NepalEHR for universal health coverage:
Scalability of an integrated solution for financial protection in a newly decentralized health system

Digital Square, Request for Application
Digital Financial Services on Health Outcomes and Health Systems
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EXECUTIVE SUMMARY

Possible is an innovative healthcare delivery organization in Nepal that partners directly with local governments to identify challenges to integrated primary healthcare systems, design and implement solutions to address gaps, and evaluate and iterate on solutions for quality and efficiency in the country's new municipal health system environment. Over the last five years, Possible has developed *NepalEHR* (nepalehr.org) as a leading public sector, home-to-facility health information system. Together with Digital Square's support, we have integrated this electronic health record (EHR)—built on the OpenMRS platform—with OpenIMIS. **The goal of this project is to adapt, test, and evaluate the potential for NepalEHR to increase financial protection at scale in a newly decentralized health system.** Given our more than a decade-long experience in implementing and testing innovative digital and service delivery solutions in Nepal, we are well positioned to leverage this opportunity for broader health systems strengthening and impact.

CONSORTIUM TEAM

Possible's inter-disciplinary team focuses on real-world evaluation and implementation research that utilizes qualitative and quantitative data to produce meaningful insights about how and why programs work, don't work, and are potentially scalable within the constraints of government resources and systems. Below we describe the primary team members involved in the evaluation:

Sabitri Sapkota, MPH, PHD is Director of Implementation Research and Site-PI, and brings over twenty years of experience in healthcare systems research and evaluation. She oversees the evaluation of the *NepalEHR* platform and is responsible for coordination with government and other stakeholders to map our advocacy efforts to national needs for designing integrated digital systems.
Anant Raut, MSc is Director of Informatics, and leads the customization and rollout of the integrated EHR, including the *NepalEHR <-> OpenIMIS* integration, applying human-centered design techniques to digital systems design. He oversees a team of three developers and five EHR implementers.
Aradhana Thapa, MPH is Director of Healthcare Design, and leads strategy and design of the organization's municipal healthcare delivery product, including Possible's networks of CHWs.
Sarita Sharma, MPH is Monitoring & Evaluation Manager, and oversees the design, integrity, and execution of Possible's approach to monitoring and evaluation, including high quality data feedback loops for continuous programmatic improvement and research alike.
Rekha Khatri, MSW is Qualitative Research Analyst, and oversees the application of rigorous qualitative methods in understanding understanding the context and mechanisms of impact surrounding our work.
Sanjay Poudel is Senior Systems Engineer, and leads installation, implementation and scaling of Electronic Health Record in government health facilities of Nepal. He supports the Director of Informatics in overseeing the rollout and implementation of the *NepalEHR <-> OpenIMIS* integration.
Hari Ghimire, MBA is Senior Finance Manager, and maintains rigorous internal and external financial and accounting systems, including the oversight of insurance claims and reimbursement.
David Citrin, MPH, PHD is Director of Evidence to Policy. He is a mixed-methods implementation researcher with over 15-years of experience working and conducting mixed methods research in Nepal.
Duncan Maru, MD, PHD is co-founder and Board Member at Possible, and senior faculty at the Arnhold Institute for Global Health. He supports strategic thinking for scale as well as impact evaluation.

As a systems strengthening organization, Possible operates in a rich ecosystem of partners and stakeholders, including partnering directly with the municipal, state, and national governments. Possible has also partnered with the German Development Cooperation (GIZ) to roll out *NepalEHR* in a district hospital in Nuwakot, and to iterate on and evaluate the *NepalEHR* <> IMIS integration module. Our team is also in regular contact with the broader OpenMRS community, the Bahmni coalition, and AeHIN for

updates and learning from other countries. We recognize the inherent value in collaborating with others to tackle pressing healthcare systems design issues, and are keenly aware of the need to collaborate broadly with other organizations and stakeholder within and outside of Nepal on this project.

