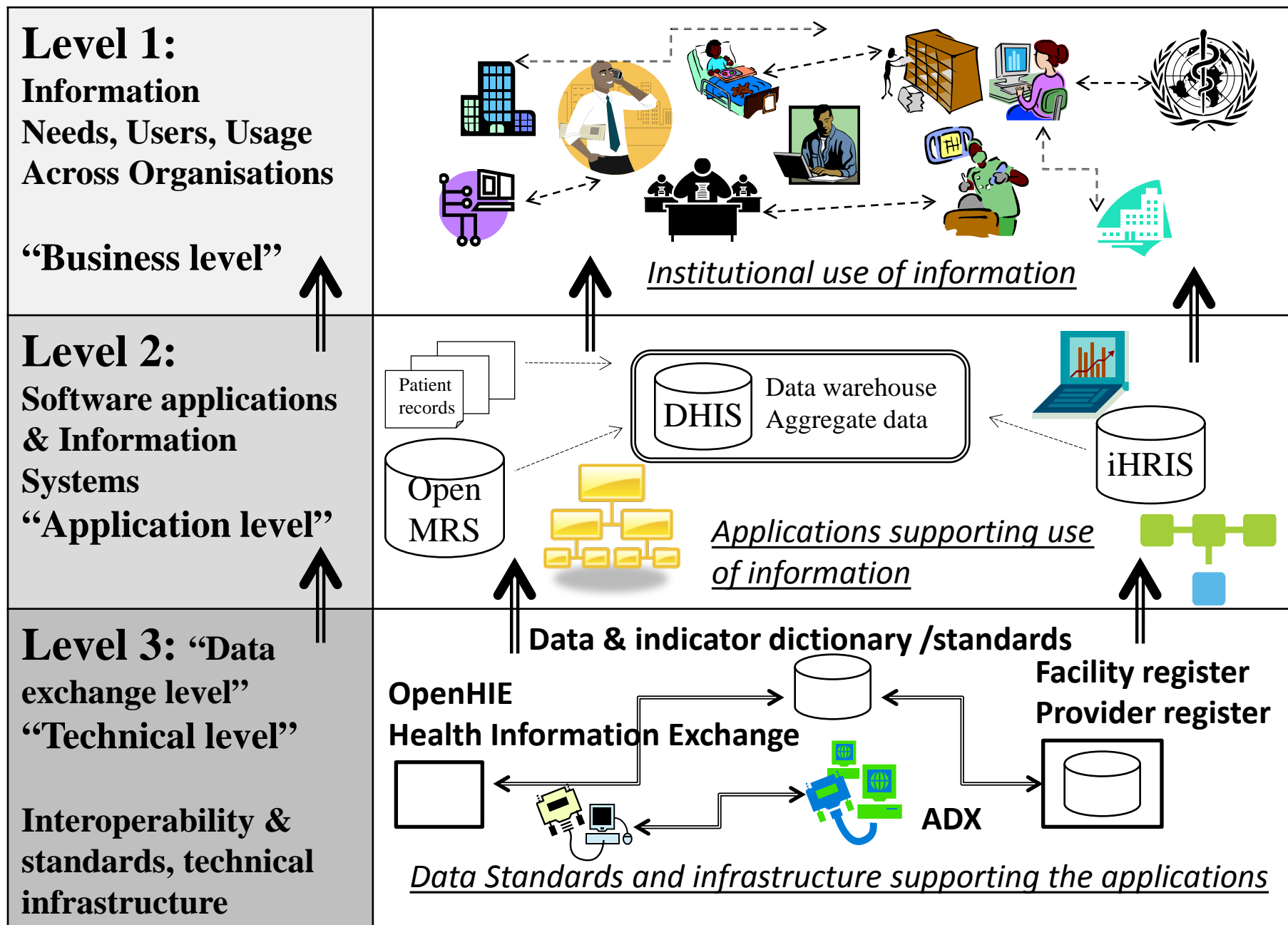
HIS as 'social system' – why things are difficult

The iceberg model



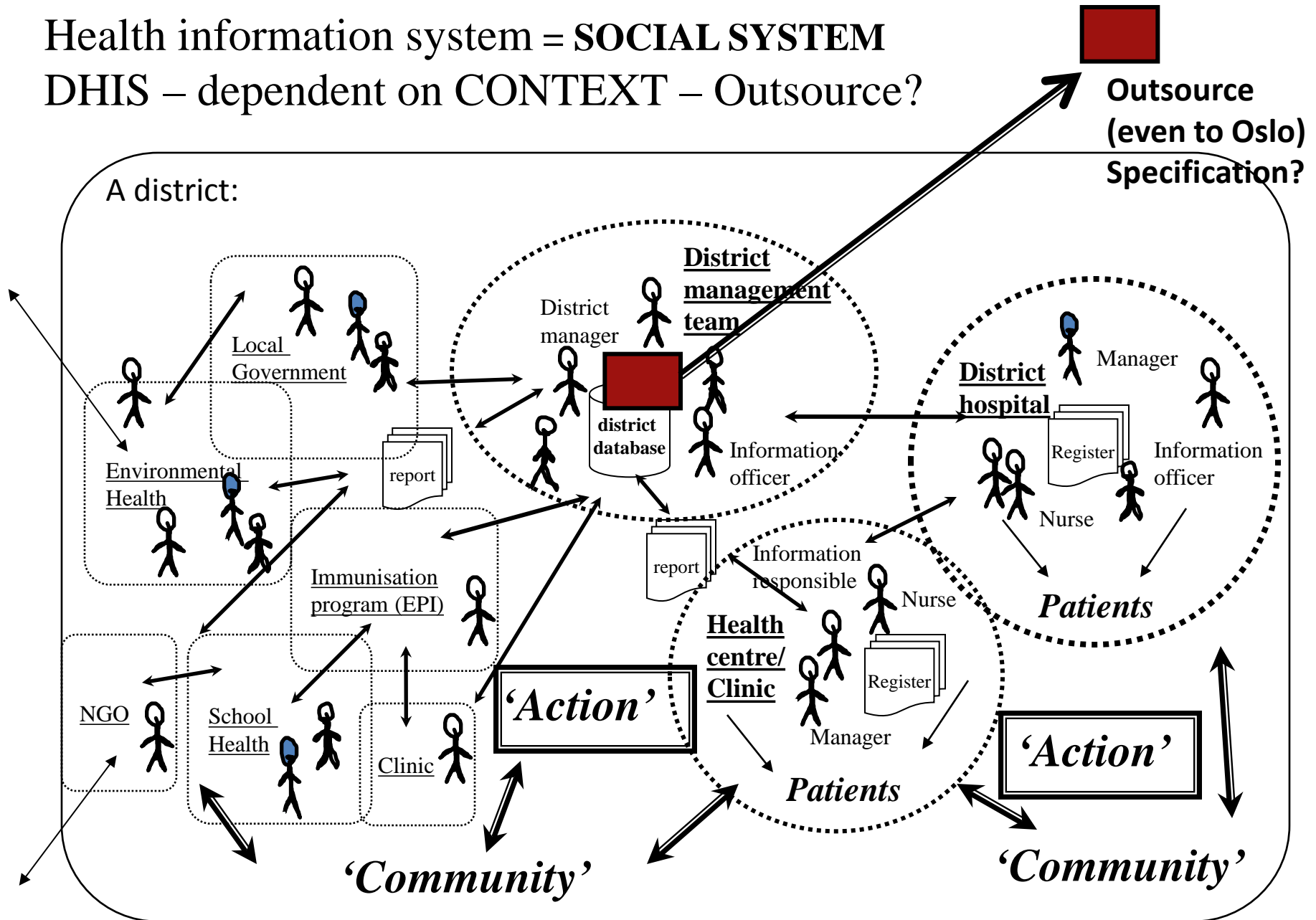
Structure: Real world, social, cultural & institutional context, the information infrastructure and 'installed base'

Enterprise architecture: 3 Levels (each serving the level above)



