LEGACY SERIES 3

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Using Health Workforce Data to Improve Access to Services

Carl Leitner, Dykki Settle, Kate Tulenko, David Potenziani, Michael Drane, Luke Duncan, Amanda Puckett, and Alfredo Fort, IntraHealth International

CapacityPlus expanded use of the open source human resources information systems platform, iHRIS, to enable countries to use data to make decisions to more effectively recruit and deploy health workers for increased access to services and to track health worker qualifications and education pipelines; the iHRIS software is now used in 20 countries to manage almost a million health worker records at a potential cost savings of over $275 million when compared to commercial software.

Background

A strong human resources information system (HRIS) helps health care leaders to quickly answer key policy questions affecting service delivery in areas related to workforce planning, education, deployment, management, and retention, among others. Yet health systems in most low- and middle-income countries have had poor data on their health workforce numbers, skills, and location, and, therefore, limited ability to address health workforce challenges. Between 2005 and 2007, the Capacity Project worked with national stakeholders to develop and release the open source iHRIS software designed to capture and maintain high-quality information for health workforce planning and management. By the end of the Capacity Project, five countries had implemented iHRIS. During Capacity*Plus*, the power of open source approaches to maximize local ownership, capacity building, innovation, and partnership for HRIS strengthening has accelerated, with country-led adoption and application of iHRIS reaching 20 countries (see Figure 1).

Strategy and Approaches

iHRIS has been developed into multiple applications to meet the needs of a variety of stakeholders and support health workers throughout their life cycle:

- **iHRIS Manage** allows tracking and management of health workers actively engaged in service delivery
- **iHRIS Qualify** enables health professional councils and associations to register, license, and regulate their respective cadres

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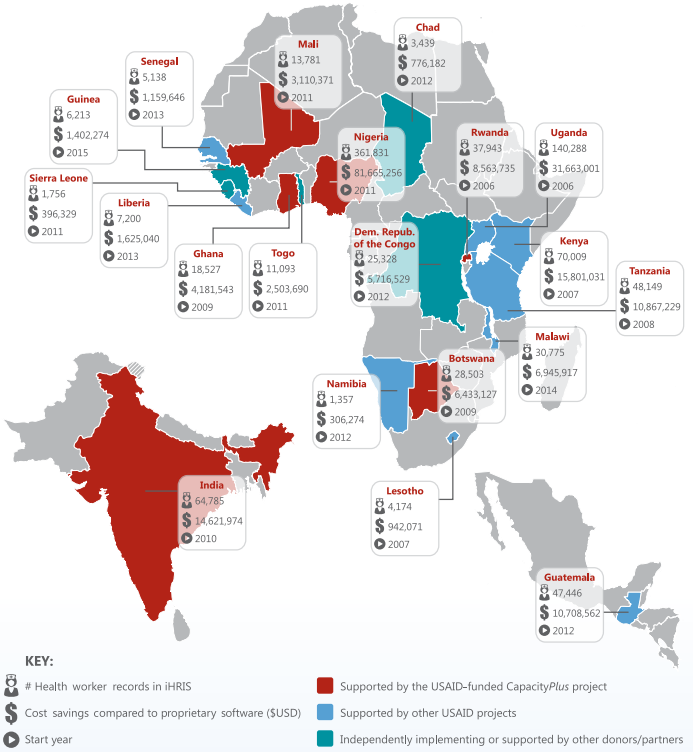
- **iHRIS Train** supports tracking and management of preservice education pipelines and in-service training
- **iHRIS Plan** informs workforce planning and provides predictive modeling, forecasting changes in the health workforce supply over time
- **iHRIS Retain**, developed with the World Health Organization (WHO), helps countries plan and cost rural health worker recruitment and retention interventions in alignment with the WHO's rural retention guidelines.

