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Making the case for investing in Routine Health Information Systems (RHIS) to achieve the health-related SDGs

RFP-2022-DDI-DNA-CNG-0001 | HQ/DDI/DNA/CNG and HQ/DDI/DNA/HIS

Synthesis of findings

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Geneva, 19th May 2023


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saMRC advancinglife

1 Perspectives and objectives

2 Methodological considerations

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4 Conclusions

5 THE FUTURE

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1 Perspectives and objectives

Global perspective

United Nations A/RES/67/81*

General Assembly

Distr.: General
14 March 2013

Sixty-seventh session
Agenda item 123

Resolution adopted by the General Assembly on 12 December 2012

[without reference to a Main Committee (A/67/L.36 and Add.1)]

67/81. Global health and foreign policy

*3.8 "Achieve **universal health coverage**, including financial risk protection, access to **quality essential health-care services** and access to safe, effective, quality and affordable essential medicines and vaccines for all"*

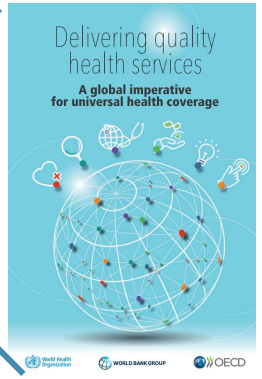
*"Universal health coverage means that **all people have access to the full range of quality health services** they need, when and where they need them, without financial hardship."*

Declaration of Astana

ASTANA, KAZAKHSTAN
25-26 OCTOBER 2018
GLOBAL CONFERENCE ON PRIMARY HEALTH CARE

From Alma-Ata towards universal health coverage and the Sustainable Development Goals

Astana, Kazakhstan, 25 and 26 October 2018



*"All this needs to be done with a clear eye on **strong linkages between measurement and improvement** – measuring alone will not improve quality."*


QUALITY OF CARE

Embedding quality in primary healthcare

Quality of care must be a central focus of efforts to strengthen primary healthcare in the drive for universal health coverage, write **Federica Secci and Shams Syed**

Federica Secci,[1] Shams Syed[2]

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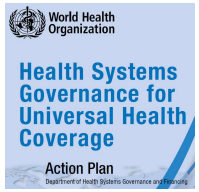
Data Governance perspective



GLOBAL STRATEGY FOR OPTIMIZING ROUTINE HEALTH INFORMATION SYSTEMS IN COUNTRIES 2022–2030

Enabling delivery of Primary Health Care and Universal Health Coverage

2014

1. Policy and strategic plans
2. Intelligence: information and analysis for decision-making
3. Tools for implementation – structures, powers, regulation, standards. incentives; enforcement and sanctions
4. Collaboration across sectors
5. Accountability: independent oversight, monitoring, transparent availability and publication regulations, openness to scrutiny by political representatives and civil society

2021

Over 2 half days in June and September 2021, the summit identified potential solutions to the challenges of implementing standards, solutions and infrastructure to increase the value of health data as a strategic asset. Best practices and challenges included data from **public health**, **routine health structures**, **research**, **trials** and **GIS**, with specific focus on data storage, sharing, legal and ethical aspects.

2022

Strategic objectives :

1. Governance and partnership structures for RHIS
2. RHIS data collection, health information management and data quality
3. Integration and interoperability of RHIS
4. Building capacities for RHIS data analyses, data use and dissemination
5. Human and financial resources required for a sustainable RHIS.

