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FINAL REPORT

Improving Health Care: The Results and Legacy of the USAID Health Care Improvement Project

SEPTEMBER 2014

This final report was prepared by University Research Co., LLC (URC) for review by the United States Agency for International Development (USAID). It was authored by Lani Marquez, Silvia Holschneider, Edward Broughton, and Simon Hildebeitel of URC. The USAID Health Care Improvement Project was made possible by the generous support of the American people through USAID.

Cover Photo

Mother and newborn at Malalai Hospital in Kabul, Afghanistan. The birth attendant for this successful outcome was trained by HCI in essential newborn care as part of efforts to improve the quality of obstetric and newborn care. *Photo by Annie Clark, URC.*

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Much of the work begun under HCI continues through the USAID Applying Science to Strengthen and Improve Systems (ASSIST) Project, managed by URC under the terms of Cooperative Agreement Number AID-OAA-A-12-00101. For more information, please visit www.usaidassist.org or contact assist-info@urc-chs.com.

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Foreword

This report is not just a summary of a USAID-funded project: It is an extensively-documented milestone for global efforts to improve health in lower- and middle-income countries (LMICs). Increasingly, the central strategy for global health efforts to save lives focuses on selected, high impact interventions. Organizations have supported these interventions chiefly by providing the required resources, such as training, drugs, and technical assistance. But in order to implement any kind of service, the health system uses standardized processes for both clinical and non-clinical activities. There are large numbers of such processes in any health system, and they have been largely overlooked by global initiatives. Even health system managers have limited knowledge about how well these processes are working. Building on earlier projects and the experience of high-income countries, the HCI Project directly examined how these neglected health care processes work and developed ways to improve them. This report summarizes that ground-breaking effort.

The Approach

A number of “quality improvement” (QI) methodologies have been developed in recent years, and more are likely to be developed in the future. One of the major findings of the published literature in this field is that attempts to improve quality are complex social interventions—efforts with the same label may have substantial differences, and the results of a given intervention cannot be predicted with confidence in the way we do, for example, with drug trials. On this basis, HCI did not select one or more specific methodologies for addressing quality issues, but rather chose a general approach for organizing QI efforts that would generate evidence of effectiveness for every application—an evidence-based approach to improving health care processes. This approach is generally known as continuous quality improvement (CQI). CQI has been extensively used in the US health care system, and prior to that, in industry.

The basic mechanism of improvement in CQI is tests of change—identifying a promising change in a health care process and then conducting a small scale trial of that change, measuring an indicator for the outcome of that process. Changes that show improvement can then be scaled up based on evidence. A central feature of CQI is that these tests are carried out by teams of health workers,

not external advisors. A major conclusion of the results presented in this report is that health workers across a wide range of settings have demonstrated the capacity to conduct and analyze these tests.

HCI also incorporated a major advance in CQI developed in the US: Shared learning among facility teams. US experience demonstrated more rapid improvement when multiple teams worked on the same area and shared what they were learning. This modification proved to be even more valuable in LMIC settings, especially through the motivation provided by an extended peer group. This “collaborative improvement” approach was also designed to work with existing resources.

Results

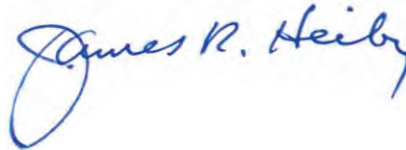
Most of the report focuses on the effectiveness of this approach across 38 countries and all USAID priority health issues. A seminal HCI paper published in *BMJ Quality & Safety* (2011) analyzes the mean level of improvement in 27 applications in 12 LMICs under earlier USAID-funded projects, covering a total of 1338 facilities. To this, HCI adds the experience of 1065 facility teams, plus 846 teams engaged in scaling up previously developed improvements. The report also summarizes the results of seven formal evaluations of country QI programs and 26 papers published in peer review journals. The report directly cites 29 key HCI reports and lists 138 more. These reports and papers also describe the largest program of research and evaluation for QI in LMICs ever conducted. Appendices provide baseline values for nearly 400 quality indicators, and the level of these indicators after a QI intervention. The volume of quantitative measures of quality in this report is unprecedented in the published or gray literature.

What the report shows

This report summarizes an extensive, real-world experience with the application of state-of-the-art QI in LMICs. There is, of course, some variability in the results from such a large number of QI applications, but there is one overwhelming impression: impressive levels of improvement, consistently achieved across a wide range of country settings and health topics. The research and evaluation component contributes important insights, particularly through its focus on the cost-effectiveness of these QI applications.

A substantial learning agenda remains, including better understanding of the institutionalization of QI as a permanent, integral part of health services, the sustainability of improved processes, the factors in successful scaling up, the application of QI to management issues, increasing the

efficiency and productivity of health care processes, and expanding the effective use of knowledge management related to tests of change. Readers of this report will want to reflect on the implications of this body of evidence for global health.



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Preface

It gives me great pleasure to present this report highlighting the accomplishments and key learnings from our seven-year experience implementing the USAID Health Care Improvement Project in 38 countries. No report can do justice to this incredible experience. As seen from the report, the USAID Health Care Improvement Project not only met, but exceeded expectations set for it.

This could not have happened without concerted efforts of several hundred staff and partner organizations on this project, both in the field and at headquarters. More importantly, it could not have happened without the talent, dedication, and hard work by health care providers, patients, their families, and communities where the work happened. The impressive results as well as the leadership in the districts, provinces, and Ministries of Health were key to achieving this.

More important than the actual results achieved are the intangible results that came along with doing the work. These include capacity building, ownership of improvement in the host countries where we've worked, the health systems strengthening, and the cultural shifts that take place when this type of work is done.

As you can imagine, doing this work can't occur without learning from both what worked and even more from what did not work. There are many lessons described in this report and of these many lessons, I would like to mention a couple which I see as influencing the future direction of our work in improving health care.

First, the improvement design work in countries such as in Afghanistan, with clear integration of the interventions at different levels of care and a phased approach through which these interventions were introduced, starting with low hanging fruit and reaching increasing levels of complexity, set new standards for improvement intervention design. The interventions were combined with improvement

expertise to enable their implementation in everyday practice. Of course, the improvements that HCI witnessed in improving the quality of health services in Afghanistan and the other countries in which we worked could not have happened without leadership from our Chiefs of Party, our staff, and more importantly, from the Ministries of Health and health workers with whom we worked. The results of these efforts are testimony to the fact that when we design and execute correctly, even in the most challenging of circumstances, we are able to obtain very significant results. Results such as these have influenced our direction going forward in improving health care.

The second learning that I would like to mention is the exploratory journey that we underwent during the lifetime of the USAID Health Care Improvement Project in understanding how to manage knowledge for improving health care. We were fortunate to have great thought leadership as well as commitment of our staff during this journey. Through HCI we have learned to see the importance of managing knowledge in order to improve health care. Going forward, this will be one of the key aspects that we emphasize in our work.