PROJECT DESCRIPTION

Problem statement

Globally, an estimated 100 million people are driven below the poverty line and around 150 million experience healthcare-related financial catastrophe annually. In South Asia, the average share of OOP payments is an estimated 50% of the total healthcare expenditure. Nepal, one of the poorest countries in South Asia, has a GNI per capita of $USD 730 and OOP payments comprise an estimated 48% of the total expenditure on healthcare nationally. Evidence from Nepal, India, and Bhutan indicate that catastrophic healthcare expenditures occur more frequently in rural areas. Unpublished data from our own census conducted among more than 3,000 households in one of Possible's remote catchment areas over three months from June to September 2016 found that more than 50% of all households reported medical debt, with the median debt reported as >200% of household monthly expenditures. Nepal's new insurance scheme is aimed at reducing OOP expenditures on healthcare, mitigating unequal financial risk, and establishing decentralized control over pooled funding mechanisms. Yet, while insurance is being rolled out, there are currently no digital systems to facilitate the efficient and accurate processing of claims. The current process of manual entry of claims in OpenIMIS is not scalable, especially as Nepal looks towards complete health insurance for all citizens. An OpenMRS <-> OpenIMIS integration will solve for Nepal's current digital financial monitoring needs, and provide a globally relevant solution for improving overall health systems accountability, responsiveness, and governance.

Locating the Project in Context

NepalEHR is becoming Nepal's leading integrated health information system, with embedded protocols and the ability to track patient, supply, laboratory, radiology, and pharmacy data seamlessly. We have integrated *NepalEHR* with DHIS2, the first known integration of the platforms to-date (dhis2.ehrnepal.org/) and are in the process of integrating our mobile tool (CommCare) with *NepalEHR*.

With the support of Digital Square, Possible has also successfully completed a proof-of-concept integration of the *NepalEHR* platform with OpenIMIS and has already begun accepting health insurance from patients and processing claims for reimbursement. To our knowledge, this is the first successful integration of Bahmni with OpenIMIS, making OpenIMIS interoperable with national health information architecture and, ultimately, support Nepal's path to universal health coverage. This step has prepared us for the next steps in evaluating the role these integrated digital platforms can play in measuring, mapping, and ultimately reducing OOP expenditures and resultant medical debt. The *NepalEHR* <> IMIS integration will make claims processing seamless for facilities, ensure compliance for reimbursement, provide opportunity for improved claim success rates (e.g., reducing duplicates and false records) at the source, and help guide the national insurance board on burden of disease and concomitant costs. Here we also leverage the unique opportunity posed by Nepal's historic 2017 health systems decentralization following the elections of local leaders across Nepal's 750 new municipalities.

APPROACH

During the funding period, we will:

1) Demonstrate the scalability of IMIS integration into the *NepalEHR* system and interface in terms of acceptability, cost, and efficiency;
2) Define the resources and training needs, as well as the barriers and constraints to scaling an OpenMRS <-> OpenIMIS system in non-NHN settings;

3) Assess the need for further technical refinements to the *NepalEHR* <-> IMIS integration that emerge during its roll out in one additional facility.

Beyond the funding period, we will:

4) Examine the relationships between the implementation of the national insurance scheme and out of pocket expenditures and medical debt as captured by *NepalEHR*; and
5) Elucidate individual and household-level drivers and barriers to enrollment in the national health insurance scheme, and experiences of using insurance at seconded facilities.

Our evaluation approach addresses the need for more localized and frequently generated qualitative and quantitative data that can be used to understand user experiences of participating in national health insurance systems; estimate with greater geospatial and temporal resolution household medical debt, catastrophic healthcare expenditure, and thresholds of impoverishment; and visualize these data to examine and monitor trends in participation, reimbursement, and financial protection over time.

To evaluate the implementation and maintenance costs for an integrated *NepalEHR* deployment at different tiers of service delivery, we will measure:

- *Deployment costs*; total hardware and software capex per facility; and cost per user
- *Operating expenditures*; yearly amount spent on maintenance, repair, training, staff; also reported as % of facility budget & municipality budget;
- *User experience*; assessed via ethnographic methods, including in-depth interviews, and focus group discussions with providers, insurance claims managers, and policy makers.

