Medic Mobile - Building a Community of Practice

Primary Author: Julie
Proposal Status: Awarded--Pending Funding

Executive Summary

Medic Mobile (MM) is a 501(c)(3) public charity that was founded in 2010 to improve health in communities that are hardest to reach. We serve this mission by building, delivering, and supporting mobile tools that help community health workers, managers, and clinical teams work together to provide equitable care. Our offices in Nairobi, Kathmandu, and San Francisco and 82 staff support partners in 23 countries. The open-source software toolkit supports more than 20,000 health workers, improving community health systems for more than 1 million families.

We envision a world where community health workers (CHWs) are supported as they provide care for their neighbors. MM believes high-quality care can be provided through integrated, community-based health systems. CHWs rely on the software to support safe pregnancies, ensure complete vaccinations for children, treat and refer quickly for childhood illnesses, screen and deliver supplements for maternal and child malnutrition, serve as early reporters for infectious disease outbreaks, manage stock levels for essential medicines, and coordinate with their management and clinical care teams.

Consortium Team

Medic Mobile employs a talented team of software developers, designers, and product managers to build, refine, support, and deploy the open-source software toolkit. Medic Mobile is the organizational contact point for this proposal.

Recognizing that partnerships are key for innovation, scale, and sustained impact, Medic Mobile has worked with more than 100 partners across 23 countries. As a simplified summary, model-building partners help us advance the software toolkit through human-centered design and research; and we collaborate with national and local governments to embed the toolkit into community health systems. Our deep partnerships will play an important role in this project, as the end users for documentation and key stakeholders for data integrations.

Key working groups, open-source communities, and projects for this work will include:

1. National eHealth and mHealth technical working groups in focus countries
2. Complementary grantees in the Digital Health Initiative's first round of funding
3. Communities for complementary tools and relevant frameworks, e.g. OpenHIE, OpenHIM, OpenMRS

Project Description

In order for digital tools for community health to achieve and sustain their potential impact at scale, governments and national service delivery organizations must be able to confidently deploy and manage these systems. Recognizing a window of opportunity for government uptake and ownership of these tools, we propose to:

1. Improve documentation for configuring and supporting deployments of the Medic Mobile toolkit.

This project will directly advance our goal for the toolkit transitioning into a mature, global public good that is owned and operated by partners. Applying the Digital Health Software Global Good Maturity Model, it is a priority for the platform to be configured and deployed by partners. In order to make this a reality, we will improve documentation for technical and non-technical staff We will also make our software roadmap

available to the global health community. This progress will lead to the first partner-supported configurations and deployments.

2. Create a community of practice

A Community Engagment Manager will be hired to work with current partners and others in the field to build a community of practice.

In the coming year, the Medic Mobile software toolkit will be deployed to 15,000 additional health workers and their communities. By the end of 2018, the software will support a network of 35,000 health workers providing essential care in poor and marginalized communities. We expect the software to support at least one million home visits per month, helping health workers with 2 million assessments for children and 150,000 safe deliveries.

In order to achieve this growth and impact, we must meet goals for regional and national scale-ups across four countries – including Uganda, Kenya, Nepal, and Bangladesh. Funding from the Digital Health Initiative will allow Medic Mobile to begin this process earlier than we had anticpiated and advance the global public good maturity score for this open-source community health toolkit.

I. Use Cases, User Stories and Activities

Medic Mobile is a free, open-source, scalable software toolkit that combines messaging, decision support for doorstep care, supervision tools, and analytics. The toolkit is designed specifically for health workers and health systems in the hardest-to-reach areas. Medic Mobile is requesting support from Digital Square to improve documentation of Medic Mobile's tools and allow us to focus on building a community of practice so that our users can configure and deploy our tools independently. This work will directly advance our goal for the toolkit transitioning into a mature, global public good that is owned and operated by partners.

CHWs use the app to lead them to the right homes at the right time and then guide them through the care and services – providing an actionable results screen with screening results, diagnoses, treatment recommendations, and follow-up schedules. Every family and person has a profile. The app is designed for integrated care for people over time and supports a community health team working together to deliver care

Our 2018 product goals include plans for our tools to:

Support community health worker supervisors using our app in their daily work.

User story: "As a supervisor, I can rely on the Medic Mobile app to manage CHWs and oversee home-to-facility patient referrals."