Capacity*Plus* emphasized open access to iHRIS through publishing the software, source code, and other resources online at www.ihris.org. These resources include the iHRIS Implementation Toolkit, which represents a strong example of open contributions to a global capacity-building product. Providing guidance and materials to assist in the implementation of all iHRIS software, the toolkit has received contributions of more than 100 resources from iHRIS users in 12 countries, all seeking to support others in the adoption and implementation of the software. Capacity*Plus* further expanded local capacity to adapt, deploy, and sustain iHRIS through establishing a global iHRIS online community and supporting other south-to-south knowledge-sharing mechanisms. For example, the University of Dar es Salaam in Tanzania now hosts annual regional iHRIS academies for developers from different countries to meet and learn together, and has supported iHRIS implementations in Malawi and Sierra Leone.

Figure 1

iHRIS Records and Potential Cost Savings by Country



Highlights of Results

Use of Data for Decision-Making

As iHRIS implementations expanded and matured in countries supported by Capacity*Plus*, national and subnational HRH leaders and managers increasingly began using iHRIS data for decision-making to improve both the accessibility and quality of health services.

Uganda: In collaboration with USAID/Uganda's Uganda Capacity Program, in 2013, the Ministry of Health (MOH) used iHRIS data, along with data from a rural retention study supported by Capacity*Plus*, to successfully advocate for an investment of $20 million to fund recruitment and deployment of 7,200 health workers. The increased availability and more equitable distribution of health workers has likely contributed to Uganda's significant increases in selected HIV/AIDS, family planning, and maternal, newborn, and child health (MNCH) indicators. To inform workforce planning, future deployment, and health worker skill levels, the Ministry's Human Resources Development department is using iHRIS Train to track almost 30,000 students in preservice education as well as an expanding number of in-service training records. The Uganda Medical and Dental Practitioners Council used iHRIS Qualify to increase

relicensure compliance from fewer than 100 to more than 2,300 doctors—providing essential information on qualified medical personnel across the country.

India: In the state of Jharkhand, where Capacity*Plus* collaborated with USAID/India to support state leaders to scale up iHRIS Manage, data identified Ob/Gyn staffing shortfalls in 60% of health facilities. This finding prompted the Jharkhand principal secretary of health to redeploy 112 specialists with skills in emergency obstetric care and life-saving anesthesia skills and place them in first referral units, which are critical for saving mothers and newborns. As a result, 36 out of 52 first referral units in Jharkhand are now fully functioning, up from 18. The Department of Health and Family Welfare recruited nearly 450 new medical officers between 2012 and 2013 based on iHRIS reports. Estimating that a single medical officer covers 2,000 patients annually, these additional medical officers are increasing access to health services, including obstetric care, newborn care, a full range of family planning services, treatment of sexually transmitted infections, and referral services for 900,000 Jharkhand residents. Now iHRIS is routinely used to assess the distribution and skills of health workers in district hospitals and community health centers in the state.

Contributing to Ending Preventable Child and Maternal Deaths and Family Planning 2020

The redeployment of skilled specialists and addition of new medical officers in Jharkhand State based on using iHRIS data for decision-making contributed to significant increases in the availability and utilization of maternal health services across the state. As examples, improvements in the first year included a 740% increase in women receiving three antenatal care visits (from 51,880 to 436,228), a nearly 12 times increase in facility births (from 25,557 to 303,876), and a nearly 20 times increase in cesarean sections for women in need of them (from 369 to 7,231). The state also saw improvements in child health and family planning services and use due to a combination of strategic human resources deployments and other programs (for example, between 2013 and 2015 there was a more than four-fold increase in the number of women choosing to receive a postpartum IUCD—from 3,544 to 15,098).