Health information system = SOCIAL SYSTEM

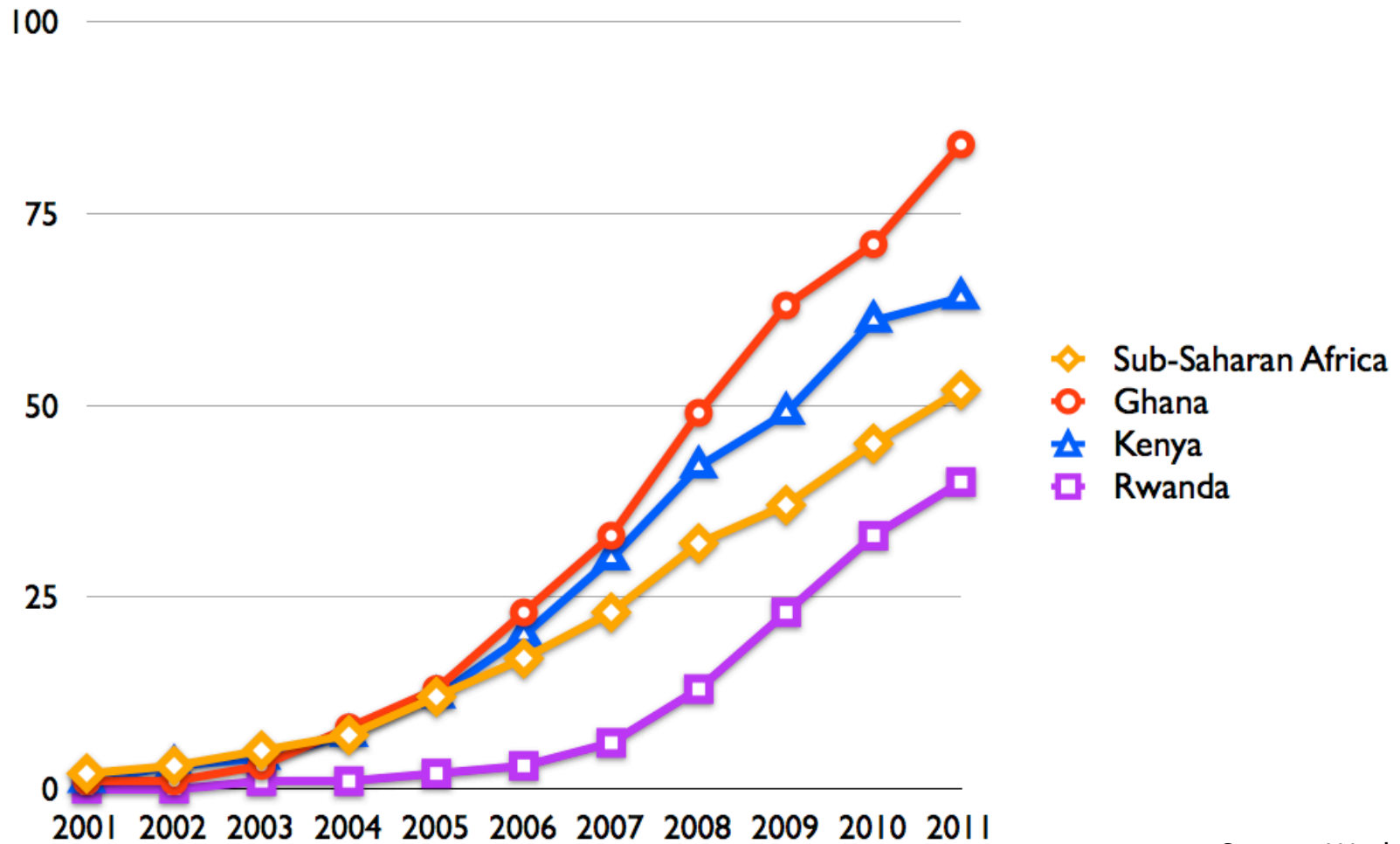
DHIS – dependent on CONTEXT – Outsource?



Development:
Internet Cnnectivity in Africa

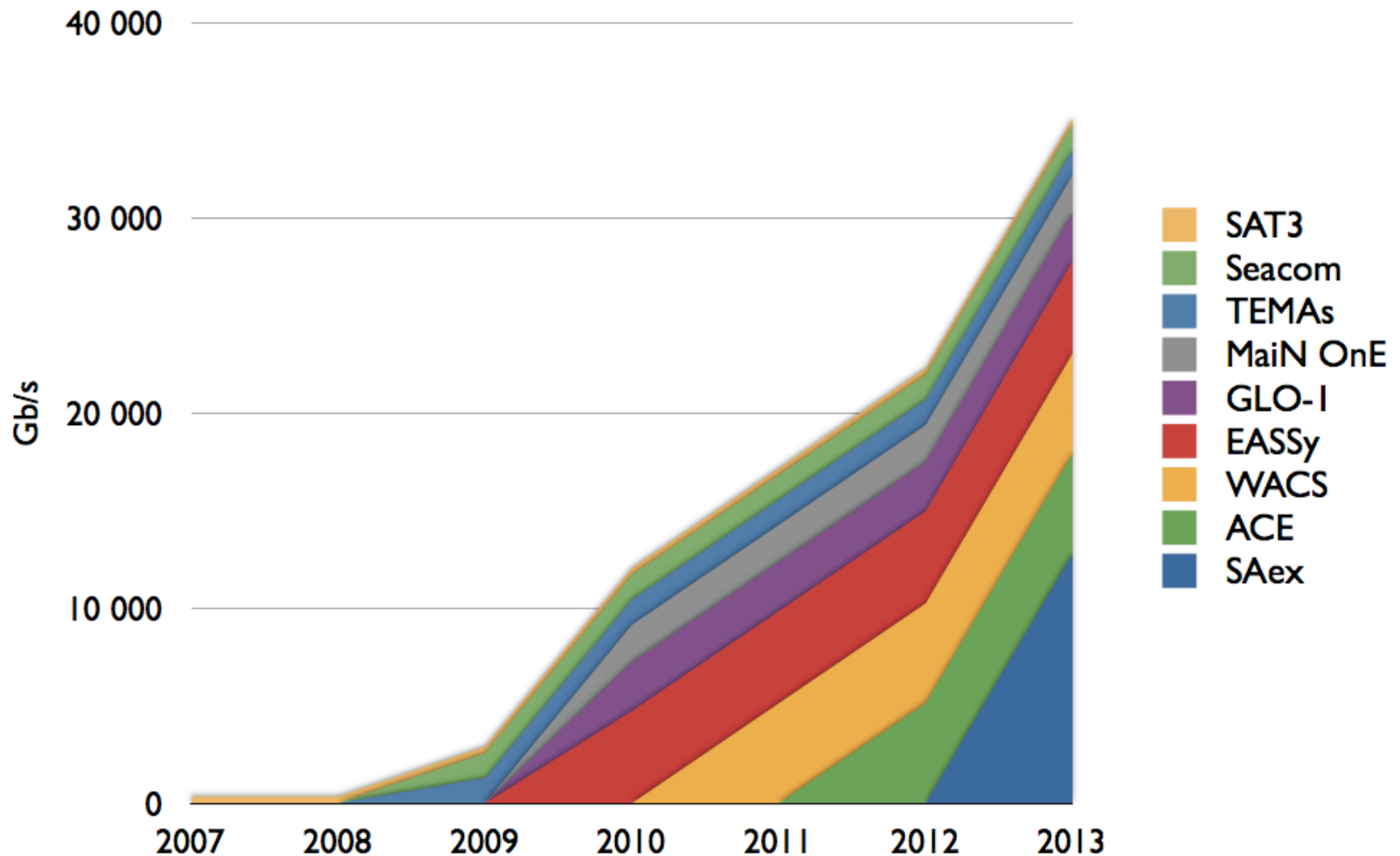
WHY SUCH DHIS2 EXPANSION ?