There is no greater privilege for public health specialists than to have the ability to influence positive change in the health systems of many countries that we have served, impacting many thousands of lives around the world. In this journey, I have been honored to work with a team of several hundred talented and dedicated professionals and several partner organizations, including ANPPCAN, Center for Family Welfare of the Universitas Indonesia, EnCompass LLC, FHI 360, Harvard University School of Public Health, HEALTHQUAL International, Initiatives Inc., Institute for Healthcare Improvement, Johns Hopkins University Center for Communication Programs, REPSSI, RSM Security, Travel Leaders, and WI-HER LLC, who together made this happen.



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Abbreviations

AIDS	Acquired immune deficiency syndrome	LTFU	Lost to follow-up
AIMGAPS	Assuring mothers and infants get all PMTCT services	MNH	Maternal newborn health
AMTSL	Active management of the third stage of labor	MOH	Ministry of Health
ANC	Antenatal care	MOHSW	Ministry of Health and Social Welfare
ANPPCAN	African Network for the Protection and Prevention of Child Abuse and Neglect	MTCT	Mother-to-child transmission of HIV
ART	Antiretroviral therapy	MUAC	Mid-upper arm circumference
ARV	Antiretroviral	NACS	Nutrition, assessment, counselling, and support
ASSIST	USAID Applying Science to Strengthen and Improve Systems Project	NB	Newborn
CBO	Community Based Organizations	NCD	Non-communicable disease
CCM	Chronic Care Model	NGO	Non-government organization
CCT	Conditional cash transfer	OHA	Office of HIV and AIDS
CDC	U.S. Centers for Disease Control and Prevention	OVC	Orphans and vulnerable children
CHW	Community health worker	PE/E	Pre-eclampsia/eclampsia
CHW AIM	CHW Assessment and Improvement Matrix	Peoples-Uni	People's Open Access Education Initiative
COPD	Chronic obstructive pulmonary disease	PEPFAR	U.S. President's Emergency Plan for AIDS Relief
CQI	Continuous quality improvement	PLHIV	Persons living with HIV
CVD	Cardiovascular disease	PMTCT	Prevention of mother-to-child transmission of HIV
ECSA	East, Central, and Southern Africa	PPFP	Postpartum family planning
ENC	Essential newborn care	ProCONE	Promotion of Essential Obstetric and Neonatal Care
EONC	Essential obstetric and newborn care	QAP	Quality Assurance Project
FP	Family planning	QI	Quality improvement
HAPIE	Hospital Accreditation Process Impact Evaluation	RCH	Reproductive and Child Health
HCI	USAID Health Care Improvement Project	REPPSI	Regional Psychosocial Support Initiative
HCT	HIV counseling and testing	RTI	Respiratory tract infection
HIV	Human immunodeficiency virus	SES	Standard Evaluation System
HPT	Human performance technology	TB	Tuberculosis
HR	Human resources	TO	HCI Task Order
HRH	Human resources for health	TT	Tetanus toxoid
IQC	Indefinite Quantity Contract	URC	University Research Co., LLC
ISQua	International Society for Quality in Health Care	US	United States
IST	In-service training	USAID	United States Agency for International Development
JCI	Joint Commission International	USG	United States Government
JHU CCP	Johns Hopkins University Center for Communication Programs	VHT	Village Health Team
KARS	Indonesian Hospital Accreditation Commission	WHO	World Health Organization
KM	Knowledge management	WI-HER LLC	Women Influencing Health, Education, and Rule of Law
LMIC	Lower- and middle-income countries		



BOX 1. HCI objectives

- Document the content and impact of interventions to improve health care quality
- Institutionalize modern quality improvement approaches as an integral part of health care in USAID-assisted countries
- Expand the evidence base for methods to improve the quality of health care, with an emphasis on collaborative improvement
- Expand the evidence base for the application of improvement methods to human resources planning and management
- Improve the cost-effectiveness of quality improvement in USAID-assisted countries
- Provide global technical leadership for improving the quality of health care in USAID-assisted countries and global learning about health care improvement.

Above: A health worker showing mothers how to position infants when breastfeeding during a postnatal health talk in the Iringa Region of Tanzania. Photo: Delphina Ntangeki, URC.

I. Introduction

The Health Care Improvement Project (HCI) was the global mechanism of the United States Agency for International Development (USAID) for technical leadership and assistance to improve health care delivery and health workforce capacity and performance in USAID-assisted countries from 2007-2014. Managed by University Research Co., LLC (URC), HCI built the capacity of health systems to apply modern quality improvement approaches to strengthen facility- and community-based health services, human resources management, and services for vulnerable children and families, improving health outcomes and contributing to the achievement of the Millennium Development Goals.

HCI operated under two global task orders (TOs)—TO1 and TO3—and one country task order—TO2 issued by USAID/El Salvador—under the USAID Health Care Improvement Indefinite Quantity Contract (IQC) and assisted a total of 38 countries. A complete list of HCI activities by country over the life of the project is in Appendix A. This report presents the groundbreaking results and lessons learned from TOs 1 and 3.

The objectives of the IQC and the two global task orders, listed in Box 1, were grounded in the use of modern improvement methods and the lessons of URC's over 20 years of USAID-funded experience in improving health care services in low- and middle-income countries. The HCI statement of work's emphasis on expanding the evidence base for modern improvement methods led to a large and diverse portfolio of HCI research and evaluation studies.

HCI's technical strategies to improve services relied on a diverse set of partnerships, beginning with frontline service providers, health ministries, non-governmental organizations, USAID Missions and other U.S. Government agencies, implementing partners, global experts in quality improvement, and organizations working to improve specific care areas. URC's subcontractors for HCI included EnCompass LLC, FHI 360, Harvard University School of Public Health, HEALTHQUAL International, Initiatives Inc., the Institute for Healthcare Improvement, and Johns Hopkins University Center for Communication Programs (JHU CCP). EnCompass, Initiatives, and JHU CCP provided seconded staff who worked at URC headquarters as part of the core HCI team.

II. Results

Objective 1:

Document the interventions supported by task order to improve the quality of health care, how quality was measured, and the impact of these interventions over a specified period of observation



1. Documenting improvement interventions

HCI placed strong emphasis on documenting the content of improvement interventions as well as their impact, so that effective interventions could be replicated. One of HCI's early activities was to develop and field test the Standard Evaluation System (SES), which would offer uniform tools to support documentation, analysis, and sharing of improvement team activities to improve care through

Above: Health provider in Buikwe District, Uganda and URC staff discuss how to overcome barriers to providing comprehensive care for patients with chronic conditions like HIV. HCI supported the Ministry of Health to implement the chronic care model in Buikwe District and then apply the refined model in new sites. *Photo by Suzanne Gaudreault, URC.*

testing of changes. The SES tools were originally introduced in 2008 with 65 teams in six countries: Benin, Honduras, Niger, Russia, Tanzania, and Uganda. The tools field tested included three SES tools for use at the team level (team

improvement journal, synthesis form, and a Microsoft Office Excel database) and one tool for collaborative managers (Excel database for consolidating results across teams).