Mali: The Ministry of Public Health piloted iHRIS Manage in Sikasso Region, with results showing that urban facilities had disproportionately more midwives than health centers in the rural areas where 63% of the population lives. Taking quick action, regional leaders implemented a rotation system, in which midwives work one week each month in a rural health center to mentor lower-level auxiliary midwives and provide access to long-acting reversible contraceptive methods, including for postpartum family planning. These services are critically important in a country with a fertility rate of 6.1 births per woman and 26% unmet need for contraceptives (Mali Demographic and Health Survey 2014). Building on the success of the pilot intervention, the Ministry completed national rollout of iHRIS Manage in 2015. Its Human Resources for Health (HRH) Directorate has been using iHRIS data to serve a range of needs, including guiding deployment of newly recruited health workers, identifying experienced supervisors for deployment to a new health center, locating health workers who had fled from the northern regions during the armed conflict in 2012 to offer them grants to return, tracking international commitments, and advocating for more health workers.

> **"When there was Ebola, the ministry came to the HRH Directorate to have a clear idea about the distribution of health personnel in the affected areas. Since we had iHRIS at hand [we were able] to respond diligently to the request…in relation to the spatial and geographical distribution of health personnel by category and specialty. From there, we could get an idea of the decisions to be taken to respond to the epidemic in our country."**
>
> **—Dr. Idrissa Cissé, Director of HRH, Ministry of Public Health, Mali**

Ghana: The MOH, Ghana Health Service, and the Christian Health Association of Ghana (CHAG) led the rollout of iHRIS Manage, with support from Capacity*Plus*. More than 18,500 health worker

records are captured in the system, which is being used to plan and adjust facility staffing levels to improve service delivery and to analyze data on issues such as retirement planning.

> **"With iHRIS you can tell where the vacancies are, and then you base your advertisement on the vacancies. [That] will help to improve distribution, which will have a direct impact on quality of access to health care."**
>
> **—Obeng Asomaning, principal human resources manager, Ghana Health Service**

Nigeria: The Nursing and Midwifery Council of Nigeria and the Community Health Practitioners Registration Board of Nigeria deployed iHRIS Qualify for registration, certification, and licensing. Up-to-date records are now available for more than 250,000 nurses and midwives and an estimated 90,000 community health workers. The Federal MOH is using the data to inform deployment decisions to provide care in the most underserved areas, identify duplicate health worker records, provide and track education and training, and for budget planning.

Cost Savings

Globally, the use of free, open source iHRIS software has saved a calculated $226.9 million in aggregate licensing costs when compared to initial licensing fees from a comparable commercial software product (Table 1). Each new iHRIS adoption adds to the total saved.

Table 1: Aggregate Savings of Licensing Costs Compared to Proprietary Software
(Estimated cost of supporting the number of employees in iHRIS using proprietary software)

Number of employees	1,226,727
License price per employee	$185
Total cost of license alone	$226,944,495

Source: Oracle PeopleSoft Component Global Price List October 16, 2014

This cost is for the base software license alone and does not include customization of the software, capacity building, infrastructure strengthening, or even all of the functionality offered in iHRIS. (For example, modules such as leave management, benefits, interoperability, and reporting require additional purchases in many commercial product licensing models.) In addition, the global iHRIS community provides ongoing updates and support. If the same degree of updates and support were procured from a commercial HRIS software vendor, it would cost country stakeholders almost $50 million every year (Table 2).

Table 2: Aggregate Annual Savings in Ongoing Updates and Support
(Estimated cost of iHRIS open source community updates and support if purchased for proprietary software)

Number of employees	1,226,727
Annual support price per employee	$40.70
Total support cost each year	$49,927,788

Source: Oracle PeopleSoft Component Global Price List October 16, 2014

Independent Uptake and Support from Other Donors

The open source approach to HRIS has also proved its value through independent applications without direct USAID support and implementations supported by other donors, particularly in West Africa. In 2010, the West African Health Organization (WAHO) identified the need for national HRIS for health workers, identified iHRIS as its preferred platform, downloaded and adapted the software, and piloted it in Ghana's Northern Region without direct support from Capacity*Plus*. This successful independent pilot application prompted rapid iHRIS uptake in the region through different funding sources. Ghana, Mali, and Nigeria received funding from USAID missions to expand iHRIS through Capacity*Plus*, while Liberia and Senegal adopted iHRIS through USAID bilateral projects. Mali also received support from the Canadian Cooperation and WHO. Chad, Sierra Leone, and Togo adapted the

software with support from the WHO, WAHO, and consultants from Nigeria's Foundation for Sustainable Development and the University of Dar es Salaam.