Mobile subscribers per 100 persons, Africa



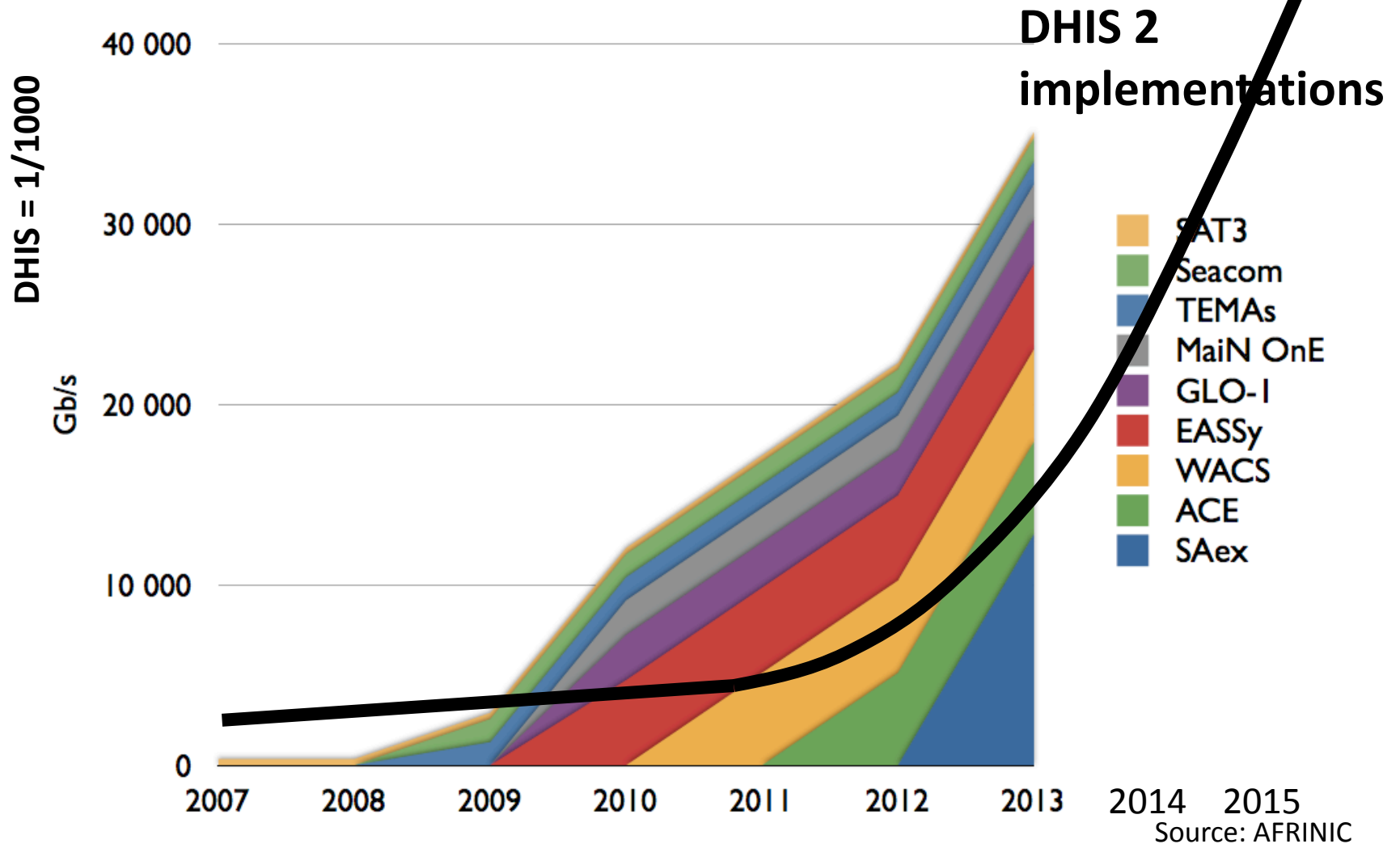
Source: World Bank

Internet: Total bandwidth of communication cables to Africa South of Sahara



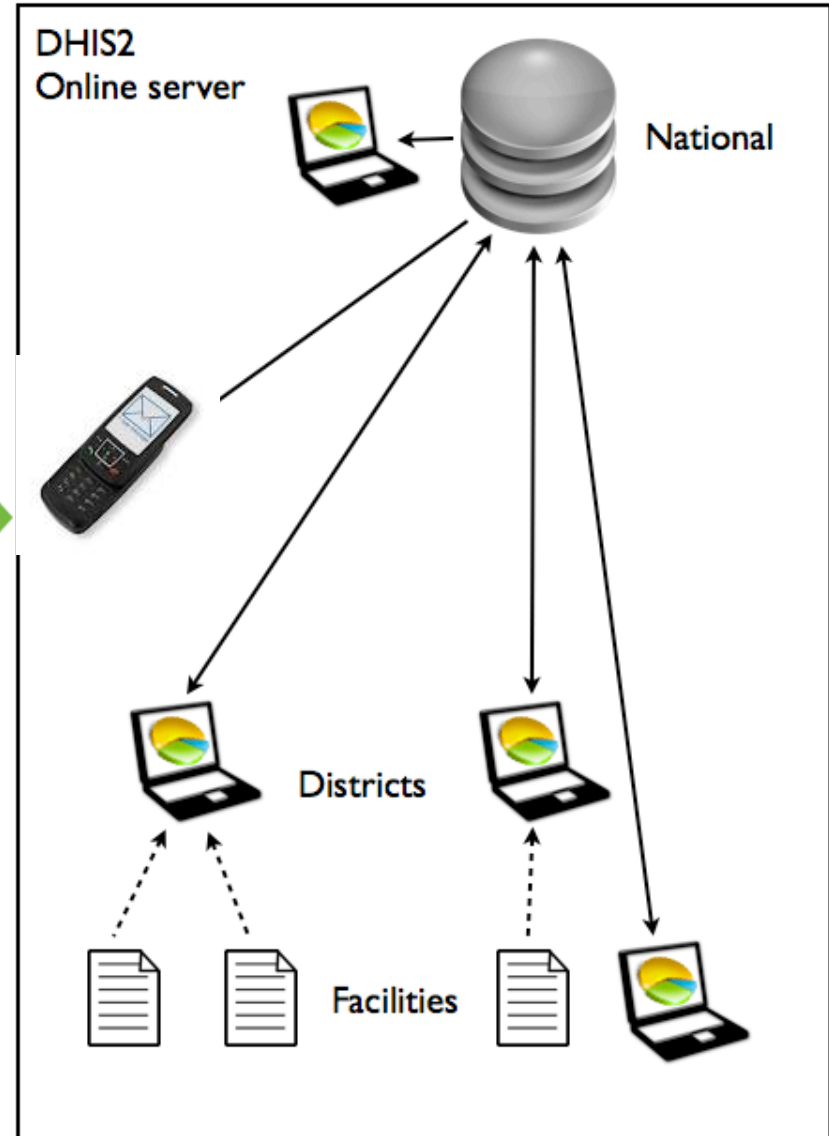
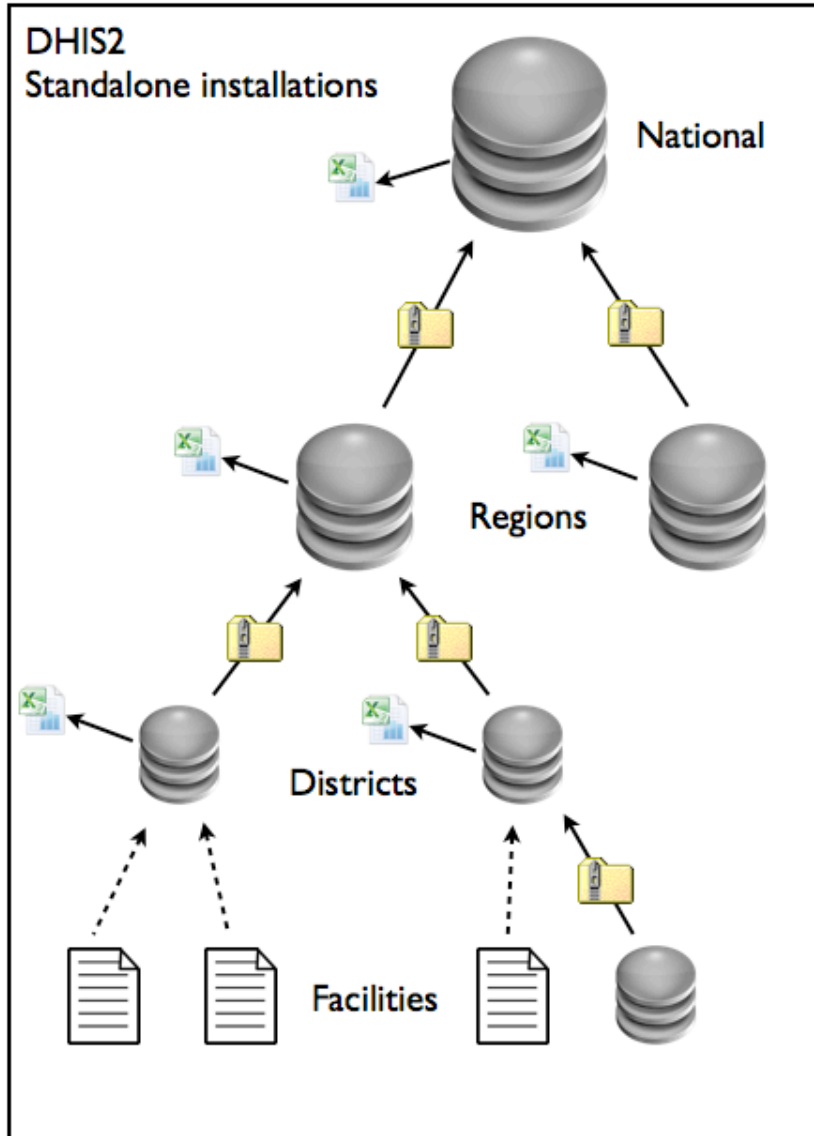
Source: AFRINIC

