Systems Toolkit for Sample Registration Systems (SRS): A Systems Lens to Design and Planning

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Objectives of the Toolkit

Apply a systems thinking lens to SRS planning and design by making explicit how the properties of complex adaptive systems manifest at each step, and what this means for practical decision-making.

Bridge theory and practice - pairing each planning step with systems considerations, tools, templates, and methods needed. How to navigate the complexity involved.

Complement the 12 Steps guide - translating technical guidance into a structured, systems-informed process that can be applied during the planning and design phase

Consolidate instruments into a coherent package, forms, templates, checklists, and assessment tools, organised around the logic of each planning step and interdependencies between them.

Guide sequencing and application - clarifying when and how each tool should be used, which stakeholders to involve, and what outputs are expected at each stage.

Embed integration and sustainability from the outset - positioning SRS within existing national data ecosystems.

Who is the Systems Toolkit for?

Policymakers, planners, and program managers responsible for SRS.

Technical experts including statisticians, epidemiologists, IT architects, and monitoring and evaluation specialists, who support SRS.

Development partners, donors, and implementing organizations

SRS is a complex adaptive system

- Mortality systems composed of many interacting agents whose collective behaviour produces emergent outcomes that no single component can determine or predict alone
- Characterised by non-linearity, self-organisation, feedback loops, and constant adaptation to changing conditions.
- SRS involves many interacting agents—community informants, field supervisors, data managers, health system staff, statisticians, and policymakers
    - behaviours are shaped by local incentives, norms, and capacities that vary across settings and evolve over time.

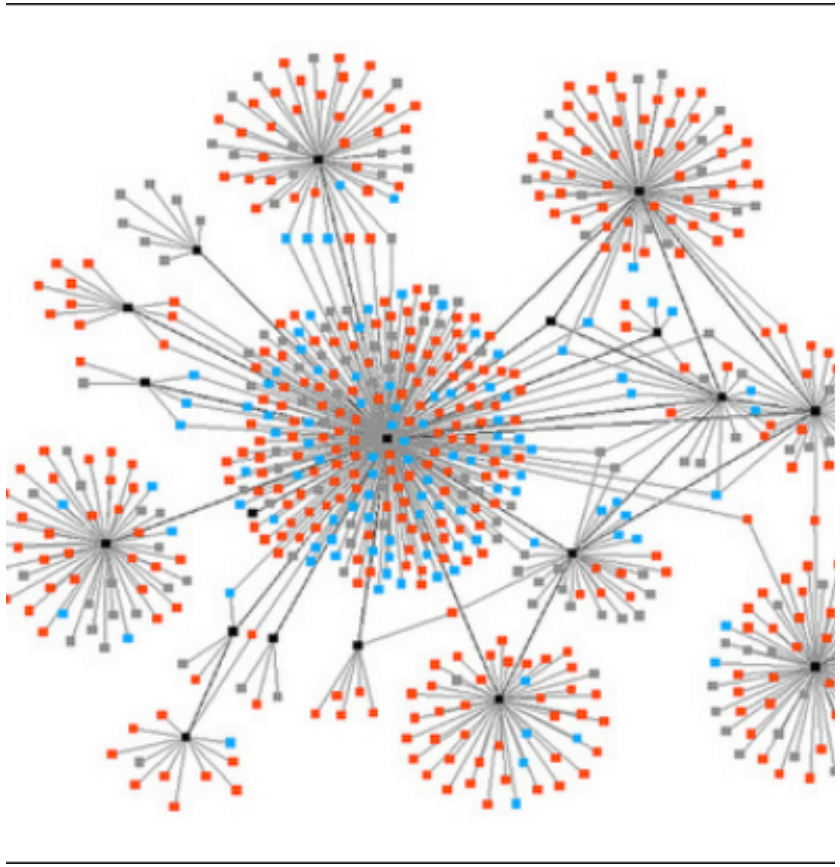
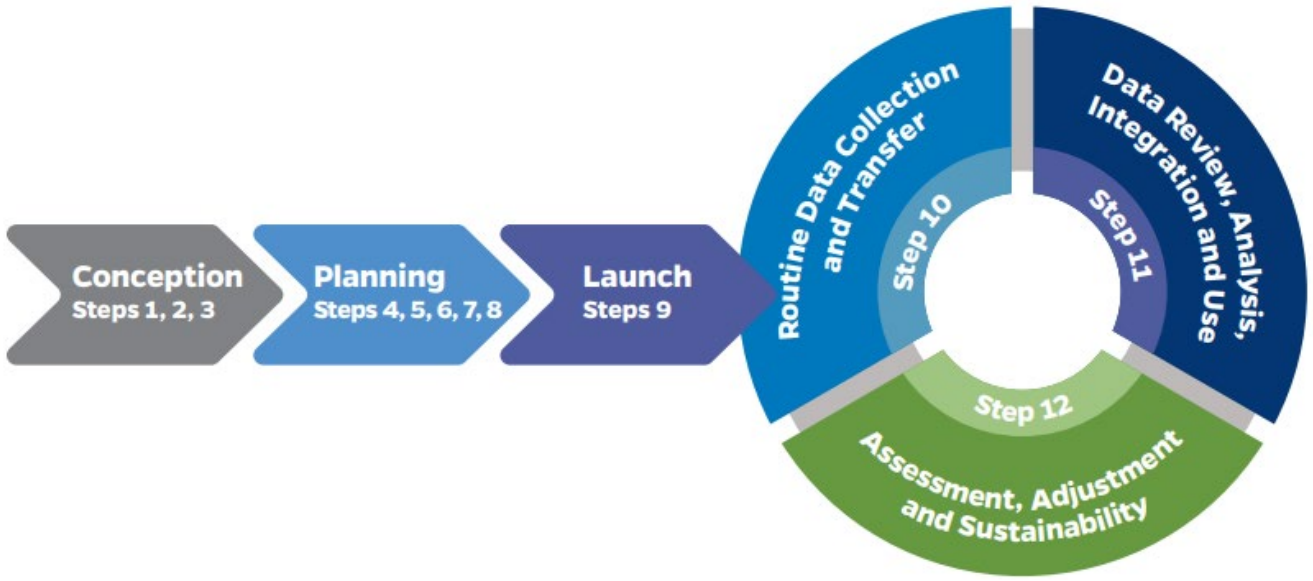