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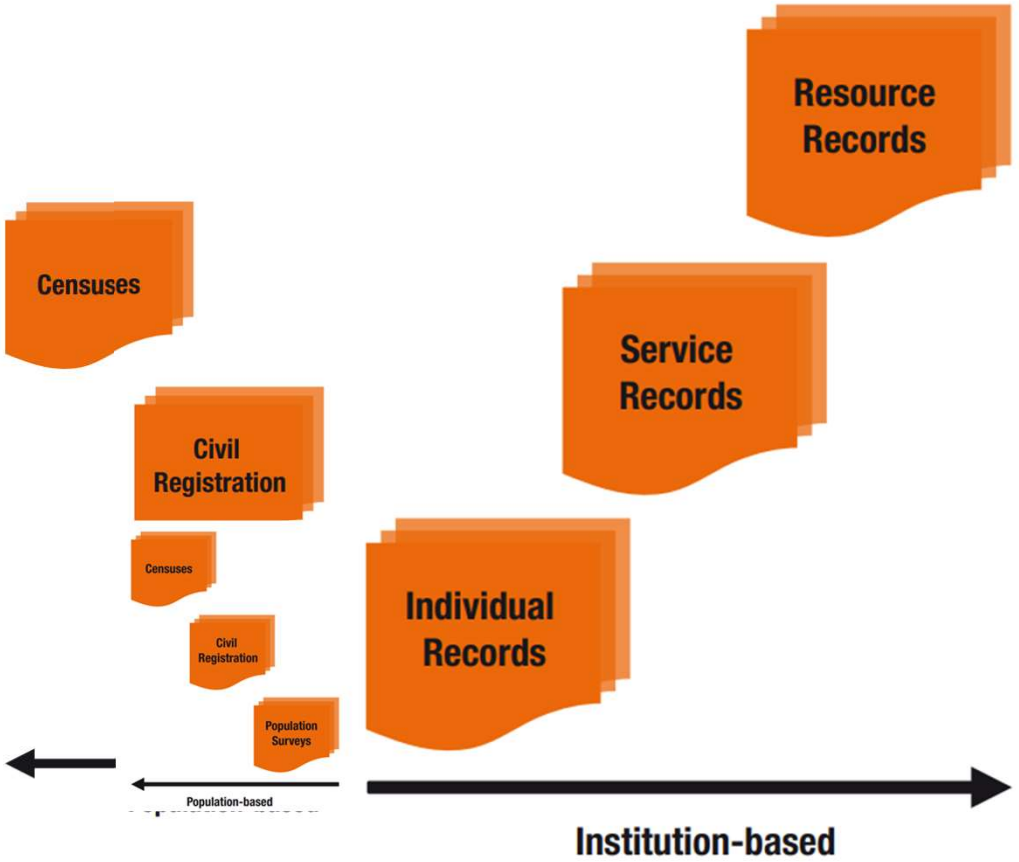
RHIS perspective

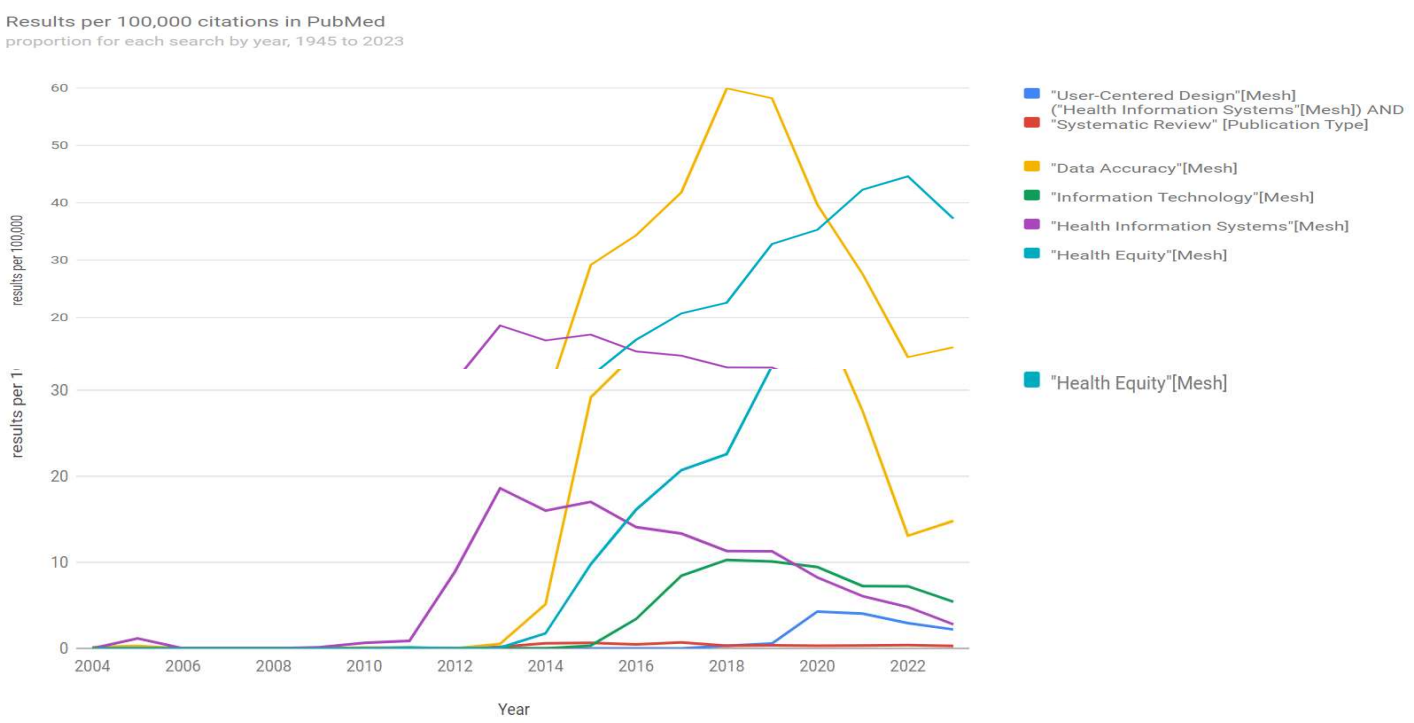
RHIS collect health service data **directly from the health facilities**, where they are produced by the **health-care workers and community health workers**.
[…] RHIS have the potential to produce frequent – almost real-time – information on service **performance** and **quality** at all levels of the health system.

