DCS Workshop

Deep Dive: Standards, SMART guidelines, and open source/ open architecture systems and tools

SMART guidelines

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Outline

WHO SMART Guidelines – 10 minutes
- What problems are they intended to address?
- What are the 5 layers?
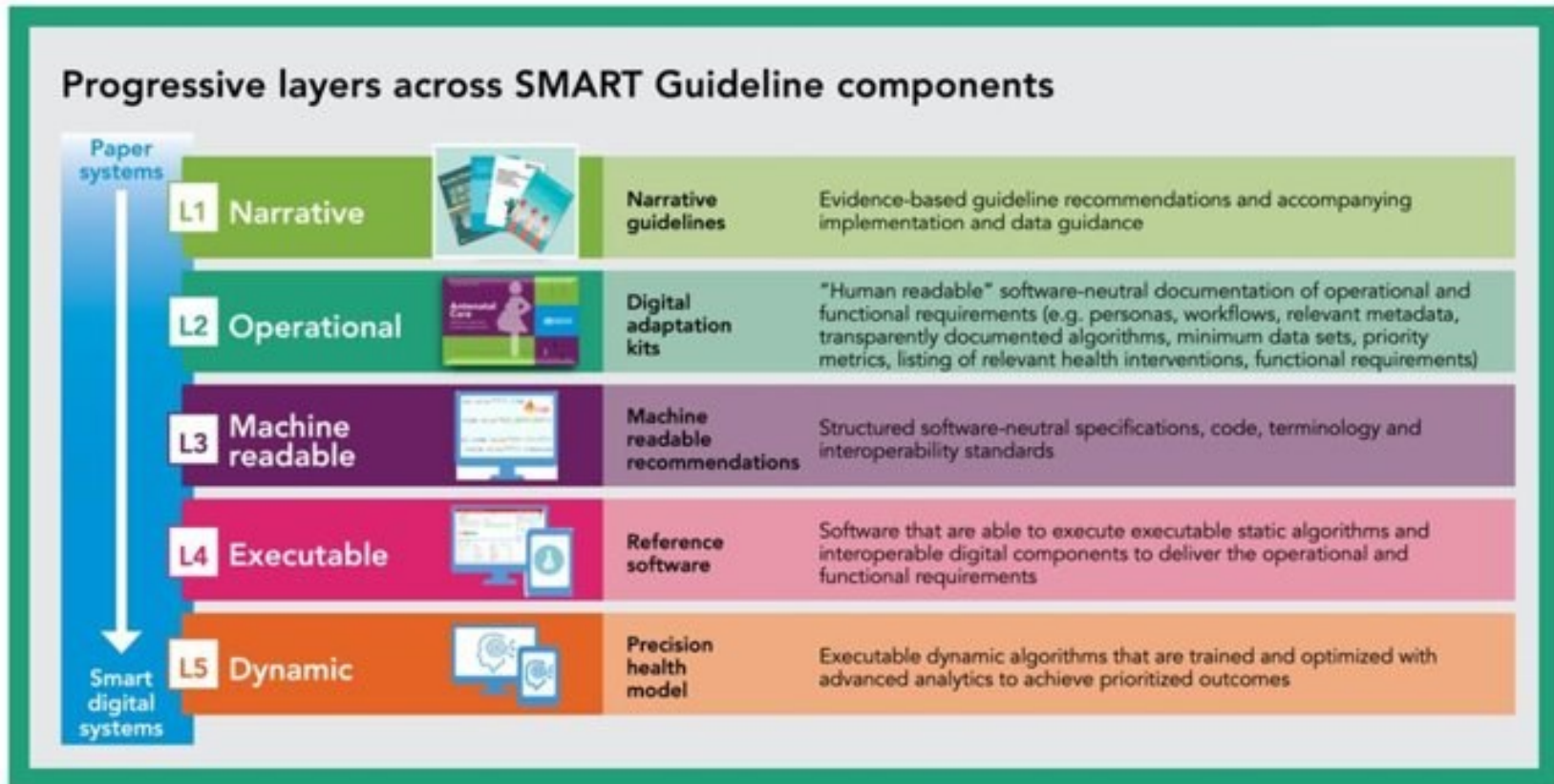- Deeper dive into the L2 Digital Adaptation Kit

