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 CapacityPlus, 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
• 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.

CapacityPlus 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. CapacityPlus 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](image)

**Highlights of Results**

**Use of Data for Decision-Making**

As iHRIS implementations expanded and matured in countries supported by CapacityPlus, 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 CapacityPlus, 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
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

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 CapacityPlus 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.

Ghana:

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

The MOH, Ghana Health Service, and the Christian Health Association of Ghana (CHAG) led the rollout of iHRIS Manage, with support from CapacityPlus. 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
Quality 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>
<thead>
<tr>
<th>Number of employees</th>
<th>1,226,727</th>
</tr>
</thead>
<tbody>
<tr>
<td>License price per employee</td>
<td>$1.85</td>
</tr>
<tr>
<td>Total cost of license alone</td>
<td>$226,944,495</td>
</tr>
</tbody>
</table>

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)

<table>
<thead>
<tr>
<th>Number of employees</th>
<th>1,226,727</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual support price per employee</td>
<td>$40.70</td>
</tr>
<tr>
<td>Total support cost each year</td>
<td>$49,927,788</td>
</tr>
</tbody>
</table>

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 CapacityPlus. 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
CapacityPlus, 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, CapacityPlus 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, CapacityPlus 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. CapacityPlus 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.

• CapacityPlus’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).

References


Photo credits: Carol Bales, Trevor Snapp, and Pedro Ramirez