In 2009, endline evaluation data were collected from five of these countries (Niger's funding for improvement activities had ended) and three additional countries: Cote d'Ivoire, Guatemala, and Swaziland [1].

The field test evaluation led HCI to propose in FY10 a new strategy for establishing an effective learning system for health care improvement: a minimal set of clear standards and expectations for improvement teams and collaboratives and other large-scale improvement efforts related to documentation, analysis, synthesis, and sharing of learning. The seven standards for an effective learning system for improvement include standards for both improvement teams and collaboratives (see Box 2). The standards represent a set of "simple rules" that can be applied and adapted to any setting or context.

These learning system standards were introduced in all HCI field- and headquarters-led improvement activities at the end of FY10. While the continued use of the SES tools was not required, many HCI country teams continued to use the SES team journal and team-level and program-level Excel spreadsheets, and their use continues under the USAID ASSIST Project [2].

BOX 2.

HCI learning system standards

Key tasks for improvement teams:

1. Maintain a record of changes being tested (dates and description).
2. Graph indicators on time series chart and annotate with changes tested regularly.
3. Share tested changes and results with others.

Key tasks for collaboratives and other large-scale improvement interventions:

1. Maintain an up-to-date inventory of changes being tested at each site.
2. Aggregate and analyze results in light of tested changes across sites.
3. Regularly consolidate and share learning about changes being tested within the collaborative.
4. Package and share learning about effective changes to those outside the collaborative, both at national and global levels.

2. Improvements in quality of care

HCI's main focus was to support improvement in quality of care at the country level. Much of the funding for HCI technical assistance came from the U.S. President's Emergency Plan for AIDS Relief (PEPFAR) through USAID Missions. Consequently, support for facility and community teams to improve delivery of HIV services (including care and treatment for people with HIV, management of HIV-TB co-infection, services for orphans and other vulnerable children affected by HIV, and other services for people living with HIV, such as nutritional support and family planning) constituted the largest share of country-level activities, followed by efforts to improve maternal and newborn care.

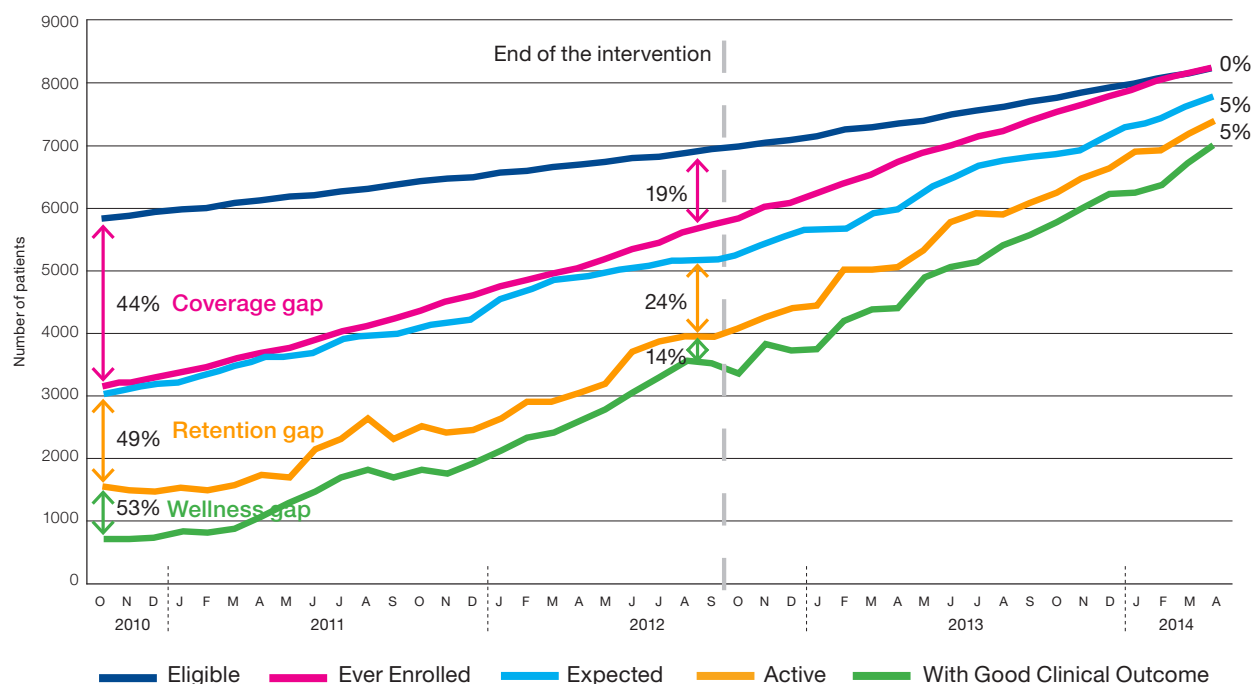
Health workforce development and performance improvement activities also figured prominently in HCI country work, primarily funded by PEPFAR but initially with funding from the USAID maternal and child health team to work on strengthening the performance of community health workers (CHWs). The initial health workforce activities related to CHWs developed into broader activities to strengthen community health systems and linkages with the formal health system. HCI received limited funding to directly support improvement of tuberculosis case detection and management, care for non-communicable diseases, and family planning, but also achieved important results in these areas.

Key results achieved with HCI support in each of the programmatic areas addressed by the project are highlighted below. A comprehensive presentation of baseline and final results for key indicators collected by improvement teams supported by HCI in 23 countries is in Appendix B, organized by clinical topic. The appendix excludes data from assessments conducted by HCI where there were no follow-on improvement activities supported by the project and excludes data from El Salvador, which was not supported through the global task orders that are the focus of this report. Data from orphans and vulnerable children (OVC) standards piloting activities in Haiti, Mozambique, and Nigeria are also excluded because data were available only from single teams that could not be readily aggregated. Additional results by country are available in each of the HCI global task orders' annual reports, available on the USAID ASSIST website at: <https://usaidassist.org/resources/annual-project-reports-usaid-health-care-improvement-project-fy08-fy14>.

HIV and AIDS

Interventions to improve the delivery of clinical HIV prevention, care, and treatment services figured prominently in HCI's support for national improvement activities in Cote d'Ivoire, Kenya, South Africa, Swaziland, Tanzania, Uganda,

Figure 1. Uganda: Coverage, retention, and clinical outcome gap analysis showing improvement at five sites implementing the Chronic Care Model in Buikwe District (October 2010–April 2014)



Pakistan, Vietnam, Russia, and Nicaragua. HCI HIV and AIDS improvements spanned counseling and testing, prevention of mother-to-child transmission of HIV (PMTCT), antiretroviral therapy (ART) and pre-ART care, management of tuberculosis (TB) and HIV co-infection, injection safety, and home-based care for persons living with HIV (PLHIV).