Global Strategy for Optimizing Routing Health Information Systems in Countries. Adapted from the Final Draft Terms of Reference 23 October 2020 of the Routine Health Information Systems (RHIS) Working Group of the Health Data Collaborative (HDC).

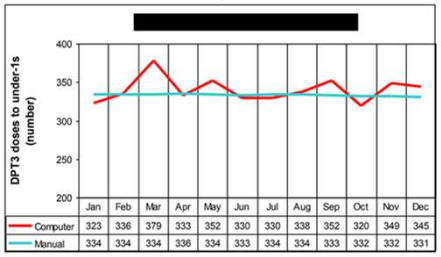


Health Metrics Network & World Health Organization. (2008). Framework and standards for country health information systems, 2nd ed. World Health Organization. https://apps.who.int/iris/handle/10665/43872

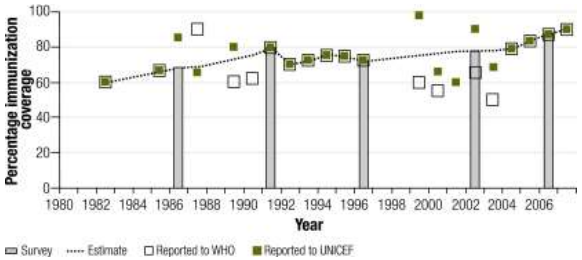
Historical perspective



Reality perspective



Xavier Bosch-Capblanch – personal communication



Burton A, Monasch R, Lautenbach B, Gacic-Dobo M, Neill M, Karimov R, Wolfson L, Jones G, Birmingham M. WHO and UNICEF estimates of national infant immunization coverage: methods and processes. Bull World Health Organ. 2009 Jul;87(7):535-41. doi: 10.2471/blt.08.053819. PMID: 19649368; PMCID: PMC2704038.


Percentage of countries
SURVEY
populations and health risks
20%
1%
11%
34%
35%
Sustainable 26 51%
Well-developed 45 24%
Moderate 47 11%
Limited 14 1%
Nascent 1 0%
68%
of countries have good capacity for public health threat surveillance
COUNT
births, deaths and causes of death
16%
28%
27%
16%
14%
Sustainable 21 7%
Well-developed 36 32%
Moderate 18 22%
Limited 21 12%
Nascent 37 14%
40%
of the world's deaths remain unregistered
OPTIMIZE
ealth service data
4%
2%
20%
32%
43%
Sustainable 5 3%
Well-developed 42 62%
Moderate 57 17%
Limited 26 4%
Nascent 3 1%
50%
of countries have limited or less capacity for systematic monitoring quality of care
REVIEW
progress and performance
5%
27%
8%
28%
33%
Sustainable 36 55%
Well-developed 44 21%
Moderate 37 10%
Limited 10 1%
Nascent 6 0%
60%
of countries have good capacity to review progress and performance of the health sector
ENABLE
data use for policy and action
5%
8%
27%
22%
38%
Sustainable 7 6%
Well-developed 36 55%
Moderate 51 21%
Limited 29 4%
Nascent 10 1%
59%
of countries have good capacity to use data to drive policy and planning

Objectives of this assignment

In the RFP	In our response to it
1. To identify effective and ineffective models of investing in country RHIS (country case studies)	1. To explore RHIS definitions and frameworks
2. To identify and recommend possible frameworks, methods and costing tools to support integrated RHIS investments.	2. To describe how return of investments are portrayed in the literature
3. To estimate the return on investment in RHIS, where possible.	3. To estimates costs and returns of RHIS in selected countries
4. Production of technical materials and a peer review publication	4. (same)

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2 Methodological considerations

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1 Definitions and frameworks

