Enabling Collaboration for Building High Quality, Sustainable and Scalable National Health Information Systems in Resource-Limited Settings

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In resource-limited settings, health information systems are often developed by donor funded organizations. These organizations frequently work in silos to ensure they meet their specific grant requirements. As a result, efforts in the country are duplicated and developed solutions lack oversight and are underutilized. With development expertise lacking, best practices and standards are often not followed. Furthermore, knowledge gained is siloed within a single organization. While resulting systems may meet the functional requirements at the time of release, scalability and maintainability is challenging due to *ad hoc* development processes. As organizations scale these systems, they often end up with multiple software versions and configurations across facilities that are difficult to support and manage. Systems built with little coordination between organizations and a lack of interoperability results in a fragmented national healthcare information system. Ministries of Health faced with this fragmented system may struggle to effectively manage and use all of these systems to manage and improve care and outcomes in their country.

In order to address these issues and enable collaboration, shared technical infrastructure and processes need to be in place to support health information system development. Processes need to be agreed upon by all partners and well documented to enable onboarding of new members and organizations. Functionality should be designed collectively to enable broad applicability, final products should be well documented and demonstrated to allow knowledge transfer between individuals and organizations. Mechanisms should be in place to ensure the delivery of high quality products, and reliable automated delivery pipelines should ensure predictable release timelines and enable easy upgrading. Finally, systems developed should work together to enable a health information exchange.

In partnership with local stakeholders, we implemented a solution in Mozambique that addresses some of these needs. The initial step was the establishment of a cross-organizational software development community to collaborate on OpenMRS [1], called eSaude[1]. The community has adopted a number of open sources tools for project management, including Trello for task scheduling, a Google Groups mailing list, and Slack for real-time chat between community members. For source code collaboration and version control, eSaude uses GitHub. The Travis continuous integration platform, which is free for open source projects, automatically runs tests against all newly contributed code and publishes a packaged deployable end product. The tests programmatically validate all new code against community agreed functional and style guidelines, ensuring every new feature is high quality and error free. This gives junior contributors the confidence to add their contributions, and as a result gain experience as developers. The community uses container technology by the open source Docker project to generate predictable and sharable deployable packages that are easy to install and upgrade across sites and ensure consistent versioning.

As a result of establishing the eSaude community in Mozambique, the 5 HIV care & treatment implementing partners work together to build shared health information systems, using software development best processes collectively agreed upon. The structured setup of standard tools and processes enables the effective contribution of developers with a range of experience, while deduplicating efforts across organizations, and creating a scalable and manageable national platform of HIS products.

References

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[1] https://www.esaude.org/