Fig Source: https://paul4innovating.com/2012/02/09/a-recognition-that-innovation-is-a-complex-adaptive-system/


NATIONAL MORTALITY DATA ECOSYSTEM
CRVS · HMIS · Surveys · Community reporting
Institutional & policy context
SAMPLE REGISTRATION SYSTEM
Many interacting agents whose behaviours are shaped by local incentives, norms, and capacities that vary across settings and evolve over time
Community informants
Field supervisors
Data managers
Health system staff
Statisticians
Policymakers
Design goal
Build a system that functions, learns, and adapts over time — not one assuming a fixed environment
Interdependence
Disruption in one component cascades across the whole system; no single part owns the problem
Non-linearity & emergence
Small early decisions produce disproportionately large and unexpected downstream effects
Adaptation
Agents continuously adjust behaviour to local conditions, producing unintended system-level patterns
Feedback loops
Primary mechanism for self-regulation and learning; must be designed in from day one
Embeddedness
Nested within national data ecosystems; shaped by legal frameworks, statistical capacity, and political priorities
Legend
CAS property of SRS
National mortality data ecosystem (external context)
SRS

A systems lens for design and planning SRS

- The 12 Steps of SRS Implementation describe the full lifecycle of a Sample Registration System
- 6 phases: conception, planning, launch, routine data collection, data analysis and use, and assessment and sustainability.
- This toolkit focuses specifically on the conception and planning phase, **Steps 1 to 8**.
- These steps provide the foundation upon which later phases are built.



Report Format

Aim

Rationale

Systems lens — Interdependence & shared resources

Requirements and system considerations

Outputs

Key systems message

Step 1: Building Support

Establish the governance, ownership, and financing foundation for the SRS.

Requirements and system considerations

a) Identify institutions involved;

b) Identify institutional leadership;

c) Establish ownership & accountability;

d) Map stakeholders;

e) Initiate financing discussions.

Comprehensive stakeholder mapping - identify key actors

Countries should analyse stakeholder roles, interests, and influence

Financing considerations

Outputs

- Interview with stakeholders and managers (Forms 1.2 and 1.3)
- A stakeholder map and power–interest analysis (Form 1.4)
- Defined institutional arrangements and governance structure
- Establishment of an SRS Technical Working Group
- Funding landscape tool
- Resource mobilisation plan

Key systems message: Governance decisions create path dependencies that constrain every subsequent choice. Design the system, not just the approval.

Step 2: Situational Assessment

Map the existing mortality data ecosystem before designing anything new.

Requirements and system considerations:
Inventory of existing mortality data systems
Examine system interdependencies
Consider historical factors
Assess whether effective feedback loops exist
Apply equity lens

Outputs
Completed Form 1.1 – Inventory of mortality systems
Completed Forms 1.2–1.3 – Interviews with stakeholders & managers
Completed Form 1.5 & 1.5.1 – Information architecture analysis
Completed Form 1.6 – Process mapping of "as-is" workflows
Completed Situational Assessment report
Legal/ regulatory review report

Key systems message: You cannot design or modify a system you do not understand. This step reveals the interdependencies, path dependencies, and feedback failures that will shape — or undermine — what you build next.