Community Contributions

In 2012, Capacity*Plus* started actively supporting the global iHRIS community of software developers and information technologists with an online forum and regular interactive discussions and training sessions. The community has grown to 260 active participants, who have raised and resolved more than 450 technical issues since its inception. The community has contributed code to iHRIS; provided tools, guidance, and case studies for the iHRIS Implementation Toolkit; and translated iHRIS Manage into 16 languages. iHRIS Train represents a good example of how an open source community can empower local information technology teams to adopt, adapt, and deploy new software to address unmet or emerging challenges. Originally developed by a Ugandan team to support preservice education and in-service training, the software was adapted by a Kenyan team to support training institutions, and is being further adapted in Nigeria for the coordination and tracking of participants in PEPFAR-funded HIV in-service training courses.

Developing a Health Worker Registry

To enable countries to link the various systems (including HRIS) in their health information architecture, Capacity*Plus* led development of a health worker registry for the global Open Health Information Exchange (OpenHIE) program. The registry provides a master list of health workers in a country, pulling information from all health workforce information systems in the public, private, and other sectors. This information is then made available to other digital health systems through open standards and can be used to select groups of health workers for targeted communications that take into account factors such as cadre, location, and services delivered. The registry also enables a health worker to refer a patient to another provider electronically, a service critically important for HIV patients who may need highly specialized services. Capacity*Plus* supported piloting and scale-up of a prototype registry in Rwanda, and worked with an international standards organization, Integrating the Healthcare Enterprise, to develop a new global standard for exchanging health worker information. The project then supported a local information technology (IT) organization to lead national-level implementation of a registry in Nigeria.

Lessons Learned and Recommendations

- Open source approaches are effective. Through building a virtual community, iHRIS has become a widely applied and extended solution demonstrating many development aid priorities including local ownership and partnership.
- Capacity*Plus's* experiences with the University of Dar es Salaam in Tanzania, Makerere University in Uganda, and Luanar University in Malawi clearly indicate that universities have the best infrastructure for capacity-building in informatics and ensuring sustainability of capacity-building efforts. Returns on investments in local universities are magnified when they start working beyond the borders of a single country. Twinning between global and local universities may yield unique benefits to local development and support.
- Regional organizations such as WAHO are the strongest vehicles for disseminating and supporting uptake of HRIS best practices, tools, and technologies.
- Interoperability assists with uptake and leveraging of health information system strengthening activities. By ensuring that iHRIS is interoperable with other leading national health information systems, investments in those systems will benefit implementation of iHRIS, and vice versa. Once the systems are linked with quality data (e.g., DHIS 2), important correlations across health domains (e.g., services, supply chain) can be identified and incorporated into solution planning.
- National HRH stakeholders benefit by working through a stakeholder leadership group to develop a common strategy, policy, and standards for a national health workforce information architecture as well as to promote increased use of data for decision-making. One-time data use training can increase stakeholder buy-in and goodwill; however, mentorship and sustained collaborative development of skills with real-life examples are often needed to change data use behaviors.
- Countries should be encouraged to use iHRIS with the WHO's Workload Indicators of Staffing Need (WISN) tool to generate data on how many health workers are needed (from WISN) along with how many workers are present or missing from established positions (from iHRIS).

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Capacity*Plus*
IntraHealth International, Inc.

1776 I Street, NW, Suite 650
Washington, DC 20006
T +1.202.407.9425

6340 Quadrangle Drive
Suite 200
Chapel Hill, NC 27517
T +1.919.313.9100

info@capacityplus.org
www.capacityplus.org

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