For objective 1

Objective 1 – Definitions and frameworks

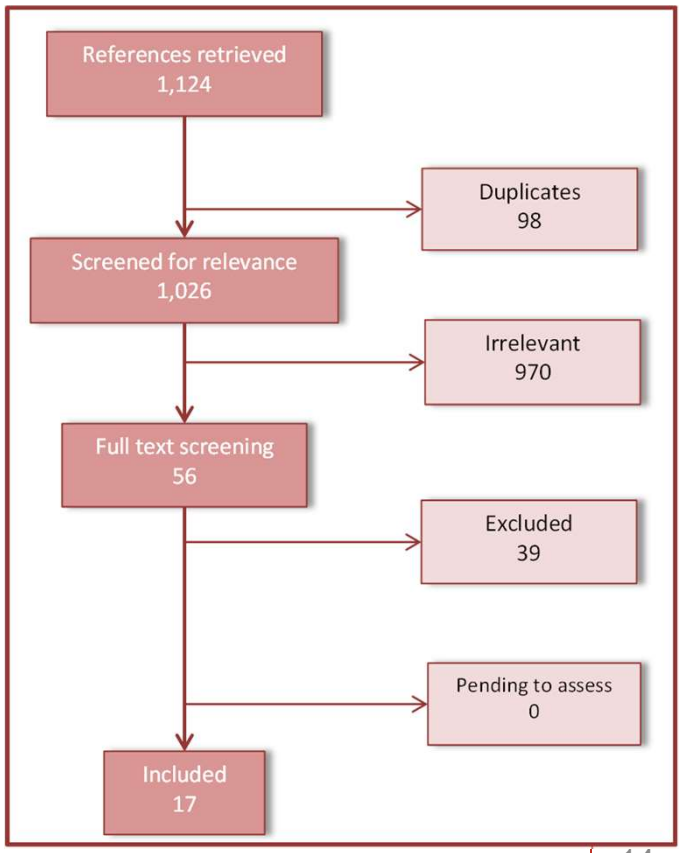
- Focus
  - on processes
  - data issues
  - Much less on outcomes
- Links to health services and health systems anecdotal
- No obvious “conceptual changes” over the years, despite technological progress.

Objective 1 - Scoping review on examples of returns of investments

- Selection criteria
  - studies showing investments and returns
  - with health systems components / interventions
  - excluding merely clinical interventions or tools
  - from 2007

- Single selection and data extraction
- No assessment of risk of bias

- 17 included | 39 excluded



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2 Country case studies

For objective 2

Objective 2 (1/3) - Country case studies

- Protocol based
- Selection of countries criteria
- WHO contacts with country offices
- Swiss TPH teams
- Data collection tools in XLSForm
- Levels of uncertainty data / documents / expert opinion
- Clearance

6 National

2 Sub-national:

Cross River state (Nigeria)

Western Cape (South Africa)

Objective 2 (2/3) - Country case studies

- Systems design
- ‘Magnitude’ of the RHIS across health systems tiers and health facilities
- Costing and level of effort
- Funding and external support map
- Hypothesis generation through data exploration (e.g. correlation)
- Measures of health outcomes and quality of care – attribution scenarios

Objective 2 (3/3) – Economic analyses

- Amenable deaths: prevented through public health interventions policies + appropriate services
- Healthcare Access and Quality Index (Global Burden of Disease)
  - comparative assessment of health system performance across countries
  - indicator for potential health care improvements that can be achieved globally (UHC, quality of care)
- Value of lost output: indication of GDP losses over time; value of lost welfare, reflecting losses.
  - calculated using the WHO Projecting the Economic Cost of Ill-health (EPIC)
- Per capita investments in HIS across 6 countries
- Relationship between investments in HAQ

Clarifications (1/2): the scope of our work

✓ We did…	× We did not…
✓ Draw on existing evidence and expert opinion	× Carry out primary research
✓ Focus on RHIS	× Address the whole spectrum of HIS
✓ Describe the status and costs of RHIS components	× Assess what works against standards
✓ Valued to potential contribution of RHIS to health outcomes	× Estimate a monetary return of investment

Clarifications (2/2): issues with monetary estimates of return of investments based on literature

- Weak study designs
- Outcomes selection bias
- Selective reporting bias
- Publication bias
- Measures of precision / uncertainty
- Heterogeneity of findings
- Interpretation

UNTRUSTFUL RESULTS!

- The impact of funding has to be assessed by controlling more direct non-financial, social determinants of health.
- Arbitrariness on the attribution of observed outcomes to the RHIS (and to which components of it, since RHIS are universal).
- Need counterfactuals, in space (i.e. different RHIS components) and/or longitudinal data (i.e. trends).
- Which RHIS components (since it is universal)
- How is the scope selected?
- What is the level of uncertainty?
- How to assess bias?
- What does it represent in real life situations?
- What are the alternatives?
- How are thresholds defined?

