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

Xavier Bosch-Capblanch, on behalf of the team
Geneva, 19th May 2023
1 Perspectives and objectives
2 Methodological considerations
3 Synthesis of findings
4 Conclusions
5 THE FUTURE
1 Perspectives and objectives
Global perspective

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.”

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

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

Astana, Kazakhstan, 25 and 26 October 2018
Data Governance perspective

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.

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.
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.


Historical perspective
Reality perspective

68% of countries have good capacity for public health threat surveillance.

40% of the world’s deaths remain unregistered.

50% of countries have limited or less capacity for systematic monitoring quality of care.

60% of countries have good capacity to review progress and performance of the health sector.

59% of countries have good capacity to use data to drive policy and planning.
Objectives of this assignment

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

<table>
<thead>
<tr>
<th>✔️ We did…</th>
<th>✗ We did not…</th>
</tr>
</thead>
<tbody>
<tr>
<td>✔️ Draw on existing evidence and expert opinion</td>
<td>✗ Carry out primary research</td>
</tr>
<tr>
<td>✔️ Focus on RHIS</td>
<td>✗ Address the whole spectrum of HIS</td>
</tr>
<tr>
<td>✔️ Describe the status and costs of RHIS components</td>
<td>✗ Assess what works against standards</td>
</tr>
<tr>
<td>✔️ Valued to potential contribution of RHIS to health outcomes</td>
<td>✗ Estimate a monetary return of investment</td>
</tr>
</tbody>
</table>
Clarifications (2/2): issues with monetary estimates of return of investments based on literature

- 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?

UNTRUSTFUL RESULTS!
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**
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
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)

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

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

<table>
<thead>
<tr>
<th>Country</th>
<th>Expenditure per capita (2022)</th>
<th>2019 HAQ index score Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colombia</td>
<td>0.47</td>
<td>61.1</td>
</tr>
<tr>
<td>Cote Divoire</td>
<td>0.42</td>
<td>34.3</td>
</tr>
<tr>
<td>Nepal</td>
<td>0.22</td>
<td>38.8</td>
</tr>
<tr>
<td>South Africa</td>
<td>0.14</td>
<td>44.6</td>
</tr>
<tr>
<td>Nigeria</td>
<td>0.02</td>
<td>31.6</td>
</tr>
</tbody>
</table>

- 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.
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
Swiss TPH

5 THE FUTURE
### 1 Paradigm change

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

- Jim Ricca
- Michelle Monroe
- Maria Petro Brunal
- Kuntal Saha
- Taavi Erkkola
- "Khondkar RifatHossain (co-chair)"
- "Eman AbdelkreemAly"
- Arash Rashidian
- Daniel Low-Beer
- Regina Guthold
- Elizabeth Katwan
- Theresa Diaz
- Wendy Vender
- Anh Chu
- Andrew Porth
- Chika Hayashi
- Ifeoluwa Olokod
- Norah Stoops
- Jean-Pierre de Lamalle (co-chair)
- Theo Lippeveld
- Debra Jackson
- Jorn Braa
- Derek Kunaka
- Lisa Bursales (co- chair)
- Arthur Heywood
- Bob Pond

- Craig Burgess
- Carolina Salles
- Anh Chu
- Dejan Loncar
- Melanie Bertram
- Rifat Hossain
- Mwenya Kasonde
- other WHO supporting staff