Two areas of innovation by HCI in support of HIV services are worth noting. The first was the development of a simplified framework for measuring and guiding improvement in the quality of care for patients on ART. This **ART Improvement Framework**, first piloted in Morogoro, Tanzania, was designed to focus improvement efforts on the most significant gaps in assuring quality HIV care and treatment: 1) coverage, which measures the proportion of patients who are started on ART of those who require treatment; 2) retention, which measures the proportion of patients who remain on ART of those who were started on it; and 3) clinical outcomes, measuring the proportion of patients with healthy outcomes from those who are retained in care. This emphasis on outcomes helped to raise awareness of improvement teams of the importance of focusing on the end results for patients and helped steer teams away from focusing on isolated process improvements.

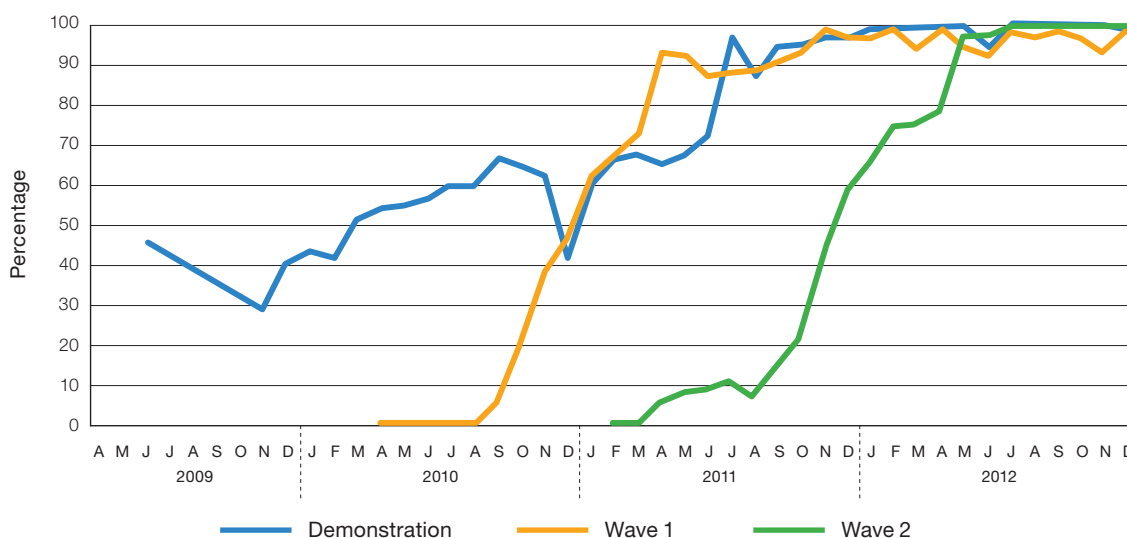
The second innovation, which built on the first, was the development and piloting of **HIV care delivery models based on the WHO-endorsed Chronic Care Model (CCM)** to

address interlinked system components critical in providing good chronic illness care. HCI's chronic care activities included convening a regional meeting addressing the chronic care of HIV in 2011 and the piloting and refinement of strategies to deliver high-quality patient self-management support, palliative care, clinical information systems, efficient delivery systems, decision support, and linkages to community resources. In Uganda, HCI worked with 15 facility-level teams and the district management team in Buikwe District to use the CCM to examine and improve their HIV care delivery systems, using the ART framework to measure their impact. As shown in Figure 1, data on coverage, retention, and clinical outcome gaps at the five sites in Buikwe that provided comprehensive ART care revealed a dramatic increase in coverage of persons eligible for ART, with improved patient retention and clinical wellness over the course of the collaborative. Furthermore, achievements in coverage, retention, and wellness were not only sustained but also enhanced over a period of 20 months following the end of the intervention.

Illustrative improvements achieved by HCI-supported facilities in HIV and AIDS care include:

- **South Africa:** HCI supported facility teams and district supervisors in five provinces in almost 200 sites in FY10 and over 300 sites by FY12 to achieve and sustain high coverage with HIV counseling and testing and to improve

Figure 2. Afghanistan: Percentage of vaginal births for which 3 AMTSL elements were performed by group of provinces (November 2009–December 2012)



post-testing services: CD4 testing rates among PMTCT clients improved from 84% (Q2 FY10) to 99% (Q4 FY12); the rate of referral for CD4 testing among co-infected TB/HIV patients improved from 84% (Q2 FY10) to 92% (Q4 FY12); and TB screening among HIV-infected clients improved from 76% (Q2 FY10) to 90% (Q4 FY12).

- **Tanzania:** HCI worked with the Ministry of Health and Social Welfare (MOHSW) of Tanzania to operationalize the 2010 WHO PMTCT guidelines in Iringa Region and increased the proportion of HIV-positive mothers being initiated on lifelong ART from 43% in January 2011 (11 sites) to 90% by February 2013 (9 sites).
- **Uganda:** Over the course of the 14-month palliative care improvement collaborative (July 2010–August 2011) in 10 sites, the proportion of patients asked about pain increased from 30% to 94%. The proportion of patients with pain whose pain was scored increased from 74% to 89%. Despite struggles with supplies of pain medicines, the percentage of patients who were prescribed pain medications increased from 75% to 83%.
- **Swaziland:** HCI supported on-site clinical mentoring on ART provision to TB-HIV co-infected adults in 65 TB clinics across the country. Interventions included adding a TB-ART clinical advisor to the coaching team; health care worker training; development of patient flow charts and a TB-HIV database; harmonization of TB-HIV tools; and data quality audits. The uptake of ART in adult TB-HIV co-infected patients increased from 16% in FY08 to 64% in Q4 FY12. Uptake of Cotrimoxazole prophylaxis by co-infected patients increased from 32% to 99% during the same time period.

- **Nicaragua:** HCI worked with health facilities in eight regions to expand HIV counseling and testing among patients with TB, increasing the proportion of TB patients tested for HIV from 50% in February 2010 to 92% in September 2011.

Additional results by country are presented in Appendix B.

Maternal, newborn, and child health

HCI supported Ministries of Health in Afghanistan, Ecuador, Guatemala, Honduras, Kenya, Mali, Nicaragua, Niger, Russia, and Uganda to address quality gaps across the continuum of maternal, newborn, and child health services, including missed opportunities to provide essential services during antenatal care (ANC), low compliance with evidence-based practices such as active management of the third stage of labor (AMTSL), use of the partograph, appropriate management of childhood diarrhea and pneumonia, and failure to promptly detect newborn asphyxia and apply immediate resuscitation.