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3 Synthesis of findings

RHIS are “special”

No other information system…

- encompasses the whole health system, from Tertiary University Hospitals up to community health workers – **65 million health workers**
- is permanently active, in each and every encounter with service users – **the whole population**
- has a universal distribution in all countries and territories, even in humanitarian crises – **almost 200 countries**
- data collection point = data use point – **is a process of care**
- carries personal information – **data security**

Boniol M, Kunjumen T, Nair TS, Siyam A, Campbell J, Diallo K. The global health workforce stock and distribution in 2020 and 2030: a threat to equity and 'universal' health coverage? BMJ Glob Health. 2022 Jun;7(6):e009316. doi: 10.1136/bmjgh-2022-009316. PMID: 35760437; PMCID: PMC9237893.

RHIS in countries – selected features

- High level regulations attain data security and technology (i.e. data protection laws) | specificities of HIS and RHIS are in lower level documents
- Adherence to international standards (Colombia)
- The most relevant historical hallmarks in RHIS include:
  - "Observatories" (National Health Observatories, Colombia 2011)
  - Digitalisation (Nepal, 2013)
- Organised across the health systems tiers with reporting schedules (all countries)
- Specialised data-managers only in higher managerial levels or in secondary and tertiary care
- Data related events tend to happen at higher tiers of the system
- Systems are supported by external partners (Côte d'Ivoire, Nigeria, Nepal)
- Data dictionaries and standards available (Côte d'Ivoire, Colombia, South Africa)
- Initiatives running, interoperability, digitalisation… (Côte d'Ivoire, Nepal, South Africa)

RHIS in countries – generic issues

- Lack of integration with hospitals information (Côte d'Ivoire)
- Lack of integration of multiple systems / duplicity (Colombia)
- Lack of integration of HIV programme data (Nigeria)
- Lack of integration with the private sector (Colombia, Nigeria)
- Undifferentiation between health care and data activities (all countries)
- Unequal compliance with data requirements, particularly by community health workers (Nepal)
- Multiplicity of sub-systems

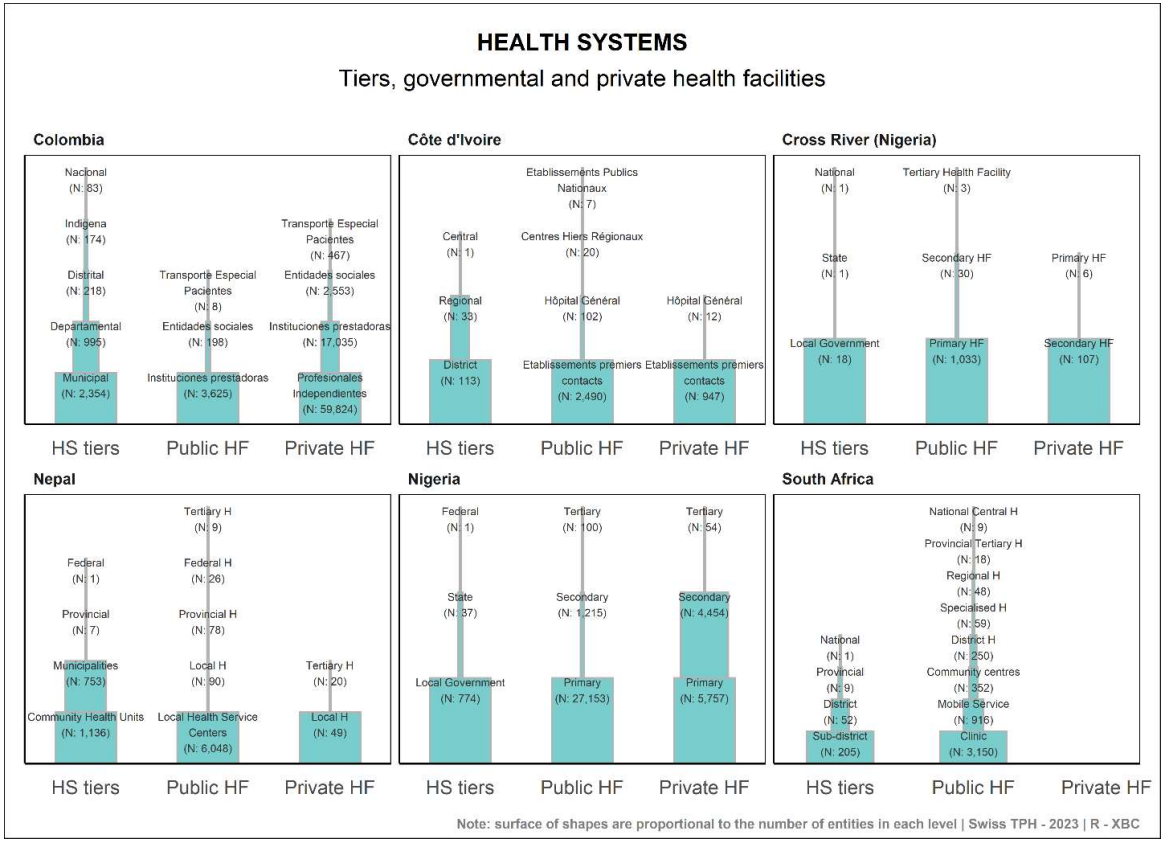
  DHS2, ESIGL, OPEN Elis, SIGDEP, MSupply, MAGPI, DATIM (DHS2), COMCARE, SiHO, REPS, SIPE, ReTHUS, MIPRES, MiVAcuna, Massive Survival Consultation, RUAFND, ICD 11, ICF, ICHI, eLMIS, eTB register, SORMAS