DHIS2 implementations /initial projects correlated with increase in bandwidth



Improved Internet & mobile network – ‘cloud’ infrastructure

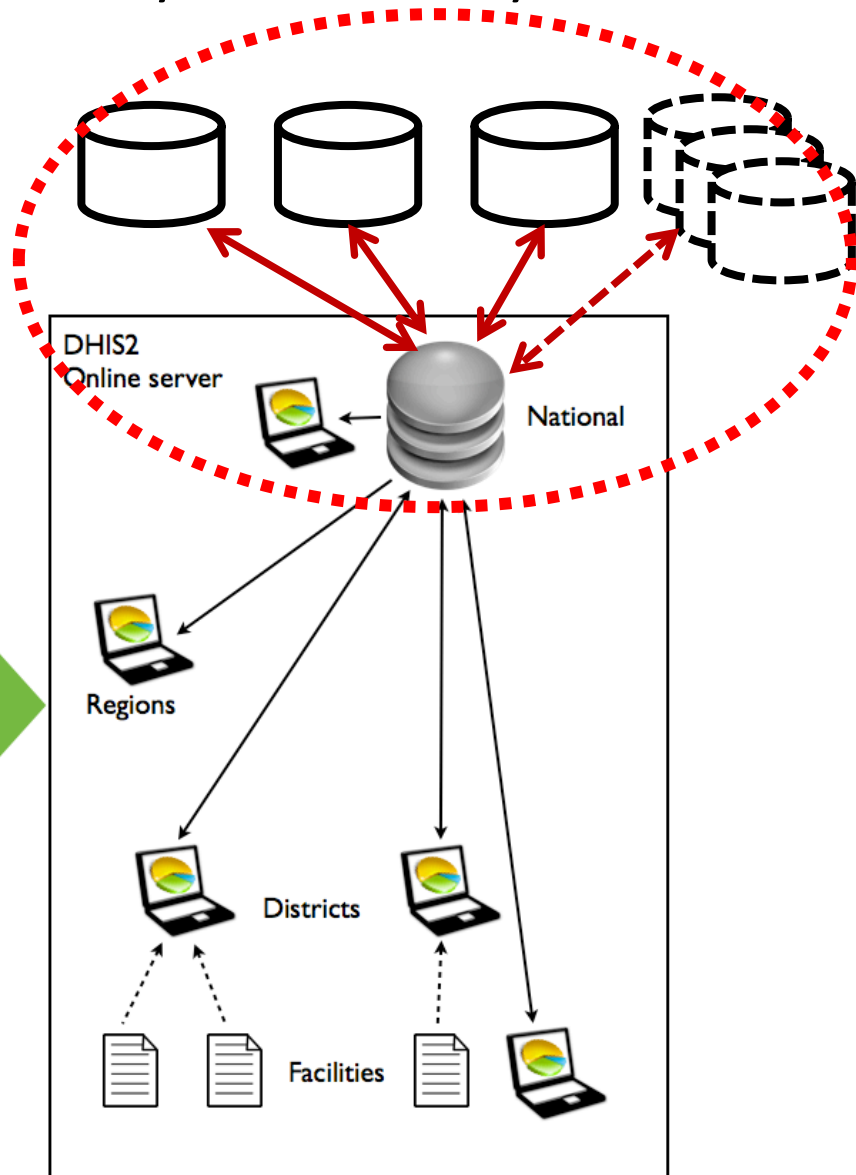
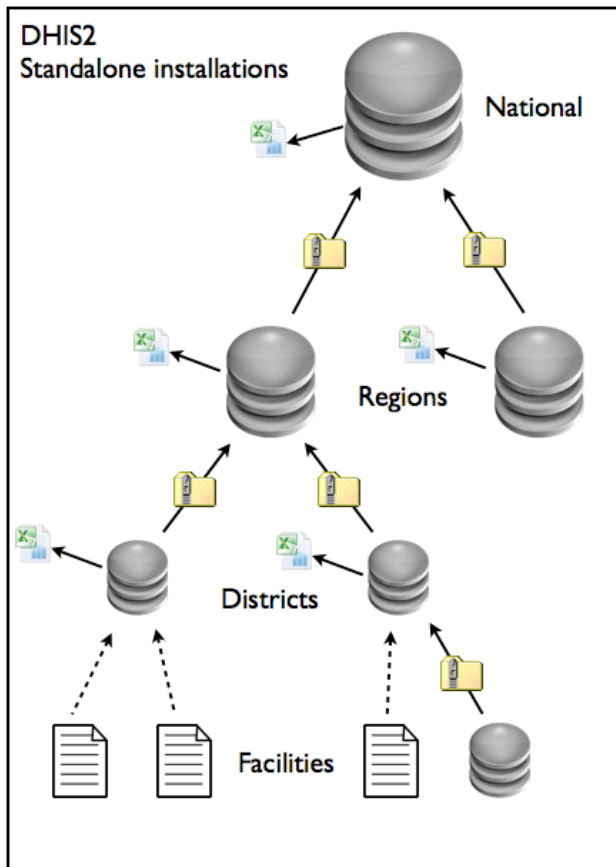
➔ Rapid scaling – from ‘hundreds’ of installations to 1



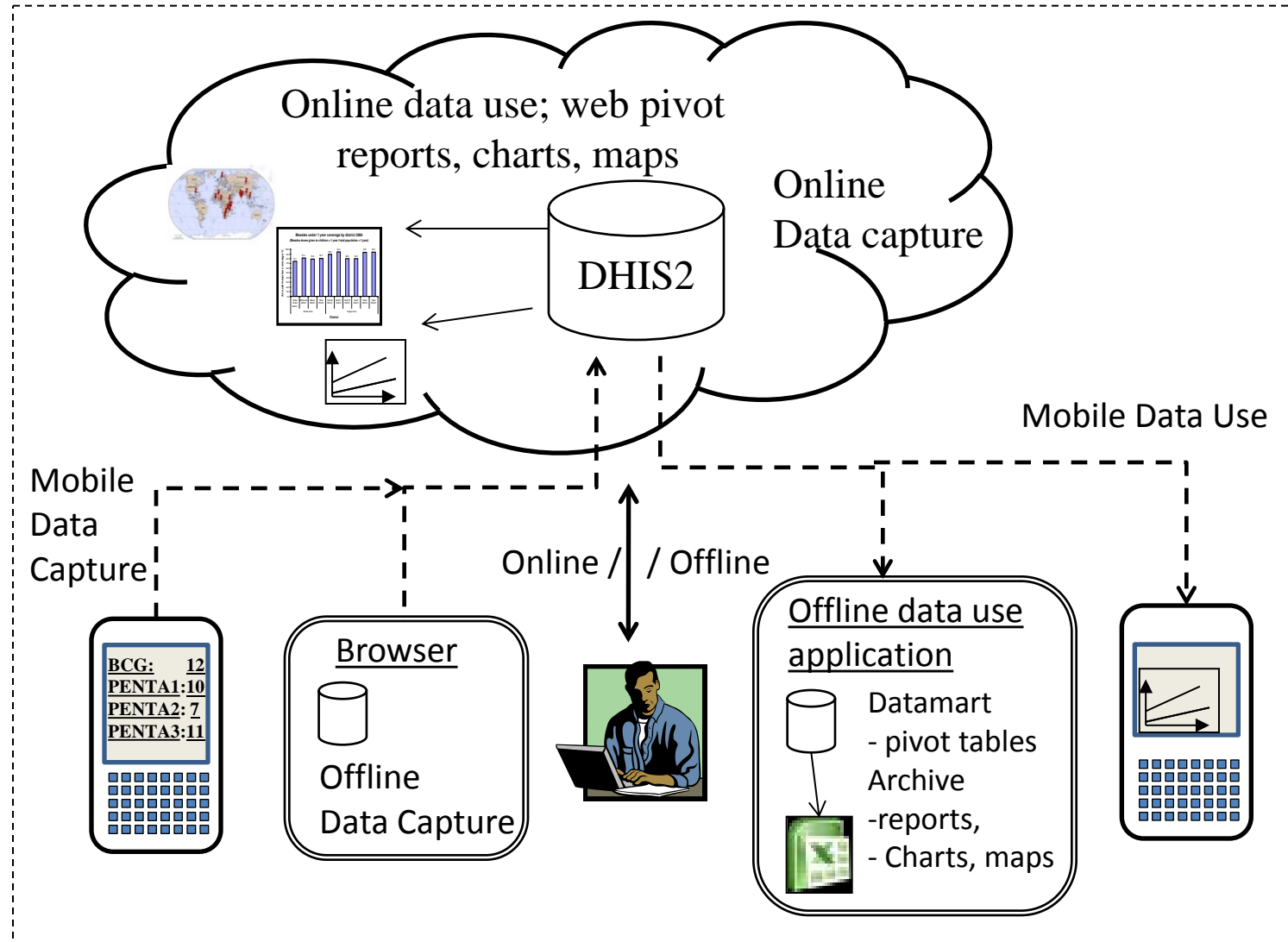
Online system – central server

➔ Easier to integrate / interoperability with other systems
which are also online: web API
& central server

*Interoperability
with Other systems*



Improved Internet and mobile network: Rapid scaling Implementation Using central server & “cloud” infrastructure



Cloud: New Challenges

- From installations everywhere to central server:
 - Easier: Less maintenance, from many to one ‘place’, no viruses, etc
 - More difficult: New skills – servers – required
- Cloud technology and problems: Store patient data outside the country?
- Not enough local hosting providers & server experts

DHIS 1&2 & HISP: Bottom-up architecting - from South Africa in the 90's to current challenges, Indonesia

Consistency and change over time

Technology & platform:

Emerging design and architecture:

⇒ First concepts, then functionalities & 'boxes'
Integration – no silos

Methodology:

- Evolutionary & bottom-up approaches;
- Action research, participatory design, flexibility
- Capacity development, research

How to ensure quality DHIS2 implementations?