Support scaled networks and reach the last mile with high-quality tools.

Partner story: "As a partner and system owner, I can work with Medic Mobile to deploy and update a thoroughly-tested, well-documented, easy-to-use app for many thousands of frontline health workers."

Have strong data systems that integrate with other tools.

Partner story: "As a partner and system owner, the Medic Mobile toolkit is connected to complementary technologies including health management information systems."

Increase user engagement and improve user experience in-app and via SMS.

User story: "As a health worker, I rely on the software to help me deliver equitable, fast, high-quality care in my community."

II. Digital Health Technology

Introduction to the Medic Mobile Toolkit

Medic Mobile was designed and built for health workers delivering care in hard-to-reach areas. The toolkit supports any language and works with or without internet connectivity. Our tools run on basic phones, smartphones, tablets, and computers, supporting people working in communities, health facilities, and management offices. We are committed to developing open-source software, sharing learnings, and lowering barriers to adoption, scale, and reach for these tools.

Community   Facility   Office

Tools for Basic Phones
Easy-to-use tools for health workers, household caregivers, and patients.

Our tools for familiar, basic phones work in communities with intermittent connectivity, leverage the most ubiquitous mobile infrastructure, and harness SMS as a communication, care coordination, and data channel. Text messages enable timely reminders and real-time communication between families, CHWs, and health facilities, strengthening the connection between last-mile communities and health facilities. As an example, when health workers text "P Jane 3" ("P" for pregnancy, patient's name, and "3" for number of weeks since Last Menstrual Period), Medic Mobile automatically registers the pregnancy, creates a patient ID, calculates the expected delivery date, and schedules automated antenatal care visit reminder messages to be sent to the health worker.

Medic Mobile Application
Mobile and web app for community health workers and managers.

Our mobile app was designed for a new wave of health workers and integrated health systems. It supports multiple user types, including nurses or skilled birth attendants in communities or facilities, community health workers, managers on supervisory visits, and other people who deliver care and support.

The app provides an automated and prioritized list of upcoming tasks, covering all of a health worker's activities in their community. Health workers are guided through tasks — such as screening for high-risk pregnancies or diagnosing and providing treatments for children – and get real-time indicators for progress towards their goals. Medic Mobile for Android is an offline web app with an Android container, delivering the benefits of the web and a native app. Data from every mobile user is replicated to the database and analytics tools, providing access to facility staff and managers.

Medic Mobile Analytics

Medic Mobile supports analytics in the application with key monitoring metrics for facility-based users. Advanced analytics are supported through Klipfolio, an online platform for building powerful real-time dashboards. Using Klipfolio, managers can easily monitor trends for activity and impact and use them to make important decisions about their programs. These dashboards can be exported and sent as email or printed out and handed to health workers.

Medic Mobile Architecture

Below are details on the architecture of Medic Mobile instances, how they interact, and what they are used for.
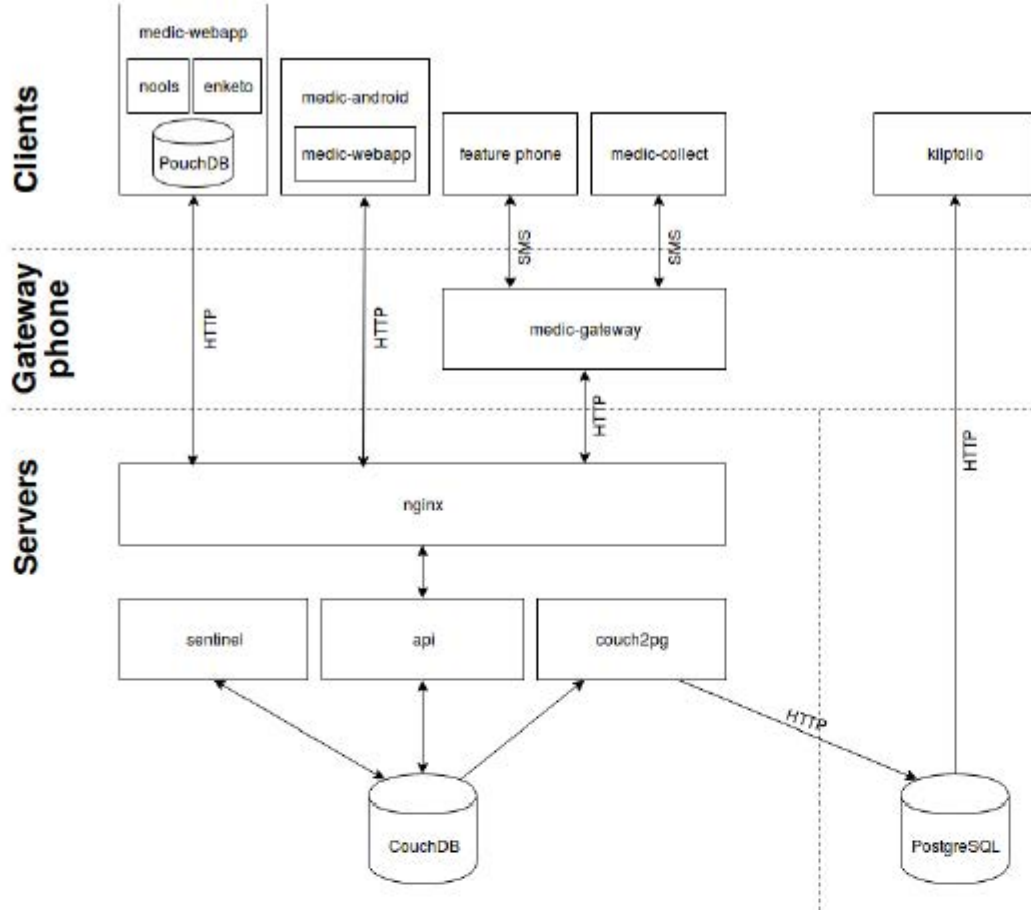
Server side