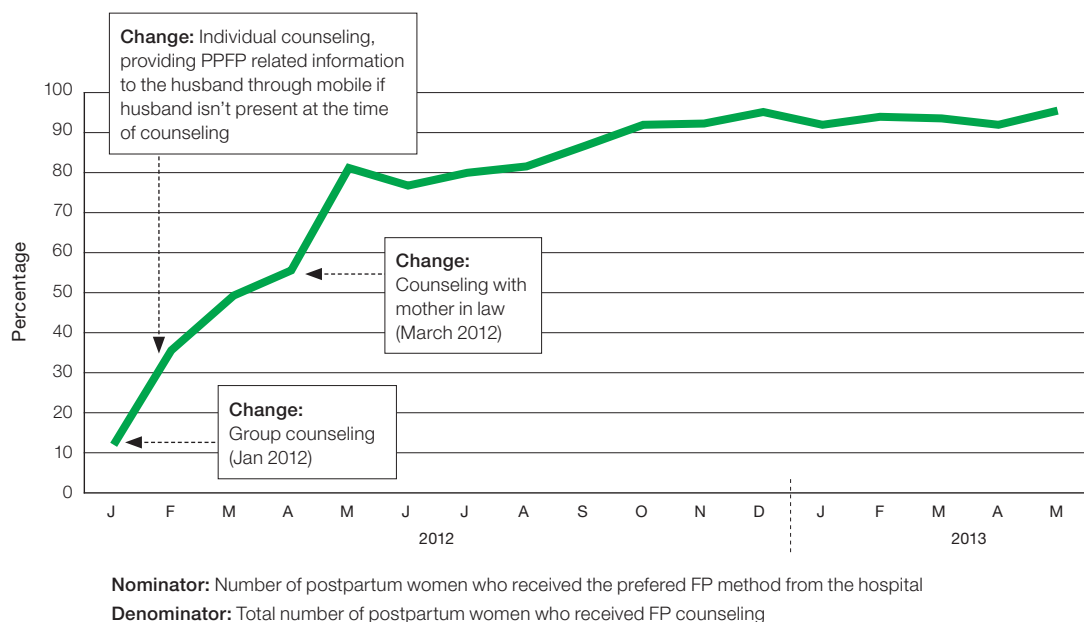
HCI's results in essential obstetric and newborn care (EONC) built on and expanded successful collaborative improvement interventions previously supported by the Quality Assurance Project (QAP). For example, benefiting from the experience and lessons learned in Niger, the implementation of changes in the Kayes Region of Mali under HCI was swift and soon demonstrated a sharp increase in the uptake of AMTSL and a decrease in postpartum hemorrhage. Similarly, the maternal and newborn care improvement work in Afghanistan benefited from an intensive design activity to integrate and sequence evidence-based practices, drawing on learning from QAP.

HCI also introduced quality improvement activities in Afghanistan, Honduras, Nicaragua, and Uganda to scale up newborn resuscitation, integrating the Helping Babies Breathe curriculum with the delivery of EONC services.

Key results achieved in maternal, newborn, and child health under HCI include:

- **Kenya:** HCI supported a demonstration activity in Kwale District to increase the coverage and quality of ANC services. In 21 facilities, the percentage of pregnant women delivered by skilled birth attendants increased from 23% in January 2011 to 51% of the estimated number of pregnant women in the district by August 2012. In the same period, the percentage of pregnant women completing at least four ANC visits increased from 26% to 57% of the estimated number of pregnant women in the district, and the percentage of pregnant women starting ANC in the first trimester also increased, from 6% to 19%. The quality of ANC services also improved: By the intervention's end in August 2012, 100% of women receiving ANC services in the district had their blood pressure measured during each visit, as opposed to only 32% before the start of the collaborative improvement intervention in Kwale, and 98% of those attending ANC received a regular supply of iron supplements, as opposed to 23% at the beginning of the project.
- **Afghanistan:** From 2009 through the end of 2012, HCI supported maternal and newborn health facility collaborative improvement interventions in Afghanistan that over time reached 85 health facilities in nine HCI-targeted provinces, achieving measurable gains in quality of maternal and newborn care for about 24% of the total population of the nine provinces. The biggest gains achieved by the sites included an increase in the use of the partograph, which averaged 92% during the last three months that data were collected, up from baseline levels of around 20%; improved compliance with ANC counseling standards, which averaged 91% during the last three months of data collection, up from baseline levels of under 40%; an increase in the percentage of pregnant women able to cite at least two birth preparedness actions and at least two pregnancy danger signs, which averaged 94% and 95%, respectively, during the last three months of data collection, up from baseline levels below 50%; and an increase in the percentage of vaginal births in which all three elements of AMTSL were performed to an average of 87% during the last three months of data collection, up from baseline levels of under 50% in Balkh and Kunduz and below 10% in the other provinces (see Figure 2).
- **Mali:** HCI introduced a package of change ideas that had been tested in neighboring Niger, resulting in rapid increases in the quality of EONC services among sites in Diema and Kayes districts. The proportion of deliveries that received all three elements of AMTSL increased from 48% in November 2009 to 100% in April 2013 in Kayes Region. The proportion of newborns receiving the standard elements of essential newborn care increased from 56% to 100% in the same period. The work in Mali also focused on improving the diagnosis and treatment of pre-eclampsia and eclampsia, increasing compliance with treatment standards from 41% at baseline in November 2009 to 85% in April 2013.
- **Uganda:** In Masaka and Luwero districts of Uganda from December 2010 to August 2012, HCI supported facilities to improve compliance with AMTSL (10% to 95%), essential newborn care standards (11% to 86%), and percentage of newborns breastfed within one hour of delivery (17% to 88%). In addition, the detection of neonatal asphyxia and immediate application of resuscitation increased dramatically after changing health staff's belief that resuscitation was too sophisticated to be applied at the primary care level. Furthermore, training using locally made models and ensuring the availability of essential supplies empowered the staff to apply the procedure promptly.
- **Guatemala:** HCI developed an approach to improve essential obstetric and newborn care in Guatemala through community mobilization and facility-level quality improvement, working initially in 22 health centers of San Marcos Department and then spreading the improved practices to seven other highlands departments. In the scale-up departments, the proportion of newborns receiving essential care according to standards improved from 33% in January 2009 to 97% in May 2012.
- **Russia:** HCI's support for the promotion of exclusive breastfeeding resulted in an increase in the proportion of newborns being exclusively breastfed at discharge from 14 participating maternity hospitals from 51% in January 2009 to 96% in September 2011. A related collaborative to reduce hypothermia among neonates achieved a significant shift in the median percentage of newborns who received mother-to-child skin-to-skin contact for at least two hours after birth in 33 hospitals, from 0% in 2009 to 74% in 2011.
- **Senegal:** In partnership with ChildFund International, HCI applied modern QI approaches at the community level in two districts, Mbour and Tivaoune, to increase the ability of CHWs to detect sick children within 24 hours of disease onset, initiate treatment as appropriate, and refer to the nearest health facility. The percentage of sick children seen within 24 hours increased from 28% at baseline in October 2010 to 97% in May 2011.

Figure 3. Afghanistan: Increase in postpartum counseling and FP (January 2012–May 2013)



- **Honduras:** HCI supported the Health Department of La Paz Region to improve the management of child pneumonia and acute diarrheal disease in four of its nine provider networks. Compliance with integrated management of childhood illness treatment norms in La Paz Region improved from 51% in January 2009 to 88% in March 2010. Improving the quality of pneumonia care for children under five was a major goal of the collaborative, and by September 2011, facilities reached 100% compliance with this norm, up from 73% at baseline in January 2009.