➡ Combining evaluation & action research

- Evaluation

- refining design, plans

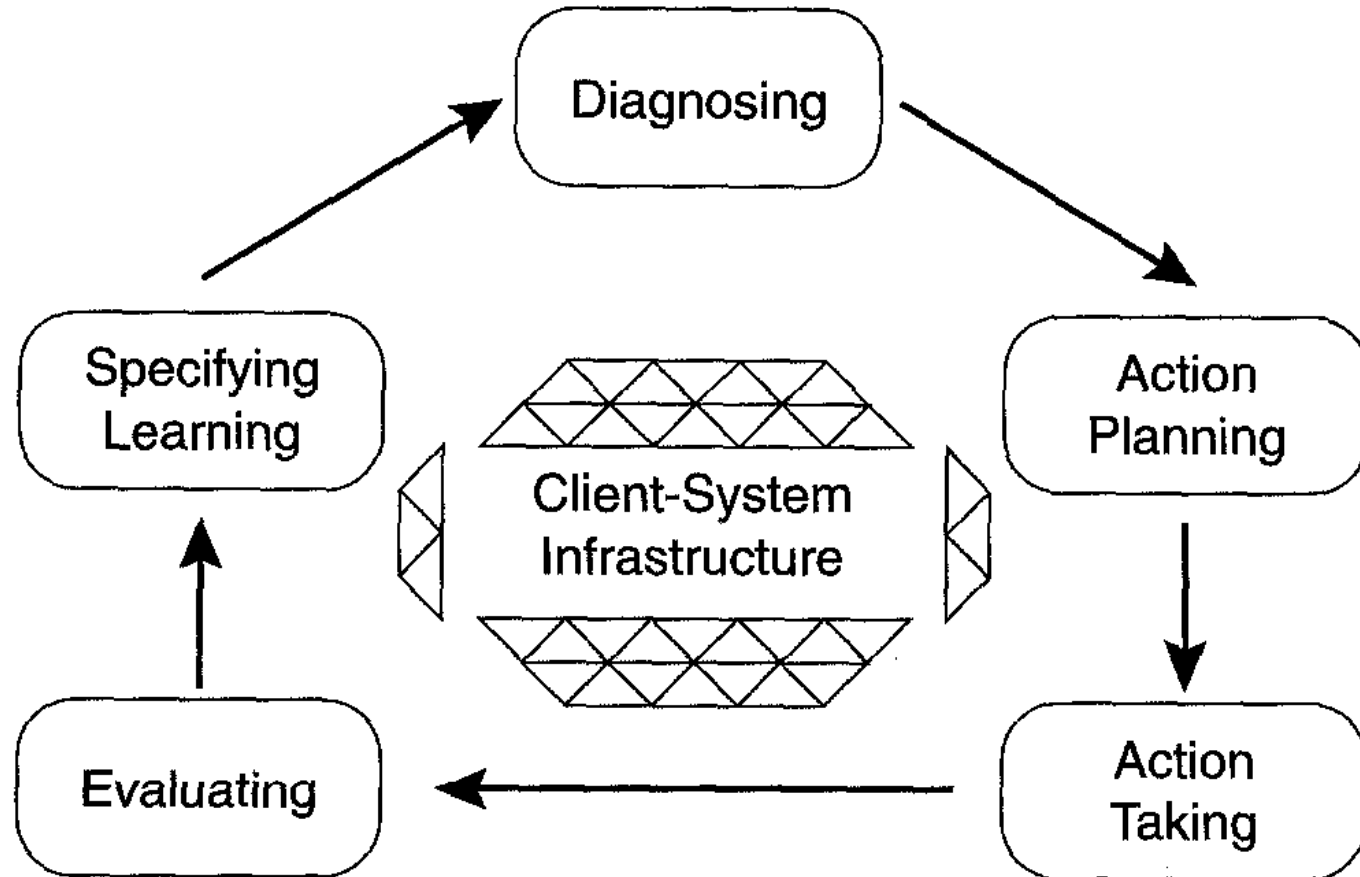
- action, implementation

Conceptualise new knowledge, write up, publish
In a cyclic process oriented approach

‘Text book’ approach to information systems development

- **But** complicated due to ‘short’ funding & planning cycles
- Often, identified problems are not being addressed
- Long time horizon needed

The Action Research Cycle



Lao PDR: Annual evaluation and redesign

Two identified problems with similar solutions

- Problem 1: ANC reporting
 - Poor data on: 3 Zones with increasing risk (poor, travel distance), ANC before 12 weeks, mother s<19 years, TT vaccination
 - Zones linked to villages, which also has population data
 - Solution / action: Implement (only) ANC first visit event register including village & zone; addresses all data quality issues
- Problem 2: Immunisation data: poor data on coverage
 - Many do vaccination in hospitals , missing 'village'
 - implement tracker event: both area and facility coverage
- (Action) Research: Conceptualise, Write up and publish

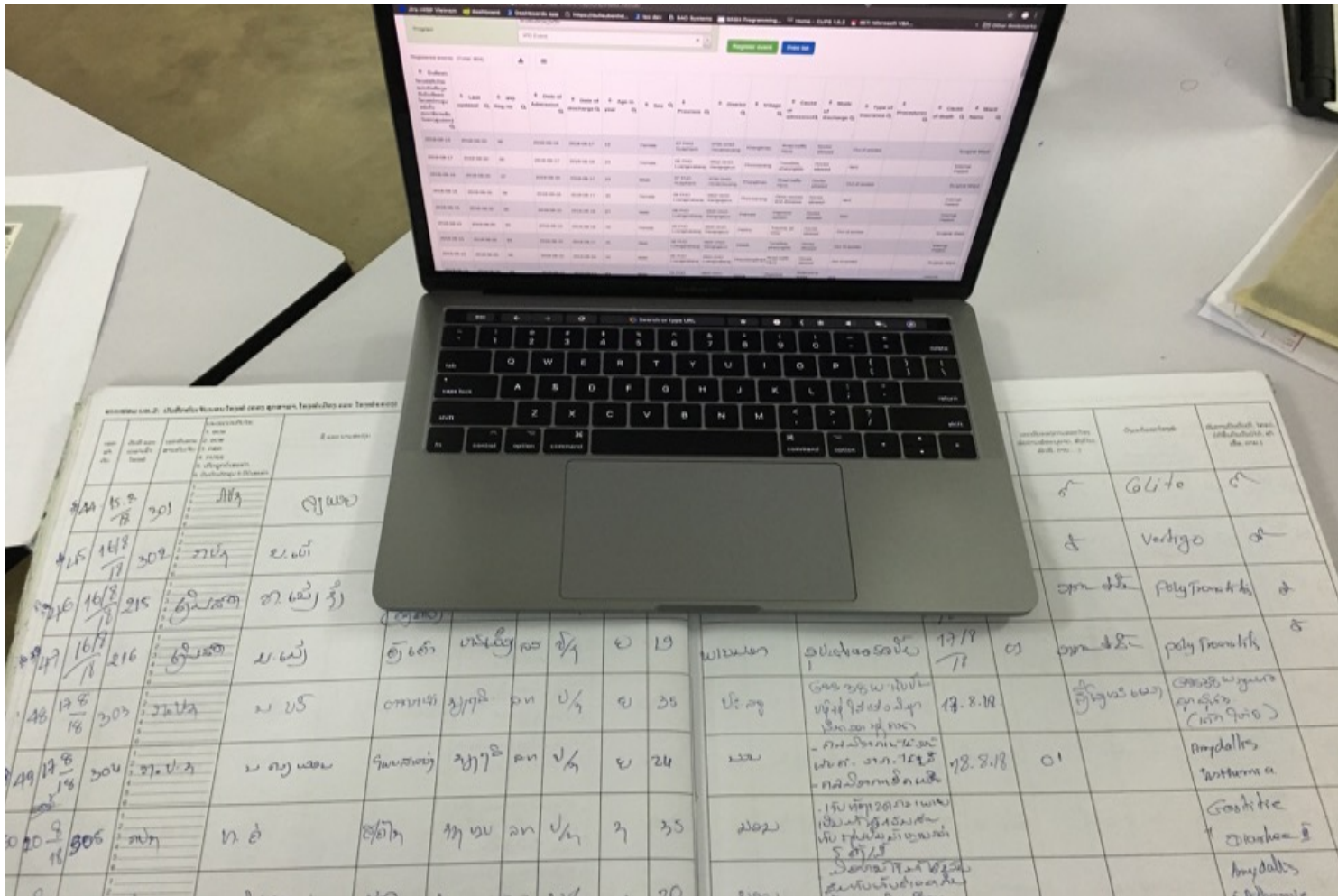
Action research & evaluation

- Action Research and participatory design: both cyclic and evolutionary & part of the Ifi ideology
 - BUT; poor systematic follow-up & continuation
- (Try) make it 'compulsory' to evaluate and document all projects and initiatives (warning!!)
- & Systematic follow-up of findings and recommendations
- & Focus on the Research part – publication and dissemination of lessons and findings