Medic Mobile provides a Docker container image which defines all the software required to launch the server. Server containers can be created from the image and launched in many environments including cloud providers for production instances or local machines for development and testing.

Being based on Ubuntu, the server has access to standard UNIX-like command-line tools, including OpenSSH and service supervision to keep the software running.

Some key components on the server are:

CouchDB

A free and open source NoSQL database we use to store all our data, configuration, and even the application code. CouchDB is really good at replication which is the process of sending the data to another database, such as PouchDB in the client application, and back again.

api

A NodeJS service which runs on the server as a wrapper around CouchDB. It provides some security, auditing, and integration APIs. It also includes a custom implementation of filtered replication to allow it to support more concurrent users.

sentinel

Another NodeJS service running on the server, sentinel performs actions called transitions every time a document in CouchDB is added or modified. Some examples are validations, generating scheduled messages, automatic responses, creating patients, and sending alerts.

PostgreSQL

A free and open source SQL database that we use for analytics queries for display in tools like Klipfolio. We created a library called couch2pg to replicate data from CouchDB into PostgreSQL.

nginx

nginx proxies all requests to api and adds encryption and compression.

Client side

The Medic Mobile application works in the browser or wrapped in the medic-android app which allows for project branding, sets the project URL, and hides browser elements like the URL bar. The native Android container application provides progressive enhancements for smartphone users. The application can be installed and updated using the Google Play store, and extends some application features (e.g. location services).

The application is an AngularJS single page responsive web application. Responsive design presents a familiar user interface on desktops, laptops, tablets, and mobile devices. We use appcache and PouchDB to ensure the application works even when health workers lack internet access.

We use an offline first strategy which means the data is stored on the client and all pages can load immediately regardless of whether you have a fast connection, slow connection, or no connection at all. The data is stored in PouchDB which replicates changes back and forth in the background with the server CouchDB.

We use Enketo to render configured XForms and help with styling and dynamic elements such as show/hide and validation rules. Enketo is an open-source web application that uses a popular open-source form format. Enketo supports a large number of data types, skip logic, computed fields, grouped fields, image/video content, and XHTML/CSS markup-based formatting features.

We use the nools rules engine to compute the upcoming tasks and monthly targets of the users. Nools is a rete based rules engine written entirely in javascript. Using a rule set selected in advance, health workers can be reminded of regular visits, automatically prompted for follow-ups, be alerted to high-risk cases, or given activity goals. Large and/or complex rulesets can be executed efficiently, even on mobile devices.

Users may also interact with the following:

medic-collect

An android app based on Open Data Kit to render xforms on the phone and send reports in to medic-gateway over SMS or directly to api over mobile data.

Klipfolio

A cloud-based online platform for building powerful real-time dashboards to visualize the data in PostgreSQL. We use Klipfolio to share activity, performance, and impact metrics with partners.