Family planning

HCI supported improvements in the quality of family planning counseling and expanding method choice, with an emphasis on post-partum family planning (PPFP), in Afghanistan, Mali, Nicaragua, and Niger. In Uganda, HCI supported the integration of family planning counseling and offer of contraceptive methods as part of HIV services.

Key results achieved in the expansion of family planning services include:

- **Afghanistan:** In 2012 and 2013, HCI supported the integration of PPFP services in five large maternity hospitals in Kabul. The proportion of postpartum women who received family planning counseling before discharge in the five hospitals increased from 36% in January 2012

to 55% in November 2012, and proportion of counseled women who received family counseling with their husbands either in person or by mobile phone increased from 18% to 90% in the same period. In addition, the proportion of postpartum women who agreed to use family planning and left the hospital with their preferred method increased from 12% in January 2012 to 95% in May 2013 (see Figure 3).

- **Mali:** Improvement teams in Kayes Region successfully integrated family planning counseling into postpartum care. The teams noticed that while most health facilities offered some family planning services, these services were not regarded as part of postpartum care. They improved the family planning counseling skills of staff and ensured that a physical space was available to offer private counseling to post-partum women jointly with their husbands. From March to October 2011, the percentage of postpartum women who received family planning counseling before discharge increased from 14% to 95%, a laudable response to a baseline of virtually no PPFP services.
- **Nicaragua:** HCI worked with public and private facilities in 15 regions to support the offer of quality family planning services, emphasizing postpartum family planning and long-term methods use. In 2009, the proportion of women discharged after delivery with a contraceptive method in 23 hospitals assisted by HCI increased from 71% in January to 85% in September.

- **Niger:** Contraceptive prevalence was one of the outcome indicators used in the human resources collaborative, since improving health worker performance through team-based management was expected to positively affect achievement of service delivery goals, and one objective that the participating facilities set for themselves was to increase the use of contraceptives. At baseline in March 2009, contraceptive prevalence was 10%. By July 2010, this had risen to an average of 26% across all 20 sites, but one health center was able to achieve a much higher level of 41% because health workers 1) designated one staff member to focus on family planning counseling and 2) increased the frequency of data gathering and analysis on uptake of contraceptive methods by new clients.
- **Uganda:** In Masaka District, HCI's support for the integration of family planning and HIV services in four facilities yielded an increase in the percentage of HIV-positive clients counseled for family planning from 29% in November 2011 to 84% in February 2013 and an increase in those given a modern contraceptive methods from 16% to 60% in the same period.

Health workforce development

With PEPFAR's support, HCI developed evidence to promote the application of approaches to not only improve the quality of care, but also to strengthen the health workforce by improving health worker engagement, performance, and productivity. Pioneering HCI work in Niger and Tanzania showed that significant improvements in service delivery can be attained alongside improvements in human resources management and health worker engagement when factors affecting performance are addressed as part of the improvement work.

HCI also partnered with international, regional, and national stakeholders to develop 1) an improvement framework for developing effective national in-service training programs for health workers and 2) a methodology for assessing the functionality of CHW programs in areas such as recruitment, training, supervision, and performance evaluation.

Key results achieved through health workforce interventions included:

- **Tanzania:** In the Mtwara Region, 12 health facility teams mapped and reviewed HIV processes of care and analyzed health worker tasks. Based on identified problems, teams reorganized the process of care, shifted tasks, and clarified task expectations that were then reflected in individual job descriptions and work plans. Between July 2010 and February 2012, the proportion of HIV clients

assessed for active TB at every visit improved from 35% to 93%; the proportion of HIV-exposed children under 18 months receiving daily Cotrimoxazole prophylaxis increased from 13% to 100%; and the proportion of pregnant women who tested positive for HIV and were enrolled in care and treatment increased from 80% to 100%. All 57 health workers also had job descriptions compared to two at baseline, and 88% of staff said they were highly motivated, compared to 67% at baseline.

- **Tanzania:** A collaborative involving all six district management teams in Lindi Region focused on improving district-level management by analyzing gaps in performance of key management functions. These districts saw the percentage of facilities that submitted supply orders on time to the district increase from 76% (March 2011) to 96% (September 2013). In the same period, the districts improved retention of newly recruited staff at six months from 69% to 97%.
- **Niger:** In the Tahoua Region, improvements made by facility and district management teams to improve human resources management resulted in significant clinical, performance, and efficiency gains between May 2009 and December 2010: Six of Tahoua's eight districts met the national target for the percentage of births delivered in a health facility (i.e., more than 25%); adherence to essential newborn care standards rose from 72% to 98%; and the average waiting time for pre-natal consultations fell by 50–98%.
- **Uganda:** HCI also supported a pharmaceutical human resources improvement activity with pharmacy staff in 14 facilities in Eastern Uganda. The percentage of clients with good adherence to ART improved from 72% in April 2012 to 89% in September 2013.

Orphans and vulnerable children

Due to the long-term effects of HIV, AIDS, and poverty, many countries are home to increasing numbers of vulnerable children requiring care and support beyond what can be provided by their families. Government, civil society, and the international donor community have attempted to fill the gaps in care and support through the provision of services to at-risk children. While standardization of those services is critical to the achievement of a measureable, systemic, and sustained response, until recently, minimum standards of care for children did not exist in many countries.

Since 2007, HCI's PEPFAR-funded "Care that Counts Initiative" has provided technical assistance to ministries and partner organizations at the national, district, and community levels in nine countries to develop minimum care standards

for services to vulnerable children in seven domains: health, education, shelter, nutrition, psychosocial support, legal protection, and household economic strengthening. With support from HCI, seven countries—Ethiopia, Cote d'Ivoire, Haiti, Kenya, Mozambique, Nigeria, and Tanzania—launched or scaled up implementation of standards of care for vulnerable children. HCI's unique contribution to the process was to show how improvement methods could facilitate the local adaptation and implementation of OVC standards by engaging community-level teams and care providers in a process of identifying gaps in meeting the standards and mobilizing local resources to close those gaps. The teams were able to address needs in new, creative ways and found that using the standards was not only feasible, but led to improved well-being for the children they were serving.

Illustrative results from OVC improvement efforts include:

- **Kenya:** Implementing-partner Maua Methodist Hospital adapted their existing interventions to promote better short-term food supply and enhance household capacity to produce and/or access food with minimal external support. Over the course of piloting, the hospital saw increases in food security, with 42% of children scoring “fair” or “good” in the Child Status Index at baseline and 100% scoring “fair” or “good” at the end of the year.
- **Kenya:** In Nyanza Province, NGO Speak for the Child determined at the onset of piloting the OVC standards that availability of birth certificates needed to be improved, as they are a basic right as well as a requirement for children to enroll in school and take exams. During the piloting, the caregivers were engaged to mobilize late-registration funds and documents through support groups. Required documentation was obtained and organized through a local community-based organization that streamlined the process and removed the barrier of transport costs for caregivers by delivering the collected forms all at once. These changes resulted in 1,007 children receiving their birth certificates.
- **Tanzania:** From 2011-2013, HCI supported the Bagamoyo District Council and community-level committees to implement OVC standards at the community level. After six months of implementation of the guidelines, the committees were able to show notable improvements in coverage of vulnerable children with key services. From May 2011 to February 2012, access to adequate shelter improved from 43% to 85%; access and use of insecticide-treated nets improved from 15% to 100%; the percentage of children with normal growth as shown on their growth monitoring cards improved from 35% to 100%; children with birth certificates increased from 6% to 44%.