RHIS in countries – Covid-19 related issues

- New databases, new procedures and new management (Côte d'Ivoire)
- New digital tools specific to Covid-19; however other health care events ceased to be reported timely
- Establishment of the Information Management Unit, outsourced to local companies, specific for Covid-19 (Nepal)
- Covid-19 stopped the uptake of the NHMIS 2019 changes; weak reporting through regular mechanisms (Nigeria)
- Multiple adaptations reported, including organisation of health care (South Africa)

Data for measuring AND for acting

- RHIS are organised following the health system tiers
- There is a large number of management units and health
- These makes RHIS complex, large and linked to health care



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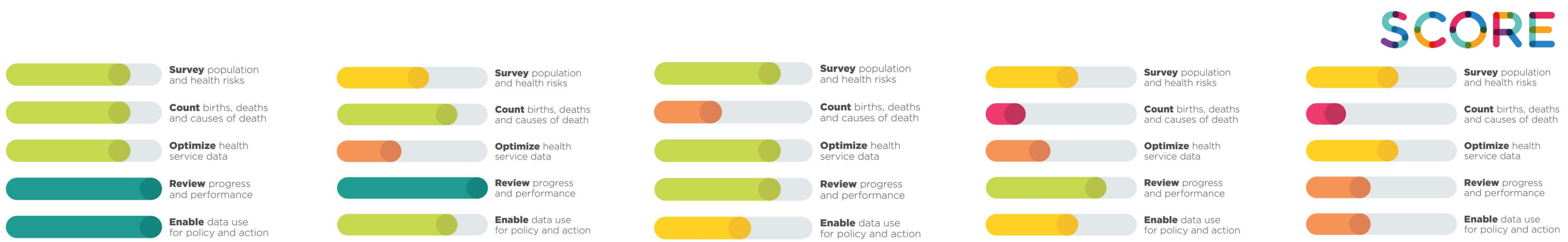
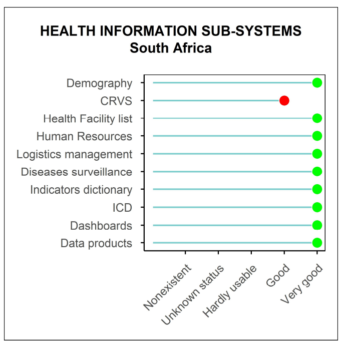
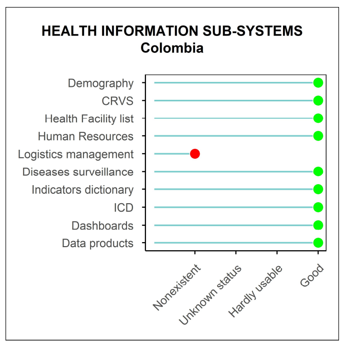
Availability and status of RHIS components

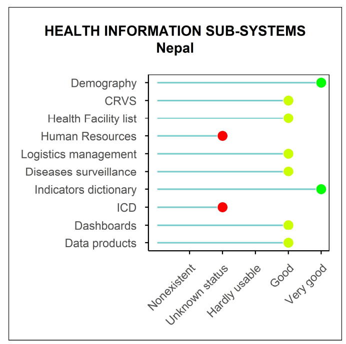
- All items at least existed in all countries, except the LMIS in Colombia.
- The LMIS was the least developed, being inexistant in Colombia and of unknown status in Nigeria and in Cross River state.

