

Managing the 21st Century Health Workforce: Shelf-Ready iHRIS 5 Global Digital Health Good

iHRIS is the premier global digital health good for Ministries of Health to manage their health workforce. Digital Square can help promote iHRIS 5 upgrades in the 20 countries that have previous versions of iHRIS, and stimulate new countries to adopt iHRIS, with shelf-ready investments in:

- A technology demonstration that shows greater product information and documentation.
- A dashboard integration that enhances the Instant OpenHIE reference design.
- Automated testing that verifies quality assurance of iHRIS and its components.

Executive Summary

iHRIS is the premier open source human resources information system for ministries of health to manage their health workforces. It is a recognized global digital health good with deployments in more than 20 countries that manage over a million health worker records. IntraHealth International has invested in iHRIS since 2005, and we seek new Digital Square support to promote iHRIS 5 upgrades and stimulate new deployments with shelf readiness investments in three core work packages:

- Greater product information and documentation delivered via a highly functional technology demonstration that allows prospective users to appreciate the full functionality of iHRIS 5.0.
- Improved Kibana integration in iHRIS, and therefore improved ease of iHRIS installation and deployment, so that it becomes a transparent component of the Instant OpenHIE reference design.
- Automated integration and regression testing so that our software commits to Github are covered by verifiable quality assurance and testing, and iHRIS always functions as promised.

IntraHealth will leverage the global iHRIS Advisory Board, the greater iHRIS Community, and the OpenHIE Community to ensure these developments increase demand for iHRIS and ease of deployment in low- and middle-income countries.

Consortium Team

IntraHealth International is a global health NGO with a 40-year history in developing successful data tools and digital health applications for health workers and managers. We develop solutions that are open source, data-driven, sustainable, and collaborative. As a pioneer in the field of health workforce informatics, we're committed to using technology, information, and analytical approaches to support the people at the center of our health systems.

IntraHealth is the lead developer of iHRIS, the free, open source software, that helps countries around the world track and manage their health workforce data to improve access to services. Since 2005, IntraHealth has invested in iHRIS for countries to capture and maintain high-quality information for health workforce planning, management, regulation, and training. iHRIS is an established global digital health good that is used in more than 20 countries to manage over a million health worker records at a potential cost savings of over \$275 million when compared to commercial software.

Project Description

Background: IntraHealth has invested in iHRIS since 2005, and by 2017, the system was at version 4.3. A key to its success is the ability to easily customize it, and users requested support for the increasingly popular FHIR standard. In 2018, IntraHealth started investing in the development of iHRIS 5.0, a complete update of the iHRIS front-end user interface and back-end architecture, including:

- Powerful new dashboards with Kibana visualizations
- Global data interoperability with FHIR standards for health information systems.
- Beautiful new interfaces with a fast and responsive mobile design

This update has increased interest in iHRIS to manage health records, including a new national country deployment now underway, and several very interested national ministries of health.

Problem statement: The increased interest in iHRIS has highlighted three areas of improvement to increase its shelf-readiness and therefore translate interest into commitment, including:

Work Package 1: A Highly Functional Technology Demonstration.

Currently, the live demonstration of iHRIS technology at <https://v5-demo.ihris.org/> is still a nascent deployment. It lacks detailed workflows, sample data, and the ability of ministry of health staff to import sample data and create custom reports. The limited functionality results in a sub-optimal user experience that is hindering ministry adoption of iHRIS 5.0, which would bring with it much more functionality than previous versions. We seek to correct this with greater product information and documentation delivered via a highly functional technology demonstration that allows prospective users to appreciate the full capacity and functionality of iHRIS 5.0 and spur its adoption by LMIC governments.

Work Package 2: Better, Faster Data Visualization Deployment

When we were developing iHRIS 5.0, we chose the Elasticsearch and Kibana open source applications to provide cutting-edge search and data visualization functionality. This has proven to be a wise choice for delivering industry-leading visual analysis for any FHIR-compliant data source connected to iHRIS. However, Kibana brings certain software compatibility complexities that can create frustrating errors in certain situations. We seek to improve Kibana's integration in iHRIS, and therefore iHRIS' installation and deployment ease, so that it becomes a transparent and error-free tool for all users.