Community health

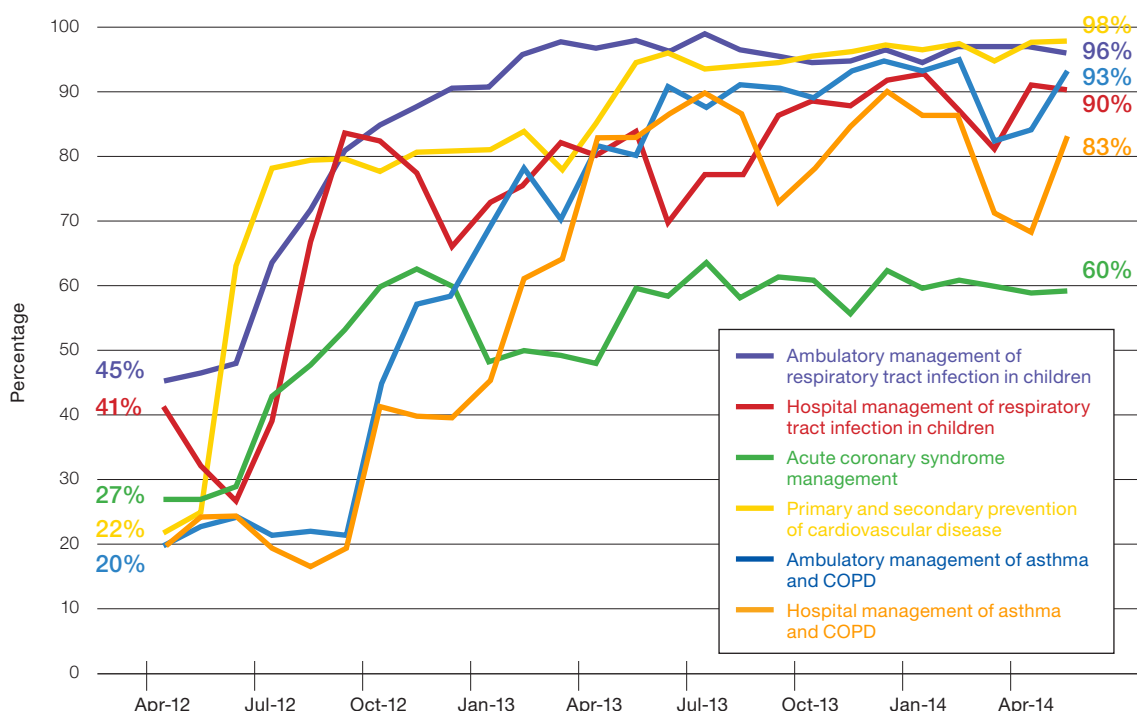
By the second year of project implementation, HCI began to develop applications of the collaborative improvement approach to community-level health issues, initially to complement facility-level improvement work in EONC in countries like Guatemala, Honduras, and later, Afghanistan. By the project's third year, HCI began to apply collaborative improvement to bolster linkages between the informal community system and the formal health system, improve the performance of CHWs, and build the capacity of community groups to take ownership of health programs.

- **Ethiopia:** Working with the Federal Ministry of Health in the Oromia Region, HCI supported a CHW collaborative in Illu and Tole districts that sought to leverage existing community resources to identify pregnant women, link them to ANC, and refer them to the health facility for HIV testing. Between November 2011 and September 2012, in nine health posts, the number of pregnant women tested for HIV rose from 36 to 191. When the improvement activities began in October 2011, the proportion of pregnant women being identified by community QI team members who had actually received ANC at the health post was 72%. By June 2012, this ratio had increased to 86%, and the number of pregnant women identified had almost doubled.
- **Uganda:** In FY12, HCI began a community demonstration project in Buikwe District, forming a total of 10 community improvement teams that brought together Village Health Teams (VHTs) and representatives of religious leaders, community groups, HIV patients, health workers, schools, and local leaders. The community improvement teams focused on improving patient outcomes by first identifying the HIV patients on ART, secondly assessing patients for clinical outcomes, and lastly promoting self-management support. The number of ART patients identified for follow-up support increased when community groups assisted CHWs in identifying patients needing HIV care from 15 patients in June to 257 patients in September 2012.

Non-communicable diseases

HCI assistance was requested in 2010 by the Europe and Eurasia Bureau of USAID to carry out an assessment of non-communicable disease (NCD) prevention, screening, and care practices for women of reproductive age (15-49 years) in Albania, Armenia, Georgia, and Russia. The assessment results demonstrated variable but generally weak delivery of high-impact prevention, screening, and treatment interventions for cardiovascular disease (CVD),

Figure 4. Georgia: Average compliance with all percentage process indicators per clinical focus area, Imereti (April 2012–May 2014), average 210 charts reviewed monthly



diabetes, chronic respiratory conditions, high-burden cancers, and mental health in the four countries. Assessment results highlight many missed opportunities to deliver low-cost NCD interventions that WHO has characterized as “best buys.” Both provider self-reported practice and chart results revealed low rates of screening and follow-up interventions for tobacco use, obesity, physical inactivity, and alcohol use. Among CVD risk factors, treatment of high blood pressure demonstrated the strongest performance. However, only 83% of surveyed charts in the four countries documented a blood pressure value within the last 12 months, demonstrating missed opportunities to detect and treat high blood pressure in a fifth of a client sample known to actively use ambulatory health care services. Based on these findings, HCI was funded by the USAID Mission in Georgia to initiate an NCD improvement activity beginning in 2012.

