SantéMPI Client Registry

Two-Sentence Overview

This project seeks to improve several key areas of SantéMPI, a next generation online/offline capable CR solution, to strengthen the ability of LMICs to adopt and sustain this technology by: improving installation and configuration processes, enhancing tooling for end-users to more easily customize deployments, upgrading standards support from FHIR R3 to R4, and expanding community documentation.

Our organization and partners' will contribute to achieving these goals by leveraging and applying two decades of deep expertise and experience in open source digital health software including: software innovation, development, implementation, support and capacity building; open standards and OpenHIE; along with our in-depth experience developing, evolving and implementing the MEDIC CR solution.

Executive Summary

Silo'd digital health solutions, implementing multiple patient IDs present significant barriers in LMICs to operationalizing strategies for achieving UHC including shifting digital health to person-centered care, reducing the burden of indicator reporting on frontline health workers, improving the accuracy and timeliness of data, and establishing integrated, national digital health ecosystems. A proven, robust, fully featured Master Patient Index/Client Registry (MPI/CR) like SantéMPI is a, strategic digital health building block which can be used to overcome these obstacles to data quality, harmonization and sharing, and also be leveraged to implement national health IDs.

The overall goal of this project is to strengthen the ability of LMICs to rapidly adopt and sustain SantéMPI at scale by improving key areas of this next generation online/offline capable MPI/CR solution, and leveraging nearly 10 years of experience developing and implementing MEDIC CR. Funding will go toward software infrastructure improvements, upgrading existing interoperability standards capabilities, upgrading tooling used for integration, administration and testing and engaging stakeholders and the OpenHIE Client Registry community to refine deliverables and specifications. Key activities will include improving installation and configuration processes, enhancing tooling for end-users to customize deployments, upgrading standards support more easily from FHIR R3 to R4, and expanding and enriching community technical and policy documentation.

SantéSuite will achieve the goals of this project by applying its team's extensive experience designing, developing and implementing MPI/CR and EMR solutions at national scale in LMICs; operationalizing interoperability standards; building local capacity through hands-on teaching, teaming and tooling; and co-creating digital health strategy, policy and operating procedures.

Consortium Team

SantéSuite Inc. is a Canadian social enterprise, whose founders have extensive international experience developing and implementing national digital health strategies and solutions in LMICs and beyond. Our skill set and track record includes leading the development and implementation of: MPI/CRs (SantéMPI, MEDIC CR) and immunization registries (OpenIZ, TiMR) at Mohawk College; primary care and hospital EMRs (OSCAR EMR, WorldVistA EHR); Digital health certification including US Meaningful Use, ISO 13485, and IHE Conformance; PMI PMP and Agile practitioner certifications; and establishing international open source community ecosystems. SantéSuite Inc.'s team's skills and experience can be augmented as needed through its extensive network of collaborating partners and experts including Mohawk College IDEAWORKS and Hamilton Health Sciences.

Project Description

LMICs need to be able to implement national unique health IDs and collect a standardized minimum set of demographic information during patient registration to be able to provide integrated, high-quality

person-centered care. This is also critical to generating the timely, high fidelity data that is essential for effectively monitoring and continuously improving their health systems to achieve UHC. Facilitating and simplifying the implementation and management of a proven, adaptable and scalable MPI/CR solution is a critical digital health building block necessary to achieving these goals. Our hands-on field experience developing and implementing MPI/CR in national contexts identified the following additional key requirements for successful MPI/CR deployment and use, which are not typically found in CR solutions:

- Support for disconnected/distributed operations to compliment usual cloud/central server approaches
- Extensibility to include other similar registry use cases such facility registry, vital statistics, national health ID implementation
- Highly functional tooling to better support CR management functions such as configuration and security auditing

SantéMPI Existing Functionality and Features

SantéMPI is a next-generation, open source, standards-based Client Registry (CR) solution developed to address the requirements described above. It leverages the unique online/offline capability and data architecture of SantéDB by building on our lessons learned developing and implementing the MEDIC CR. SantéMPI meets the stated functional requirements of the OpenHIE Specification for a client registry. Key features of SantéMPI that directly address these requirements include:

Online/Offline Capability – Leveraging SantéDB dCDR, SantéMPI is unique in being able to operate offline when and where needed via an online/offline MPI gateway (DCG) to/from a centrally hosted server or cloud hosted CR service. Clients on the offline gateway can use HL7 v2.5 or HL7 FHIR to perform MPI functions while offline.