Work Package 3: Automated Testing Scripts

Many global digital health goods suffer from a lack of automated testing of software code. New software code is rarely tested before it's added to larger systems and those systems are rarely tested in consistent ways that can identify errors before they become major issues. We seek to invest in end-to-end testing so that commits to Github are covered by testing and can be verified before they are added to the core iHRIS software and show that core iHRIS software has quality assurance and testing, and always functions as promised.

Objectives: Through the Digital Square E0 opportunity, we seek to invest in three work packages that will increase the level of maturity across the global goods maturity model, and therefore increase the shelf-readiness of iHRIS 5.0 software.

Work Package 1: A Highly Functional Technology Demonstration.

We seek to invest in a highly functional technology demonstration that allows ministry staff to appreciate the full capacity and functionality of iHRIS 5.0. This includes:

- Detailed Workflows: Creating the ability of users to move through standard human resources workflows like hiring, assigning, transferring, and retiring health care workers using formal step-by-step processes modeled on processes from select countries.
- Sample Data: Populating iHRIS with realistic yet fake data to accurately simulate iHRIS functionality and reports without compromising personal data from actual health workers.
- Data Import: Allowing users to bulk import their own data into iHRIS for testing, where that data is only visible to that user and is automatically deleted on their departure.
- Custom Reports: Allowing users to create custom reports in the demo to explore either fake data or their custom data in ways that are specific to users' needs.

We will monitor our progress through testing by the iHRIS Advisory Council and evaluate our success with pre- and post-project technology demonstration system reviews from the greater iHRIS Community.

Work Package 2: Better, Faster Data Visualization Deployment

We seek to improve Kibana integration in iHRIS to make it a transparent tool for all users through:

- Adding Kibana visualization in Instant OpenHIE for the health workforce: Kibana was not included in the Instant OpenHIE workstream — it was not a component of iHRIS when that work package was conceptualized — and now needs to be added so that Instant OpenHIE will have a fully-functional iHRIS component.

We will monitor our progress through feedback from the OpenHIE Interlinked Registry community that is participating in Instant OpenHIE development.

Work Package 3: Automated Testing Scripts

We seek to invest in automated testing to verify software components before they are added to the core iHRIS software and show that core iHRIS software on Github always functions as promised.

- Implement Testing: Develop automated end-to-end testing scripts using Travis, CircleCI or GitHub Actions on the core iHRIS software
- Verify Coverage: Add visual cues on Github to show the current testing status of core code.

We will use the automated testing tool reports and the related Github visual cues to monitor our progress and allow for public evaluation of our success.

Deliverables & Schedule: Through the Digital Square E0 opportunity, we will deliver on three work packages that will increase the shelf-readiness of iHRIS 5.0 software.

Package	Deliverables	Months
1	We expect to deliver a highly functional technology demonstration experience that includes: <ul style="list-style-type: none"> • Detailed workflows of standard human resources work flows • Sample data populating iHRIS with realistic yet fake data • Data import ability for users to bulk import their own data into iHRIS for testing • Custom reports in the demo to explore either fake data or users' custom data 	1-3
2	We expect to improve Kibana's integration in iHRIS by: <ul style="list-style-type: none"> • Adding Kibana visualization in Instant OpenHIE for the health workforce 	1-2
3	We expect to deliver automated testing to verify iHRIS software components with: <ul style="list-style-type: none"> • Automated end-to-end testing testing scripts on the core iHRIS software • Visual cues on Github to show the current testing status of core code 	4-6

Dependencies: The work packages above are separate and there are no dependencies between them.

Risk Mitigation: One aspect of risk for this project is that Kibana development is outside our direct control. We will engage with Elastic, the company that leads Kibana development, to ensure that we are aligned with their development roadmap and timing.