EPI – IMMUNISATION - LAOS

**EXAMPLE: CHECKING DATA QUALITY &
DHIS 2 'EVENT CAPTURE'
IMPLEMENTATION**

Easy to cross check with register to event capture



DH Xiengnguen

EPI register- One line per visit – HC Pakxueang

ບທດ1: ປຶ້ມປັນທຶກປະຈຳວັນ ການບໍລິການ

ສີສຸກສາວາ: ປະເທດ: ຈີນາ:

ລ/ດ	ສື່ສວຍດີກ	ເພດ	ວອດປະຢັດ	ສີ່ຂໍ້ແມ່	ເບີໂທລະສັບ	ສ່ວນ	ແບບຮູບ BCG	ສື່ສວຍດີກ ຕອບເຢັດ (HepB0)			ວັນເລີກ
								< 24 ສິບໂມງ	ສ່ວນ 7 ວັນ	OPV1	
1	2	3	4	5	6	7	8	9	10	11	12
1	ນ. ສຸກສາວາ	ຍ	16.4.18	ນ. ສີ່ຂໍ້ແມ່	0107771267	6					
2	ທ. ສອ	ງ	16.6.18	ນ. ສີ່ຂໍ້ແມ່	0307771666	4				2.9.18	
3	ນ. ສຸກສາວາ	ຍ	17.5.18	ນ. ສີ່ຂໍ້ແມ່	0307771666	2					3.9.18
4	ນ. ສຸກສາວາ	ຍ	7.5.18	ນ. ສີ່ຂໍ້ແມ່	0307771666						2.9.18
5	ນ. ສີ່ຂໍ້ແມ່	ງ	16.6.18	ນ. ສີ່ຂໍ້ແມ່	52887477	6				5.9.18	
6	ນ. ສີ່ຂໍ້ແມ່	ຍ	8.12.18	ນ. ສີ່ຂໍ້ແມ່	0307771666	3					9.9.18
7	ນ. ສີ່ຂໍ້ແມ່	ງ	10.6.18	ນ. ສີ່ຂໍ້ແມ່	0307771666	6					9.9.18
8	ນ. ສຸກສາວາ	ງ	20.6.18	ນ. ສີ່ຂໍ້ແມ່	0307771666	2					10.9.18
9	ນ. ສຸກສາວາ	ຍ	22.6.18	ນ. ສີ່ຂໍ້ແມ່	0307771666	2					12.9.18
10	ນ. ສຸກສາວາ	ຍ	26.4.18	ນ. ສີ່ຂໍ້ແມ່	0307771666	3					13.9.18
11	ນ. ສຸກສາວາ	ຍ	13.7.17	ນ. ສີ່ຂໍ້ແມ່	0307771666						6.9.18
12	ນ. ສຸກສາວາ	ງ	18.3.18	ນ. ສີ່ຂໍ້ແມ່	0307771666	6					10.9.18
13	ນ. ສຸກສາວາ	ງ	5.5.18	ນ. ສີ່ຂໍ້ແມ່	0307771666	3					10.9.18
14	ນ. ສຸກສາວາ	ງ	11.7.18	ນ. ສີ່ຂໍ້ແມ່	0307771666	4					10.9.18
15	ນ. ສຸກສາວາ	ຍ	17.7.18	ນ. ສີ່ຂໍ້ແມ່	0307771666	5					10.9.18

ລວມ

FIC = Full Immunization Children
 OPV = Oral Polio Vaccin
 IPV = Injection Polio Vaccin

EPI Register – One line per Child – DH Xiengnuen

ບາດ 1: ຍື່ມບັນທຶກປະຈຳວັນ ການບໍລິການສຸຂະພາບເດັກ

(Registration book for Children)

ເລກ	ຊື່ເດັກ	ເພດ	ວັນເກີດ	ຊື່ພໍ່ແມ່/ຊື່ບ້ານ	ເມັດສະໄໝ	ເລກ	ເລກ BCG	ວັນເກີດປະຈຳວັນ (DD/MM)	
								1	2
1	ທ. ສິວະກະສິດ	ຊ	22.10.19	ພ. ສິວະກະສິດ / ທ. ສິວະກະສິດ	11.10.19	12.10.19			
2	ທ. ສິວະກະສິດ	ຊ	25.2.19	ພ. ສິວະກະສິດ / ທ. ສິວະກະສິດ	11.5.19	15.5.19			
3	ທ. ສິວະກະສິດ	ຊ	28.2.19	ພ. ສິວະກະສິດ / ທ. ສິວະກະສິດ	11.5.19	15.5.19			
4	ທ. ສິວະກະສິດ	ຊ	28.2.19	ພ. ສິວະກະສິດ / ທ. ສິວະກະສິດ	11.5.19	15.5.19			
5	ທ. ສິວະກະສິດ	ຊ	28.2.19	ພ. ສິວະກະສິດ / ທ. ສິວະກະສິດ	11.5.19	15.5.19			
6	ທ. ສິວະກະສິດ	ຊ	28.2.19	ພ. ສິວະກະສິດ / ທ. ສິວະກະສິດ	11.5.19	15.5.19			
7	ທ. ສິວະກະສິດ	ຊ	28.2.19	ພ. ສິວະກະສິດ / ທ. ສິວະກະສິດ	11.5.19	15.5.19			
8	ທ. ສິວະກະສິດ	ຊ	28.2.19	ພ. ສິວະກະສິດ / ທ. ສິວະກະສິດ	11.5.19	15.5.19			
9	ທ. ສິວະກະສິດ	ຊ	28.2.19	ພ. ສິວະກະສິດ / ທ. ສິວະກະສິດ	11.5.19	15.5.19			
10	ທ. ສິວະກະສິດ	ຊ	28.2.19	ພ. ສິວະກະສິດ / ທ. ສິວະກະສິດ	11.5.19	15.5.19			
11	ທ. ສິວະກະສິດ	ຊ	28.2.19	ພ. ສິວະກະສິດ / ທ. ສິວະກະສິດ	11.5.19	15.5.19			
12	ທ. ສິວະກະສິດ	ຊ	28.2.19	ພ. ສິວະກະສິດ / ທ. ສິວະກະສິດ	11.5.19	15.5.19			
13	ທ. ສິວະກະສິດ	ຊ	28.2.19	ພ. ສິວະກະສິດ / ທ. ສິວະກະສິດ	11.5.19	15.5.19			
14	ທ. ສິວະກະສິດ	ຊ	28.2.19	ພ. ສິວະກະສິດ / ທ. ສິວະກະສິດ	11.5.19	15.5.19			
15	ທ. ສິວະກະສິດ	ຊ	28.2.19	ພ. ສິວະກະສິດ / ທ. ສິວະກະສິດ	11.5.19	15.5.19			
16	ທ. ສິວະກະສິດ	ຊ	28.2.19	ພ. ສິວະກະສິດ / ທ. ສິວະກະສິດ	11.5.19	15.5.19			
17	ທ. ສິວະກະສິດ	ຊ	28.2.19	ພ. ສິວະກະສິດ / ທ. ສິວະກະສິດ	11.5.19	15.5.19			
18	ທ. ສິວະກະສິດ	ຊ	28.2.19	ພ. ສິວະກະສິດ / ທ. ສິວະກະສິດ	11.5.19	15.5.19			
19	ທ. ສິວະກະສິດ	ຊ	28.2.19	ພ. ສິວະກະສິດ / ທ. ສິວະກະສິດ	11.5.19	15.5.19			
20	ທ. ສິວະກະສິດ	ຊ	28.2.19	ພ. ສິວະກະສິດ / ທ. ສິວະກະສິດ	11.5.19	15.5.19			
21	ທ. ສິວະກະສິດ	ຊ	28.2.19	ພ. ສິວະກະສິດ / ທ. ສິວະກະສິດ	11.5.19	15.5.19			
22	ທ. ສິວະກະສິດ	ຊ	28.2.19	ພ. ສິວະກະສິດ / ທ. ສິວະກະສິດ	11.5.19	15.5.19			
23	ທ. ສິວະກະສິດ	ຊ	28.2.19	ພ. ສິວະກະສິດ / ທ. ສິວະກະສິດ	11.5.19	15.5.19			
24	ທ. ສິວະກະສິດ	ຊ	28.2.19	ພ. ສິວະກະສິດ / ທ. ສິວະກະສິດ	11.5.19	15.5.19			
25	ທ. ສິວະກະສິດ	ຊ	28.2.19	ພ. ສິວະກະສິດ / ທ. ສິວະກະສິດ	11.5.19	15.5.19			
26	ທ. ສິວະກະສິດ	ຊ	28.2.19	ພ. ສິວະກະສິດ / ທ. ສິວະກະສິດ	11.5.19	15.5.19			
27	ທ. ສິວະກະສິດ	ຊ	28.2.19	ພ. ສິວະກະສິດ / ທ. ສິວະກະສິດ	11.5.19	15.5.19			