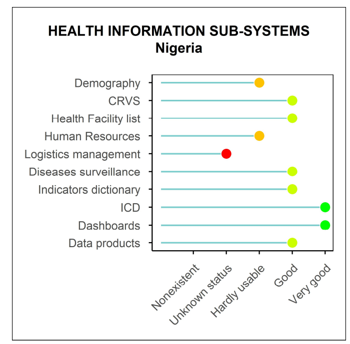
HIS status across the six countries

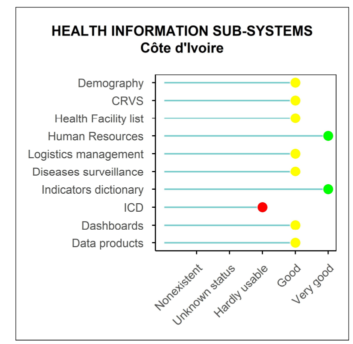












Funding of RHIS

- Governmental budget for RHIS (USD, % of health expenditure)
  - Colombia: 35 million (0.2%)
  - Nigeria: 2.2 million (0.1%)
  - South Africa: 0.8 million (0.004%)

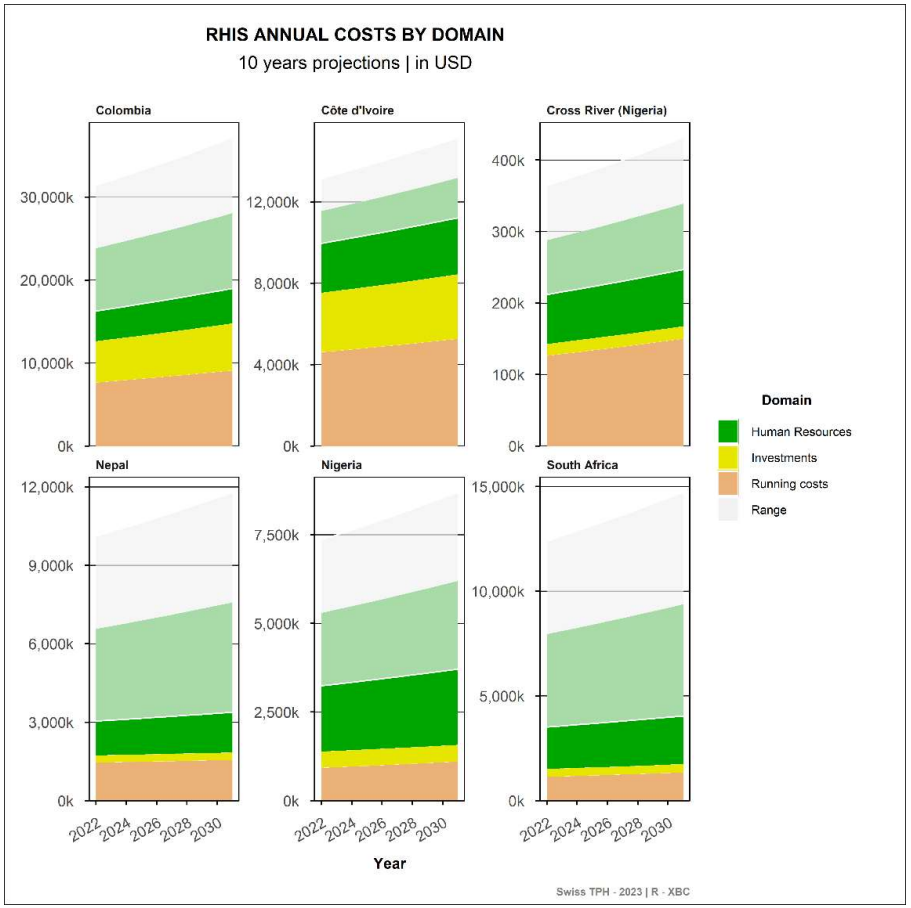
- External support as proportion of RHIS
  - Nigeria: 30%
  - Nepal: 20%
  - Items: infrastructure, software, direct financial support, equipment, training

Annual costs of RHIS (x 1,000 USD)

	Minimum	Mid-point	Maximum
Côte d'Ivoire	9,960	11,560	13,160
Colombia	16,270	23,840	31,420
Cross River (Nigeria)	210	290	360
Nepal	3,040	6,570	10,110
Nigeria	3,240	5,300	7,360
South Africa	3,520	7,950	12,390

Annual costs of RHIS by domain (x 1,000 USD)

- Costs are dependant on the estimated proportion of workload dedicated to data
- Human resources (green) get the greatest share of costs (Nepal, Nigeria and South Africa
- Most of human resources costs are incurred at peripheral level
- Median cost per capita: 0.5 USD



Time spent in data issues by health workers

- Annual person-time (hours) spent on data in the whole country:
  - Colombia: 26 million
  - Côte d'Ivoire: 8 million
  - Nepal: 11 million
  - Nigeria: 43 million
  - South Africa: 5 million (?)