To evaluate the effectiveness of the integrated claims module, we will measure, and visualize:

- *Insurance claims;* # of claims submitted each month, disaggregate by condition;
- *Claims processing*; % of submitted claims correctly processed;
- *Claims reimbursement;* % of correctly processed claims successfully reimbursed.

To evaluate financial protection among our catchment area populations, we will measure, and visualize, via our community-based mobile health data platform:

- *Reach;* % of catchment area population enrolled in the national health insurance system
- *Protection;* out of pocket expenditures as a proportion (%) of total household expenditure on health (at baseline and one-year follow-up)
- *Enrollee experience;* assessed via grounded ethnographic methods, including participant observation and key informant interviews.

RISK MITIGATION

We anticipate several challenges to this work. There remain uncertainties about expanding national and municipal fiscal space to adopt the costs of deploying *NepalEHR*, even after potentially demonstrating feasibility and cost efficiency. The use of data for decision making and improved governance are also areas that require attention. In addition, some households may feel uncomfortable providing sensitive insurance enrollment and household financial information.

To address the latter, we will collect household level qualitative and quantitative financial and insurance data via our Community Health Workers, who have accumulated deep rapport through regular household community visits for counseling, referrals, and care coordination. We are also finalizing a mixed methods protocol focused on measuring household healthcare expenditures, OOP expenses, and medical debt to be submitted to the Nepal Health Research Council for ethical review, as well as the IRB through the Arnhold Global Health Institute at the Icahn School of Medicine at Mount Sinai.

To address data utilization by municipal health officials for budgeting and resource planning, and to strengthen leadership and management capacity at the municipal level, we will also create community accountability mechanisms within each municipality, such as Community Advisory Boards. The CABs will provide iterative feedback on our overall integrated digital platform and help us gauge the overall acceptability of our approach to measuring insurance enrollment, OOP expenditures, and medical debt.

HIGH-LEVEL BUDGET SUMMARY

Possible proposes a budget of $100,000 for this project. The costs associated with this budget are primarily for personnel and travel.

OBJECTIVES, ACTIVITIES, AND SCHEDULE

Objectives	Activity	Month											
		1	2	3	4	5	6	7	8	9	10	11	12
Demonstrate the scalability of IMIS integration into the NepalEHR system and interface in terms of acceptability, cost, and efficiency	Deploy NepalEHR <> IMIS integration at one health facility												
	Conduct baseline survey to assess out of pocket expenditures as a proportion (%) of total household expenditure among patients												
	Conduct in-depth interviews and focus group discussions with providers and insurance claim managers												
	Conduct key informant interviews with patients												
	Track number/rate of claims submitted, processed correctly, and reimbursed successfully												
Define the resources and training needs, as well as the barriers and constraints to scaling an OpenMRS <-> OpenIMIS system in non-NHN settings	Analyze qualitative data from interviews and focus group discussions to determine needs and gaps												
	Analyze quantitative data on claims submission and reimbursement process to understand successes and challenges												

	Draft user manual for deploying NepalEHR <> IMIS integration at other health facilities based on findings												
Assess the need for further technical refinements to the NepalEHR <-> IMIS integration that emerge during its roll out in one additional facility	Deploy NepalEHR <> IMIS integration at one additional facility												
	Conduct additional interviews and focus group discussions with key stakeholders												
	Track claims and reimbursement data												
	Analyze quantitative and qualitative data												
	Begin conducting follow-up survey to assess out of pocket expenditures as a proportion (%) of total household expenditure												
	Summarize findings into report that describes project context, methodology, findings, and conclusions												

DELIVERABLES

Over the course of the year-long project, Possible will achieve the following key deliverables:

1. Qualitative data analysis to understand user and enrollee/patient experience related to NepalEHR <> IMIS integration
2. Quantitative data analysis to evaluate claims submission, processing and reimbursement work flow
3. Baseline survey to assess out of pocket expenditures as a proportion (%) of total household expenditure among patients
4. User manual for deploying NepalEHR <> IMIS integration
5. Summary report that describes project context, methodology, findings, and conclusions