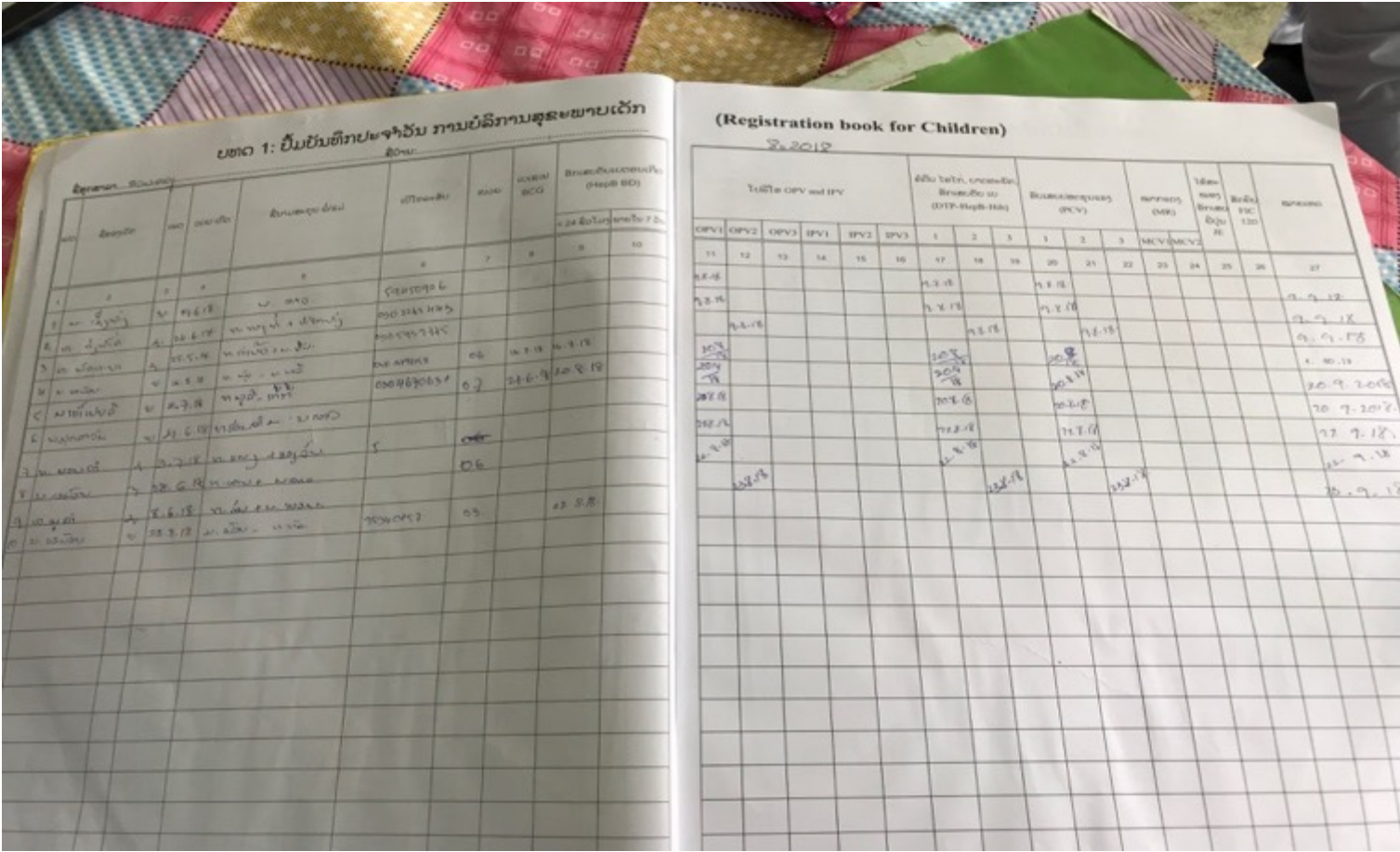
EPI Register- One line per child in that village – DH Xiengnguen

The image shows a handwritten EPI Register for the village of DH Xiengnguen. The register is organized into several columns, with the following headers visible:

- Child Name (Khmer):** ឈ្មោះកុមារ
- Age (Months):** អាយុ (ខែ)
- Sex:** ភេទ
- Registration Date:** ថ្ងៃចុះបញ្ជី
- Weight (kg):** ទម្ងន់ (គីឡូក្រាម)
- Height (cm):** មមាស (សង់ទីម៉ែត្រ)
- Health Status:** ស្ថានភាពសុខភាព
- Notes:** កំណត់សម្គាល់

The data is handwritten in Khmer script. The notebook is open to a page with a grid layout, and several pages are visible, showing a continuous record of children's health data. The handwriting is clear and legible.

EPI Register – One line per visit – HC Saunluang – Xiengnguen District



Integrated service – One line per visit – HC Saunluang – Xiengnguen District

Designed by HC staff for simplicity

ບາດ 2: ປຶ້ມບັນທຶກປະຈຳວັນສຳລັບການກວດຕິດຕາມພຶດທະນາການຂອງເດັກລຸ່ມ 5 ປີ ສະບັບ 2.0

ຊື່ເຂດ/..... ຊື່ບ້ານ..... ແມ່ເຫລືອ/ເທັດ/.....

25.7.2018 1305 ກມປ

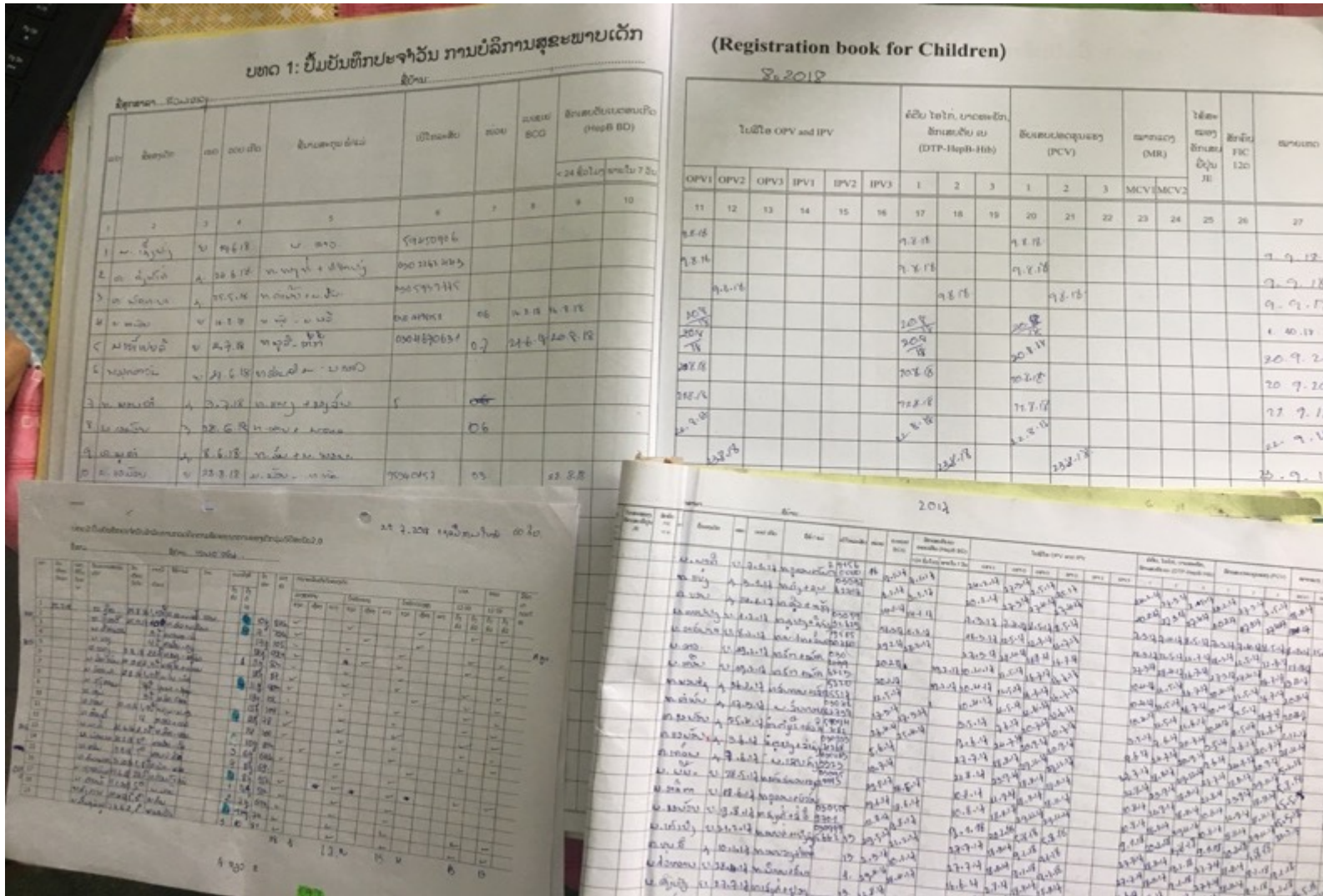
ລດ	ວັນເດືອນປີ	ເລກສີດາມ	ຊື່ແມ່ນາມສະກຸນຜູ້ກວດ	ວັນເດືອນປີ (ວັນ)	ອາຍຸ (ປີເດືອນ)	ສີ່ສ່ວນ	ວັນ	ກວດຕິດ		ລວງສູງ	ການເຮັດວຽກໂດຍງານ						VIA		Mez		ວັດແທກນ້ຳໜັກ			
								ຕົວສີດ	ຕົວສີດ		ລວງຍາວ			ນ້ຳໜັກ			ນ້ຳໜັກລວງສູງ			ຕົວສີດ		ຕົວສີດ	ຕົວສີດ	ຕົວສີດ
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(9)