Standards Governance - 10 minutes
- Syntactic vs. Semantic Standards
- Using terminology standards

Global Goods in depth – 10 minutes

SMART Guidelines

Progressive layers across SMART Guideline components

Paper systems → Smart digital systems

L1 Narrative		Narrative guidelines	Evidence-based guideline recommendations and accompanying implementation and data guidance
L2 Operational		Digital adaptation kits	"Human readable" software-neutral documentation of operational and functional requirements (e.g. personas, workflows, relevant metadata, transparently documented algorithms, minimum data sets, priority metrics, listing of relevant health interventions, functional requirements)
L3 Machine readable		Machine readable recommendations	Structured software-neutral specifications, code, terminology and interoperability standards
L4 Executable		Reference software	Software that are able to execute executable static algorithms and interoperable digital components to deliver the operational and functional requirements
L5 Dynamic		Precision health model	Executable dynamic algorithms that are trained and optimized with advanced analytics to achieve prioritized outcomes

Standards-based, Machine-readable, Adaptive, Requirements-based, and Testable

https://www.who.int/teams/digital-health-and-innovation/smart-guidelines

Challenge being addressed and objectives:

PROBLEM:

Adopting and adapting the WHO Guideline recommendations is a complex, lengthy process that can take years

- Recommendations are not integrated into practice quickly
- Accuracy can be compromised
- Resource-intensive and expensive

OBJECTIVES:

Accelerate the uptake of WHO guidelines and recommendations by providing a set of **re-usable components** that make it easier for software developers and implementers to **contextualize** and incorporate the WHO guidelines and recommendations into their digital health systems. Encourage the use of interoperability standards.

Value Proposition

- Improve quality of health content in digital health systems to ensure:

  - consistent, standardized collection of data

  - appropriate decision support

  - calculation of indicators across geographies.

- Lower the cost of related software development by providing organizations with SMART software specifications to ensure vendors provide a minimum of functionality and quality content, in turn reducing potential for vendor lock-in.

- Speed up the process of adaptation.

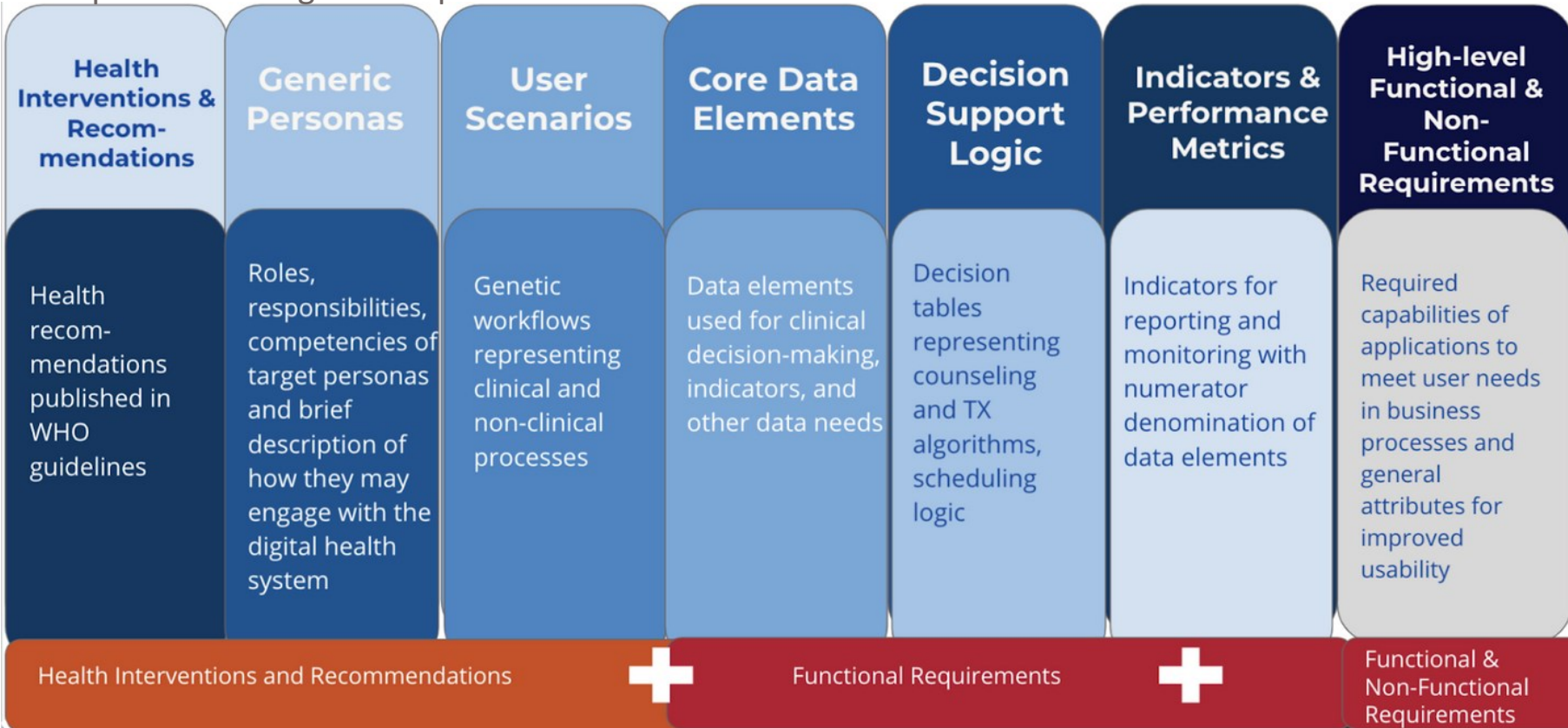- Reduce the risks associated with digital investments.