Economic analysis (1/3)

- Economic studies in the literature tend to be framed in the context of clinical care;
- No standard methodology
  - Comparability
  - “Health systems significance”
- Interpretation
  - health systems specific settings
  - items included in the calculations
  - analytical approach
  - time trends of the estimates
- Challenges: scope, assumptions, hypothesis | data requirements | approaches | interpretation

Economic analysis (2/3)

Value of Lost Welfare (VLW) due to Amenable Mortality in 2015 (millions, 2015 IND) using baseline Value of statistical Life (VSL) assumptions; VLW expressed as equivalent proportion of 2015 GDP and Value of lost welfare in 2022 USD

Country	Value of Lost Welfare 2015 (USD in mlllions)	% of GDP	Value of lost Welfare 2022 USD (millions)	Cost of RHIS (2022)	% RHIS vs foregone welfare
Colombia	35,419 (28,578 to 45,426)	5.4% (4.4% to 6.9%)	28,024,414	24,276,886	0.0001%
Côte d'Ivoire	17,249 (9,730 to 29,942)	22.2% (12.5% to 38.6%)	8,235	11,726,870	0.1424%
Nepal	8,755 (4,919 to 14,463)	12.3% (6.9% to 20.3%)	3,001	6,678,443	0.2226%
Nigeria	182,022 (111,440 to 318,036)	17.0% (10.4% to 29.8%)	1,589,108	53,914,580	0.0003%
South Africa	125,031 (103,540 to 148,511)	17.6% (14.6% to 20.9%)	62,714	8,100,216	0.0129%

Economic analysis (3/3)

Expenditure per capita on HIS and HAQ index score

Country	Expenditure per capita (2022)	2019 HAQ index score Overall
Colombia	0.47	61.1
Cote Divoire	0.42	34.3
Nepal	0.22	38.8
South Africa	0.14	44.6
Nigeria	0.02	31.6

- There did not appear to be any relationship between higher per capita investments in RHIS and improved HAQ scores.
- Some relationships between expenditure per capita in HIS and HAQ.

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4 Conclusions

RHIS…

- RHIS are core to the achievement of SDG, UHC and quality of care outcomes
- RHIS are likely the largest and more complex HIS:
  - Encompasses the whole system
  - It is inextricable from the process of care
  - It is largely driven by the periphery of the system
  - Relies on health care providers
- …however
  - Provide data to only 5% of health-related SDG indicators
  - Are marginally funded
  - Rely on the time shared by health workers

RHIS…

- The problems of RHIS have been widely described in the published and grey literature for decades
- Problems encompass every aspects of RHIS, including governance, organisation, infrastructures, communication, equipment, human resources and finances
- Attempts to improve RHIS:
  - Have not been impressively effective
  - Seem to be based in old paradigms, where different decision-spaces are not contemplated
  - Are rooted on the idea that good system as conceived by experts is a good system in real life situations
  - Is based on unreasonable demands to health workers
  - Are based on scanty, weak and inconclusive evidence

Economic analyses issues

- Comparisons to consider
  - Different cadres of staff
    - Costs
    - Performance
    - Time use of care
  - Digital versus paper-based; and types of digital
  - Disease areas
    - Number of indicators
    - Other

- Outcomes
  - Health status
  - Coverage
  - Processes of care / quality of care
  - Health systems components performance
  - Data use
  - Quality of data
  - Health seeking behaviour

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5 THE FUTURE

1 Paradigm change

× Old	✓ New
× Data – dashboards - planning	✓ SDG / UHC / Quality of care
× 'Technocratic' frameworks developed before the digital 'explosion',	✓ Innovation consistent with new knowledge
× Use of data without detail	✓ Specific decision-spaces
× Making health workers responsible	✓ Improving the system
× Observational research	✓ Experimental and mix-methods research
× De-implementation	✓ Evidence informed initiatives / no harm

What next?

- Multilaterals
  - Promote RHIS as a "health technology" (HTA)
  - Safeguard the link between RHIS and provision of care / UHC
  - Support high quality research
  - Convene partners to adhere to ethical principles of RHIS
- Governments
  - Demand a regulatory framework for RHIS (e.g. HTA)
  - Budget RHIS specifically, factoring contributions
  - Establish funding scenarios
- Technical partners
  - Stop unduly influencing RHIS
  - Use experts with up to date knowledge and expertise on key methods (e.g. HCD)
  - Adhere to ethical principles of data governance and also health care
- Funders
  - Stop unduly influencing RHIS
  - Acknowledge the radical importance of RHIS to achieve SDG / UHC
  - Factor the RHIS within competing funding needs
  - Fund high quality research

HDC – RHIS working group

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