EPI – No Registration Number in any EPI Register, Example HC Saunluang – Xiengnguen District



EPI –
All Form for
EPI Child

HC Thapho
– Phonexay
District

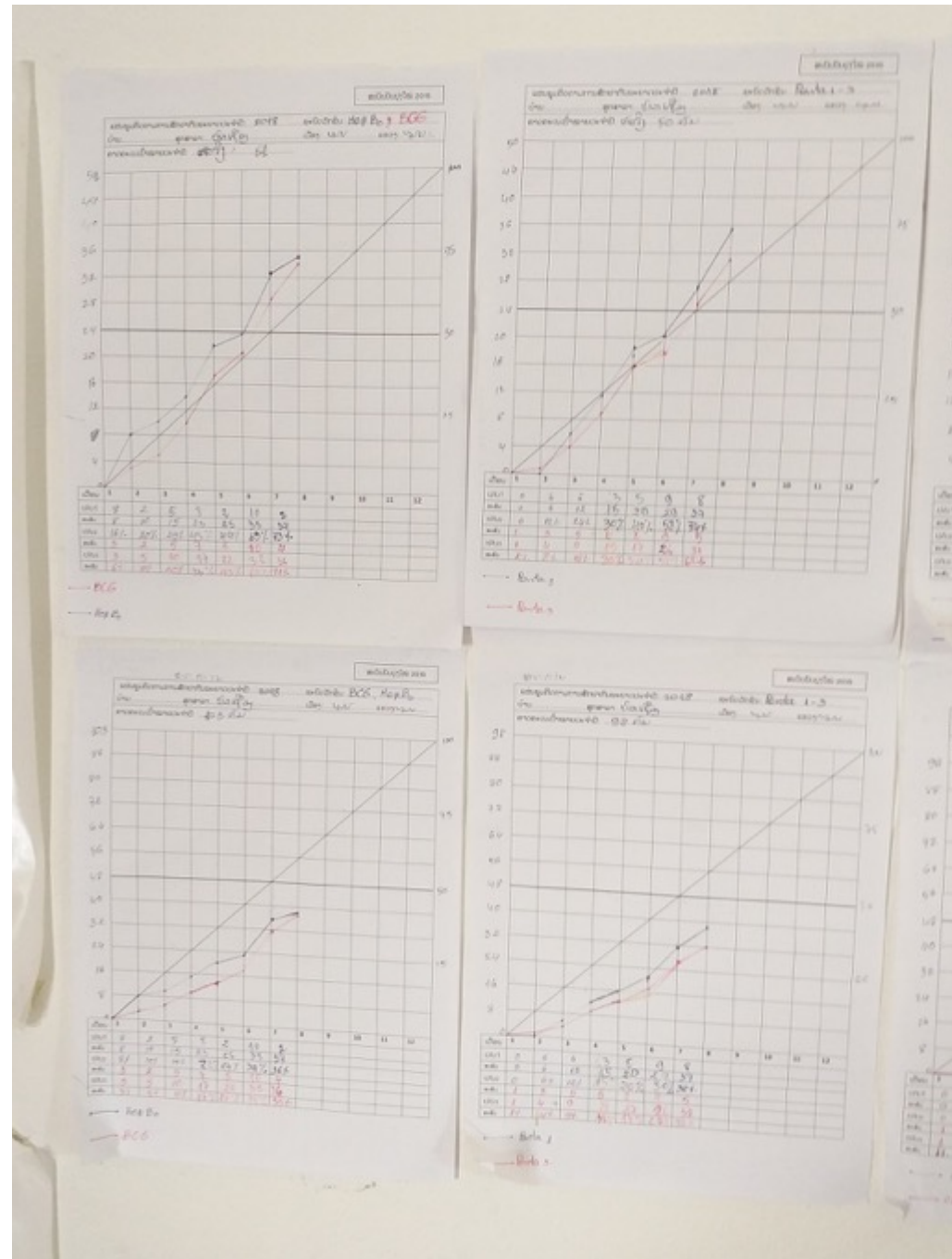
EPI - Event Capture – Designed by Red Cross

DENOMINATOR PROBLEM

Pakseuang Health Centre

2 different denominators
59 Live births
50 <1,
their own count

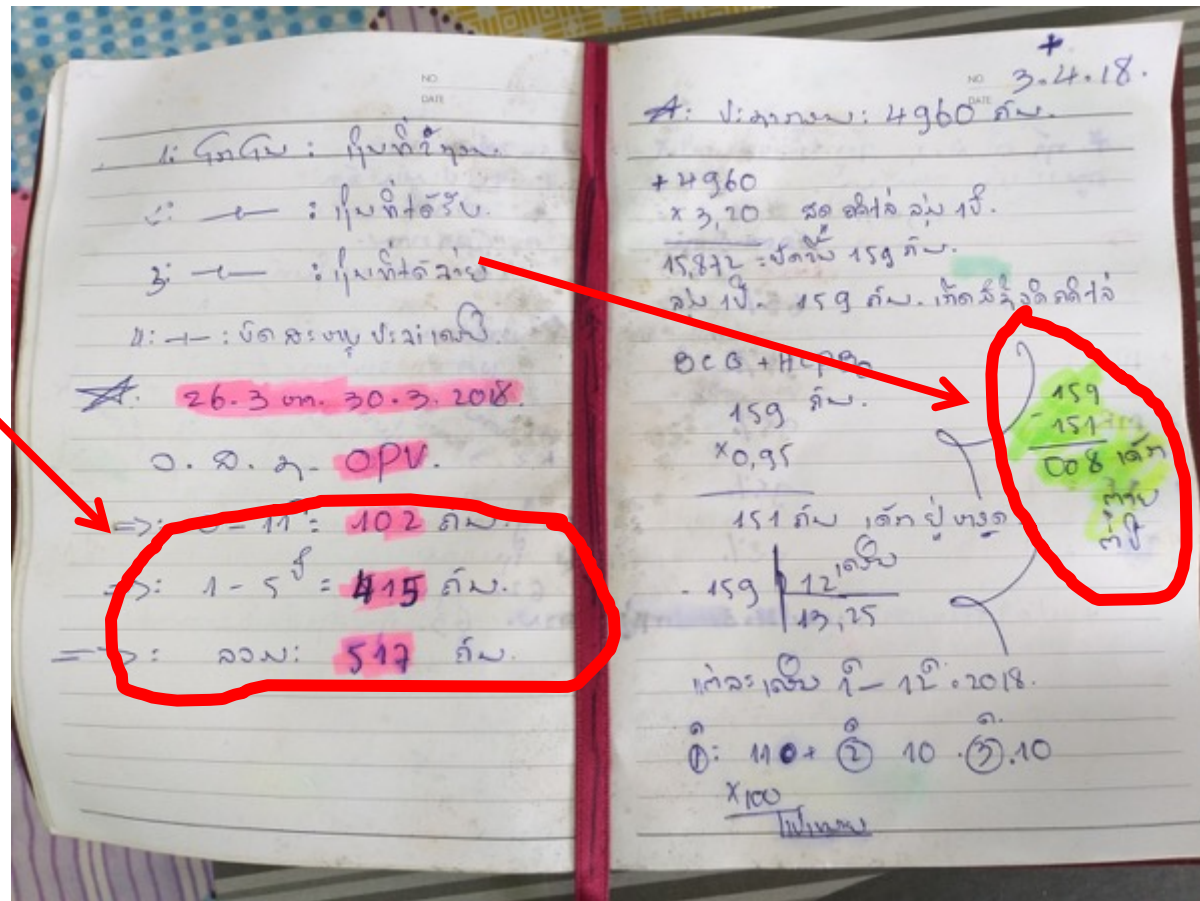
103 Live births
98 <1
estimates and official



Quija Health Centre

2 different denominators
102 < 1,
their own count

151 > 1
estimates and official



Some key findings - EPI

- EPI: no clear procedure for preparing data for event capture
 - still a lot of logbooks and very confusing
 - Main ‘fixed’ book used differently, as:
 - Record per visit, to ease event capture, or
 - Full child record, to see fully immunised & missed vaccines i.e. same as village book
 - Fixed, Outreach & mobile understood different at different health facilities (PHO,DH,HC)
- Log book for EPI event capture only used some places – or discontinued
- Registration number not used – if used: EPI records (village book) could be generated