The 5 layers of SMART guidelines

Software-neutral set of re-usable components

	L1 Narrative	**L2** Operational	**L3** Machine Readable	**L4** Executable	**L5** Dynamic
Description	**Human Readable**, written narrative clinical, public health, or policy recommendations or guidelines—based on peer reviewed articles	**Human Readable**, flow diagram, decision tree, or other similar format that describes written recommendation guidelines	**Computer/Machine Readable** specification encoding logic with data module(s) ready for software migration and program implementation	**Software Application** CDS ready for use in a local execution environment (e.g., website, mHealth app, OpenSRP)	**Executable dynamic algorithms** trained and optimized with advanced analytics to achieve outcomes
Who they inform	Health workers and Governments	Health system managers and software firms	Software firms	Health workers	Health Workers
Example	WHO Recommendation on Antenatal Care for a Positive Pregnancy	Digital Adaptation Kits	Terminology/code/value sets; FHIR Resource Mapping	WHO Antenatal Care (ANC) module; USAID CommCare app	Precision Health Model

L2 – Digital Adaptation Kits (DAKs)

All of the information within the adaptation kit represents a generic starting point, which can then be adapted according to the specific context.

Health Interventions & Recommendations	Generic Personas	User Scenarios	Core Data Elements	Decision Support Logic	Indicators & Performance Metrics	High-level Functional & Non-Functional Requirements
Health recommendations published in WHO guidelines	Roles, responsibilities, competencies of target personas and brief description of how they may engage with the digital health system	Genetic workflows representing clinical and non-clinical processes	Data elements used for clinical decision-making, indicators, and other data needs	Decision tables representing counseling and TX algorithms, scheduling logic	Indicators for reporting and monitoring with numerator denomination of data elements	Required capabilities of applications to meet user needs in business processes and general attributes for improved usability

Health Interventions and Recommendations ✚ Functional Requirements ✚ Functional & Non-Functional Requirements

Standards Governance

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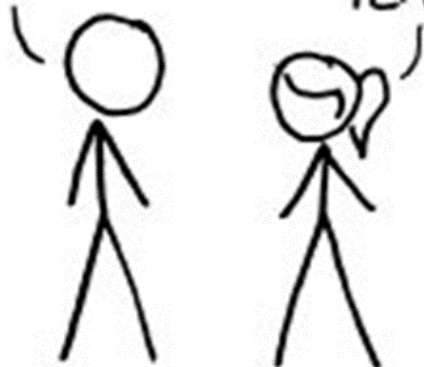
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Four Levels of Interoperability (HIMSS)

- **Foundational (Level 1):** Establishes the inter-connectivity requirements needed for one system or application to securely communicate data to and receive data from another
- **Structural (Level 2):** Defines the format, syntax and organization of data exchange including at the data field level for interpretation
- **Semantic (Level 3):** focuses more on the use of data elements with standardized definitions from publicly available value sets and coding vocabularies, providing shared understanding and meaning to the user
- **Organizational (Level 4):** Includes governance, policy, social, legal and organizational considerations

What is FHIR?