Security by Design – SantéMPI leverages the SantéDB CDR, which implements a robust privacy and security solution allowing for access control and privacy controls based on role, device, and third-party application.

Interoperability Standards Support – SantéMPI supports a variety of standards for patient registration including IHE PIX/PDQ (for HL7v2) and HL7 FHIR. It also provides a completely open API for further extension.

Probabilistic Matching – SantéMPI leverages a customizable record linkage algorithm for detecting whether two or more existing records are the same.

Master Data Management – SantéMPI provides basic master data management functionality, allowing a single record of truth to be synthesized from data submitted from local sources.

Administration Management – SantéMPI leverages the SantéDB dCDR's administrative user interfaces to provide a robust administrative solution.

Objectives and Work Packages

The objectives of this project are to build on SantéMPI's functionality by improving several key areas to strengthen and simplify how LMICs adopt, manage, and sustain SantéMPI. The associated high-level work packages will include:

- Enhancement of the integration interfaces
- Expanded testing of the underlying engine
- Stakeholder and OpenHIE Client Registry community engagement
- Streamlining installation and configuration
- Enhancing administration and tooling
- Expanding and enriching documentation

Our monitoring and evaluation approach will draw on extensive experience applying Agile processes/techniques to product management and software development. We will employ agile frameworks including: Scrum, Kanban, Scrumban, Scaled Agile Framework and Simple Agile to monitor, manage progress, evaluate deliverables, and assure quality.

Deliverables and Schedule

Deliverables	Timeframe
• Project Standup & Design Document – Including roles, responsibilities, final delivery timeline, and formal design of proposed enhancements.	Month 1
• Collaboration with relevant OpenHIE communities such as CR and Architecture communities	Month 1 – 12
• Enhancement of Community Documentation including: Source & API documentation, Operationalization Documentation, Policy & Planning Guidance, Installation, and User Interface Documentation.	Month 2 – 10
• Software Testing Enhancements including: Improved coverage of unit tests (50% code coverage goal), documentation validation & testing, installation testing, and integration testing.	Month 2 – 12
• Enhancement of interoperability interfaces to match OpenHIE specifications including: Validation of IHE PIX/PDQ interface, validation of the IHE PIXm/PDQm interface, prototyping/implementation of IHE PAM (Patient Administration Management)	Month 2 – 12
• Enhanced Installation & Configuration Tooling including: Bundled installation packages for Windows, Ubuntu, and CentOS, and VM templates for rapid demonstration standup.	Month 3 - 12
• Enhancements of Administration User Interface including: Match configuration via UI, master data management UI improvements, audit trail UI improvements, and easier implementation of extensions.	Month 3 - 12

Risk Mitigation

We do not foresee any significant technical risks as SantéMPI is based on the proven, functionally rich MEDIC CR solution and SantéMPI has been in field testing as part of Myanmar's national deployment. The following table summarizes potential risks and mitigation strategy:

Obstacle/Risk	Mitigation Strategy
COVID-19 Pandemic continuation or resurgence	• We will continue to leverage our extensive experience and tools for working remotely with international team members, collaborating partners and stakeholders
Budget Risks – cost overrun or insufficient budget	• Agile approach with 2-week sprints, monthly budget review, sliding priority system, rolling wave planning if possible
Personnel Risks – loss of personnel	• Peer-programming and peer-code reviews, cross training build process, hiring staff or leveraging partner resources if needed
Knowledge Risks – knowledge transfer	• Consortium knowledgebase setup to capture project knowledge, improved documentation
Productivity Risks – performance degradation	• Structure deliverables to balance workloads, responsibility matrix, ensuring that work-in-progress limits are followed
Timeline Risks – timelines too tight or deadline slippage	• Agile structured, regular sprint meetings, SCRUM certified project manager
Technical Risks – lengthy test correction, misunderstanding of tooling	• Implement and follow formal bug and defect framework from project start, involve end-users in user interface testing