Step 3: Surveillance Design and Data Collection Strategy

Translate situational findings into a coherent SRS design integrated with existing systems.

Requirements and system considerations

Develop a coherent design for the SRS

Define the scope of mortality indicators, data collection approaches

Ensure SRS design is integrated within the broader data ecosystem

Indicators should align with national priorities and global monitoring frameworks (e.g., WHO SCORE).

Review ongoing or parallel data collection activities

Embed quality assurance mechanisms

Outputs

Design workshop using situational assessment evidence

Refined process maps showing “to-be” data flows

Use SWOT to prioritize feasible designs

System Design Template

Key systems message: Integration is not an add-on — it is the design. An SRS that runs parallel to CRVS and HIS adds burden without adding value. Design interoperability and quality loops from the first sketch.

Step 4: Statistical Domains, Sampling Design, and Sample Size

Define who and where the SRS will measure, ensuring estimates are representative, powered, and credible.

Requirements and system considerations

Ensure SRS produces statistically valid and policy-relevant estimates. Define the geographic and population domains for which estimates are required

Sampling strategies should be designed to achieve representativeness while remaining operationally feasible.

Establish a robust sampling frame

Plan to update sampling frame regularly

Outputs

Sampling design templates (from 12 Steps)

Sample size calculation worksheets

Technical validation with National Statistics Office

Sampling Design Report template

Key systems message: Who you count shapes what you see. A sampling frame that excludes hard-to-reach populations skews the entire mortality picture the SRS is designed to correct.

Step 5: Tool and Manual Development, Testing, and Ethical Clearance

Adapt, test, and approve the instruments and operational procedures field teams will use.

Requirements and system considerations

All tools and procedures should be pilot tested

Lessons from the pilot sites should be reviewed with the stakeholders

Refine tools and processes.

Ethical and regulatory approvals must be obtained

Outputs

Finalised tools and operational manuals

Pilot testing report and revised tools

Approved ethical and regulatory clearances

Key systems message: Pilots are the only opportunity to observe real adaptation before it becomes systematic bias. Design the feedback loop — pilot, review, revise — before fixing the tools.

Step 6: Digital Solutions and IT Architecture

Design resilient, interoperable digital infrastructure that supports data flows and real-time feedback.

Requirements and system considerations

Digital solutions - part of an interconnected system
Design for resilience, with built-in mechanisms for monitoring
Plan for hardware and software (costly and complex to replace)
Digital solutions must be designed with equity and accessibility
System must support continuous learning and long-term viability.
Prioritise interoperability, scalability, and flexibility
Designed to function effectively in low-resource settings

Outputs

Information flow diagrams and system architecture documentation
Form 1.5 & 1.5.1
Digital requirements checklist (devices, servers, data security)
Data flow diagrams
Dashboard templates for mortality indicators

Key systems message: Technology chosen for convenience today becomes infrastructure tomorrow. Prioritise flexibility, open standards, and feedback mechanisms over the cheapest or most familiar platform.

Step 7: Equipment and Supplies

Identify, cost, and plan procurement, especially where resources are shared across systems.

Requirements and system considerations

Identify all equipment and supplies required (data collection and analysis devices, computer servers, transport, and communication tools)

Leverage existing infrastructure within health or statistical systems

Arrangements for procurement, asset management, maintenance, and replacement.

Comprehensive costing exercise

Outputs

Equipment and supplies inventory

Completed costing tool to estimate initiation and recurrent costs for procurement, fuel, maintenance, connectivity, etc.

Summary: Step 7 includes identifying, procuring and maintaining the required equipment and supplies for SRS, ensuring clear arrangements for sharing resources across systems, including roles, costs, and responsibilities. It suggests the use of structured costing tools and documentation to support efficient, sustainable management.

Step 8: Human Resources, Recruitment, Training, and Capacity Building

Ensure the SRS is staffed, trained, and institutionally capable of sustaining performance over time.

Requirements and system considerations

Plan for human resources and institutional capacity to implement and sustain the SRS.

Comprehensive human resource plan - roles, responsibilities, required competencies and funding for the positions at all levels.

Recruitment processes should be established for data collectors, supervisors, and technical staff.

Training programmes

Invest in long-term capacity building

Outputs

Human resource plans and budgets

Terms of reference for all roles at various levels – national, provincial and community.

Training and capacity-building plans including refresher training schedules

Capacity building plan for sustainability

Supervision and quality assurance mechanisms

Key systems message: Capacity is a system property, not an individual one. Sustainability requires institutional memory, structured supervision, and feedback mechanisms that persist beyond any individual's tenure.

A systems lens for design and planning SRS