FHIR®, The Fast Healthcare
Interoperability Resource (hl7.org/fhir) a free and open standard for
health interoperability which development began 2012. The FIVE
THINGS to know about FHIR:
- A data model for describing health and administrative data
- A Restful API for interacting with data using JSON or either XML
- A range of open source tools to implement and test FHIR
  applications
- A Collection of FHIR Servers to interactive with
- A community of implementers working together (Chart.FHIR.org)

Terminology Standards

Standard terminology provides a foundation for interoperability by improving the effectiveness of information exchange.
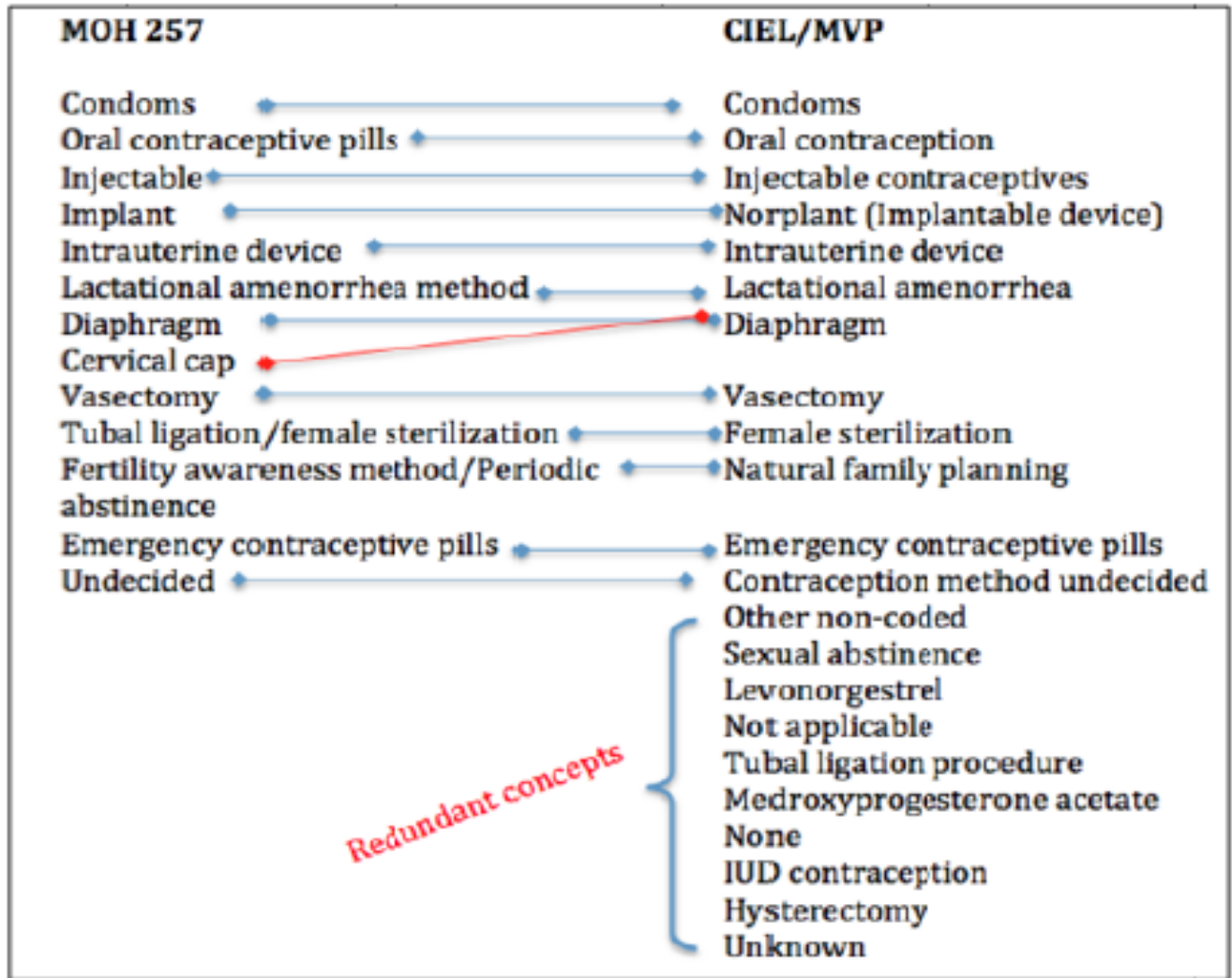
- **Interface terminologies** is called application terminologies, defined as systematic collections of healthcare-related phrases (terms) that support clinicians' entry of patient-related information

