

WHO Technical Workshop on the ecosystem of tools to achieve uptake of FHIR, ICD and CQL content as represented in Layer 3 of WHO SMART Guidelines, for Immunization and PHC service delivery domains

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28 – 30 March 2023

Campus Biotech, Geneva, Switzerland

Executive Summary

WHO's [SMART Guidelines](#) program is focused on providing a stepwise approach to transform the way WHO guidelines are adapted and implemented in digital health solutions in countries. The third layer (L3: Machine readable—machine-readable recommendations) of SMART Guidelines 5-layer framework provides software code necessary for software developers to incorporate standardized logic from WHO guidelines into digital systems. This includes calculations related to clinical decision support and performance metrics, which are conformance testable. For person-centered systems, SMART Guidelines L3 content is represented in Fast Healthcare Interoperability Resources (FHIR) as an Implementation Guide (IG). **Currently, how FHIR IGs are documented and represented as executable code, and subsequently implemented, varies greatly across health programmes and across different downstream software platforms in the ecosystem.** The lack of a specificity in the standards, lack of agreement around a common process and coordinating platform has resulted in incomplete documentation, insufficient tooling, and challenges in implementation.

There is an evolving ecosystem of templates and software tooling for creating and adapting SMART L2 and L3 content. A complementary set of foundational open-source software frameworks and codebase “commons” are being developed and maintained by multiple software developers as part of a broader effort around the FHIR, International Classifications of Diseases (ICD), and Clinical Quality Language (CQL) open standards. Numerous developers are working on tooling that builds to the WHO SMART guideline standard, and on top of the “commons” software tooling, which we here refer to as the SMART ecosystem.

The WHO Department of Digital Health and Innovations (DHI), in collaboration with the University of Geneva, a WHO Collaboration Center, will convene a three-day workshop to bring together experts who have been working on SMART guidelines to review the status of the SMART ecosystem. This includes existing tools required for development and adaptation of digital health solutions consistent with SMART L3 guidelines. This provides an opportunity to collate nascent efforts and distill learnings to inform the development of standardized tooling and system architecture based on existing and anticipated needs for the SMART Guidelines ecosystem, with the real-life focus on adoption of SMART Guidelines for Immunizations.

Participants include technology developers who have contributed to building tools to author L3 content, as well as the community of developers contributing to the SMART ecosystem related to country uptake and adaptation. **Leveraging experiences from participants, the intention is to chart a collective “roadmap” for the SMART ecosystem in support of initial adoption of SMART Guidelines for Immunization, and applicability other health domains.**

Background

SMART Guidelines provides documentation and a comprehensive set of reusable digital health components (e.g., interoperability standards, code libraries, algorithms, technical and operational specifications) that preserve fidelity and accelerate uptake of evidence-based recommendations and interoperability standards across Member States. SMART Guidelines provides a pathway to advance the adoption of best clinical, public health and data practices through standardized health content, even if a country is not yet fully digitally transformed. WHO is working to ensure SMART Guidelines are established, validated, and accessible for all of primary health care areas, to accelerate digital transformation to achieve universal health coverage.

FHIR is an open data exchange standard for electronic exchange of health information. Developed by Health Level Seven International (HL7), FHIR allows healthcare information to be securely exchanged. The basic building block of FHIR, known as resources, define the information contents and structure for the core information set that is shared by most implementations. Since FHIR was originally launched, it has been used by healthcare application implementers across the globe.

HL7 FHIR along with other free and open standards such as Clinical Quality Language (CQL) serve as the foundation of WHO's SMART Guidelines approach for digitalizing WHO guidelines recommendations as part of the Global Digital Health Strategy. These standards are leveraged to develop a supporting ecosystem of software libraries, services and tools for countries and their partners. FHIR Implementation Guides, part of the third knowledge layer (L3) of SMART Guidelines, have already been published for:

1. [Antenatal Care \(ANC\)](#);
2. [Digital Documentation of COVID-19 Certificates](#);
3. [Immunizations - DRAFT](#)

Although, additional FHIR Implementation Guides for other health domains are currently underway (i.e., child health, HIV, Family Planning, TB, etc.), there is a need to ensure consistency in representation of FHIR in L3 content, and use this meeting to work **through the immunization use case with the draft SMART guidelines content**. Additionally, there is a need to strengthen the ecosystem of tools used to build the implementation guides so that L3 content can be easily implementable for the purpose of SMART immunization systems and beyond.

Meeting objectives

1. To convene and learn of the experience of implementers who are currently leveraging SMART Guidelines L3 content, the Android FHIR SDK, and/or the FHIR with CQL standards in general for data collection and decision support systems.
2. To determine objectives, ways of working, governance, and future plans for a SMART-based community of practice (COP).
3. To understand the state of, and gaps related to in the existing standards, tooling and resources available for participants and the COP to coalesce around and contribute to global goods for the SMART ecosystem.

4. To understand the capabilities within the ecosystem of emerging software tools; and how these relate to the capabilities needed in the SMART tech ecosystem commons.
5. To determine gaps in the standards and tooling needed to support the uptake and adaptation of FHIR Implementation Guides in low-resource settings from the perspective of technology implementers.
6. To refine L3 and L4 SMART Guidelines templates, requirements, and guidance as necessary.

Expected outcomes of this work

1. Identification of barriers and challenges in curating and adopting WHO SMART Guidelines content that need to be overcome with consensus and additional guidance.
2. Landscaping of capabilities available across the ecosystem, and determination of gaps needed for the SMART ecosystem, to succeed for immunization and other areas.
3. A formalized community of practice with clear governance, working groups, and workstreams.
4. A shared roadmap of what is needed for the SMART ecosystem, including roles and responsibilities of participating organizations in the COP. Including a plan of action on how to address identified barriers and challenges.
5. Consensus around specifications for templates for L2 and L3 SMART Guidelines, based on immunizations and maternal health domains.

3-day overview

Day 1: Introduction and establishing a shared understanding of existing capacities and tools with the use case of Immunization.

Day 2: Review gaps needed in capabilities needed for the SMART ecosystem, including COP governance

Day 3: Develop a roadmap, assign role and responsibilities, and determine next steps

Participants

The participants of this three-day meeting include the community of developers and technology partners who have created and used L3 SMART content and FHIR-based content and developed open-source digital public good technology solutions for adoption of SMART guideline L3 content.

Participation is in-person only.