Other applications

medic-conf

A command line utility for uploading configuration and bulk importing of records.

Medic-Gateway

Medic Gateway is an android app for relaying SMS messages to and from Medic Mobile. Each SMS enabled project has one gateway running. It polls an api endpoint to write incoming SMS into the CouchDB and retrieve outgoing SMS to send.

lll Community Feedback

Our staff are actively involved in the digital health community through activities such as serving on the technical steering committee for ODK, and the National eHealth Technical Working Group in Nepal, and the Malawi mHealth working group. Staff have also have made technical contributions to Enketo and made an early open messaging contribution to OpenMRS

If awarded, Digital Square funding will allow us to hire a Community Engagement Manager to serve as a liaison between our product and design team, the community of partners that deploy our tools, and the larger digital health community. This position will be tasked with outreach to the community to bring in partners like complementary grantees in Digital Square's first round of funding, and communities for complementary tools and relevant frameworks, e.g. Open Data Kit, OpenHIE, OpenMRS, DHIS2.

IV. Self Assessment on the Global Goods Maturity Model

The Global Goods Maturity Model aligns with Medic Mobile's strategy and organizational values. To move Medic Mobile's scores to high across the core indicators, we need to increase user engagement and create better technical documentation. Three key areas where the maturity model and MM's strategy align are:

1. Scale goals – We aim to support 35,000 health workers in 2018, 60,000 in 2019, 115,000 in 2020, and 200,000 in 2021. This rapid scale-up is in response to urgent needs, and will only be achieved in the hardest-to-reach communities through collective action

2. Active networks – Our vision is that these numbers represent actively-supported networks of health workers. This requires local ownership of systems and tools

3. Getting to a new normal with embedded tools – We envision it being normal for technology to support community health. This requires us to demystify the tools, allowing system owners to apply and manage the technology

4. Accessibility – Any organization, clinic, or community who needs the tools should be able to get them. Transitioning to a global public good is in line with this ambitious vision for accessibility

See MM's self-assessment attached

V. Work Plan, Project Deliverables and Schedule

We understand that to have real impact at scale we need to be suitable for adoption by large organizations and Ministries of Health (MoH). To do that we need to have a mature product and process. The Global Good Capability Model outlines a useful framework for this and matches many of the goals that we have for building a community of practice. There is a unique window of opportunity for government uptake and ownership of these tools, and funding from Digital Square will allow us to put resources towards these activities immediately so that government and model building partners will be able to independently configure and implement our tools in the near future.

We propose to:

1. Improve documentation for configuring and supporting deployments of the Medic Mobile toolkit so that the partner's community can better configure our app themselves

2. Build a community of practice so that partners can share learnings, resources, and questions

Work Plan and Timeline

Create interactions between developers, contributors, and implementers

- Publicly joinable forum for outside implementers and configurers, to discuss with each other and Medic team (2018 Q3)

- Policy in place for third-party code contributions (2018 Q3)

Establish a community governance structure

- Document current governance structure (2018 Q3)

- Open discussion with community of practice about future governance structure (2019 Q2)

- Governance structure updated to include partners, community of practice directly in decision making (2019 Q3)

Produce a software roadmap

- Share high-level software roadmap publicly (2018 Q2)

- Engaging partners in feature request process (2018 Q3)

- Announce software roadmap decisions in public forum (2018 Q4)

Document technical information for implementers

- Evaluate customer journey and find documentation gaps for third-party implementer (2018 Q2)

- Complete documentation for common customizations of Medic (2018 Q3)

- Complete comprehensive documentation for customizing and deploying Medic (2018 Q4)

Conclusion

Medic Mobile has ambitious scale goals to bring our high-quality tools to community health workers across the globe so that people in all communities can receive quality health care.

We recognize that in order to achieve our goal of 200,000 health workers using MM tools by 2021, governments and programs need to own and manage these systems.

Funding from Digital Square and collaboration with other open source communities will be pivotal to our ability to achieve these goals and fully become a global good. Grant funding will allow us to hire a Community Engagement Manager this year. Medic Mobile has plans to incorporate this position into our annual budget in the future, but if awarded, we will be able to make this hire immediately and will commit to funding the position in 2019 and beyond.

Supporting Documents: MM Global good maturity model
digital_square_budget_narrative.docx