- A **reference terminology** is a set of concepts and relationships that provide a common reference point for comparison and aggregation of data about healthcare process, recorded by different individuals and systems

Terminology Management Best Practices

- Have a terminology services and server to represent factual reality in order to allow for semantic interoperability and computerized application

- Having a Terminology team/ Workgroup that governs and manages terminologies and the processes including request or update or remove concepts

- Consider building capacity in Terminology standards

- Terminology standards have a life cycle e.g code retirement, expansion, changing context, updating, new releases

- Handling Multiple Granularities: Engage Stakeholder to define the level of details of a vocabulary/ terminology

Manual Mapping of Kenya MoH Local Code to CIEL/MVP (Columbia University)

ISSUE WITH SPECIFICITY, SENSITIVITY, REDUNDANCY OF CONCEPTS

MOH 257	CIEL/MVP
Condoms	Condoms
Oral contraceptive pills	Oral contraception
Injectable	Injectable contraceptives
Implant	Norplant (Implantable device)
Intrauterine device	Intrauterine device
Lactational amenorrhea method	Lactational amenorrhea
Diaphragm	Diaphragm
Cervical cap	
Vasectomy	Vasectomy
Tubal ligation/female sterilization	Female sterilization
Fertility awareness method/Periodic abstinence	Natural family planning
Emergency contraceptive pills	Emergency contraceptive pills
Undecided	Contraception method undecided

Redundant concepts:
Other non-coded
Sexual abstinence
Levonorgestrel
Not applicable
Tubal ligation procedure
Medroxyprogesterone acetate
None
IUD contraception
Hysterectomy
Unknown

Lessons Learned from Kenya

● Develop plan for Concept Dictionary management

● Constituting the right technical work groups and consult with groups with relevant experience

● Identify a collection of concepts and assuring the scope of concepts is closely aligned with primary country's needs.

● Policies and procedures are need for natural evolution of dictionary and high quality responsiveness to implementers.

● Capacity building efforts be integral to the country's strategy for dictionary management.

● Leveraging on communities around eHealth systems that are working specifically on vocabularies and ontologies.

● OpenHIE Terminology Service, Open Concept Lab (OCL) is working on a 'Subscription Service' that would significantly reduce the burden in managing concept dictionaries.

Global Goods

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What are the problems we're trying to solve?

Implementers: What tools already exist and how can I find them?

Country Ministry: What software applications already exist? Can it be used in another sector? country?

Country Ministry: How are other governments tackling this problem?

Helping user groups tackle persistent challenges?

National program: What digital solutions are effective for my needs? Implementation considerations of solutions, to maximize digital health benefits?

Donors: Are other actors willing to co-invest with us on new digital interventions

Tool Developers: What is really needed by users?

Global Goods   VS Digital Public Goods (DPGA)

Global Goods are a sub-set of Digital Public Goods

- Focused on health domain
- Focused on digital health products defined as software, content, or service
- Open source / open license
- At a level of Maturity
  - Scale
  - Funding
  - Demonstrated effectiveness
  - Shelf-readiness

Interactive Global Goods Guidebook

Will launch in early December

Online interactive tool

Search for global goods by:

- WHO system category

- OpenHIE architecture component

- Standards supported

- Countries where it is implemented

Digital Square approved global goods