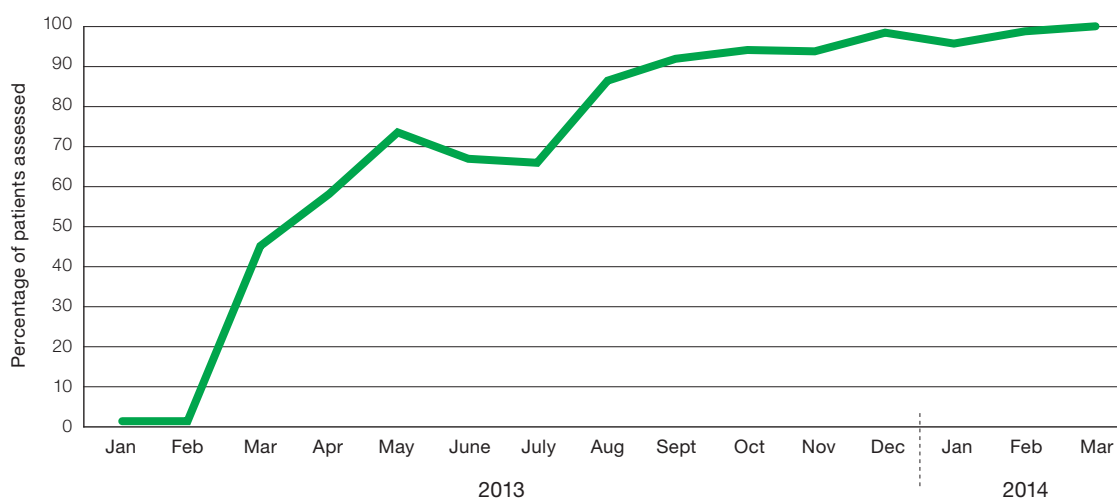
Key results achieved by HCI in improving NCD services:

- Georgia:** HCI supported improvement teams in 17 ambulatory clinics and 3 hospitals in the Imereti Region to identify quality gaps and apply a CVD change package focused on essential, cost-effective interventions, provision of clinical and improvement trainings, and the distribution of job aids and other evidence-based tools. As part of a cost-effectiveness evaluation, after 18

months of collaborative improvement interventions (June 2012–December 2013), medical charts in participant and control facilities were reviewed to determine statistically significant attributable differences. The proportion of patients with high 10-year CVD risk ($\geq 20\%$) or diabetes who were prescribed the primary prevention bundle in ambulatory facilities increased by 91% ($p < 0.001$); the proportion of myocardial infarction patients who were prescribed the secondary prevention bundle increased by 56% ($p < 0.001$) in ambulatory facilities and by 27% ($p < 0.001$) in hospitals. Average compliance with evidence-based best practices on screening, prevention, and management of CVD risk-factors increased by 75% from baseline, and average compliance with management of acute coronary syndrome best practices improved by 32%. The collaborative also addressed other conditions such as chronic obstructive pulmonary disease (COPD), asthma, and management of respiratory tract infections. Figure 4 presents overall improvements in average compliance with clinical care standards achieved in Imereti.

- Uganda:** Building on work to improve the chronic care of HIV, providers supported by HCI in Buikwe District saw the benefit of the chronic care approach for

Figure 5. Malawi: Percentage of clients assessed with their nutritional status recorded, 7 sites in Balaka and Karonga districts (January 2013–March 2014)



helping people with HIV and applied it to improve care for hypertension and diabetes mellitus. Staff started routine screening of all adults for hypertension, organized dedicated clinic days for hypertension and diabetes, and began supporting patients to learn more about their condition and how to manage it. These interventions led to more than a 10-fold increase in the number of patients receiving care for hypertension and an 8-fold increase for patients receiving care for diabetes.

Nutrition assessment, counseling, and support

In Uganda HCI partnered with the USAID Food and Nutrition Interventions for People Living with HIV project (NuLife) to support health facilities to integrate nutrition care into their HIV services. The improvement work focused on identifying a set of practices that would enable health care providers to routinely provide nutrition care in compliance with Ministry of Health (MOH) standards within the constraints they face daily. Such practices included integrating use of mid-upper arm circumference (MUAC) measurement into patient registration or triage and introducing job aids to facilitate consistent counseling. The practices applied in Uganda were shared with teams in Kenya and later in Malawi and led to high levels of coverage of HIV patients with nutritional assessment. Key results included:

- **Uganda:** Across 44 sites, the percentage of clients assessed and categorized for malnutrition at HIV clinics using MUAC increased from 34% in April 2009 to 89% in

August 2010. Of clients assessed, 8,580 were identified as malnourished and received ready-to-use food made available by NuLife.

- **Kenya:** HCI worked with eight sites in Nyanza Province to apply learning from Uganda about integrating nutrition assessment and counseling in HIV care. By incorporating MUAC assessment at registration, sites were able to rapidly raise the percentage of HIV clients assessed for nutritional status from under 10% before the intervention began in June 2011 (when only visibly malnourished patients were assessed) to 70% by September 2011 and raise the proportion assessed to 100% by the end of the intervention in October 2012.
- **Malawi:** In January 2013, HCI began working with the MOH to integrate nutrition services into ART, TB, and PMTCT services in facilities in two districts. The percentage of clients whose nutritional status was assessed increased from 2% in January 2013 to 92% by September 2013, when the work transitioned to the USAID ASSIST Project (see Figure 5).

3. Key learning

- **Frontline health workers can be engaged to make measurable improvements in service quality:** Regular health providers delivering facility-based as well as community-level services can improve health care quality fairly rapidly with an improvement approach that engages them in analyzing and acting on gaps in compliance with standards. Many changes can be made with existing

resources and in a fairly rapid timeframe once providers are engaged in the improvement process. But frontline health worker engagement requires the support of facility, district, and national program leaders to make improvement a priority. Improvement teams that lack the support of facility or program leadership often stall in their efforts and become unmotivated.

- **National level quality strategies need to be linked with action at the point of service delivery:** Policy and strategy development to improve the quality of care needs to be grounded in actual improvement work by service providers. Policies and strategies made in isolation of actual improvement work do not gain traction nearly as fast as those linked to the work of improvement teams.
- **Application of the Chronic Care Model strengthens HIV services:** The principles of the CCM are fundamental to the provision of high-quality, patient-centered HIV and NCD services. Greater impact is seen when relevant components of the CCM are applied in coordination at different levels of the health system rather than implementation of partial elements of the model in isolation.
- **Communities have solutions:** Before the introduction of community-level improvement teams to improve OVC programming, most civil society organizations and development partners thought that they had the best solutions to the challenges communities were facing,

Policy and strategy development to improve the quality of care needs to be grounded in actual improvement work by service providers.

especially in the domains covered by national OVC service standards, like health and nutrition, economic strengthening, social production, education, etc. The externally determined solutions usually were input-oriented and often died off as soon as the development partner exited. When representatives from the community participate on improvement teams and sit together to develop solutions, they often come up with innovative ways of addressing challenges that require little or minimum financial resources and are based more on the resources available from the community. For example, in Kenya, a community team set up multi-story gardens in informal settlements where overcrowding is common. Out of these gardens, OVC caregivers are now able to provide nutritious meals to their households and use the money saved and sometimes earned from selling vegetables to meet other household expenses. Strengthening the capacity of community members and organizations has potential as a locally owned and sustainable mechanism for improving the well-being of children.

Objective 2:

Institutionalize modern quality improvement approaches as an integral part of health care in USAID-assisted countries



1. Defining and documenting institutionalization

HCI had a dual goal: improve health care in USAID-assisted countries while at the same time establishing the capacity of host country institutions to perform quality improvement. By doing so, the positive gains HCI achieved would continue in the future, after the project's country assistance had ended. To achieve both goals, HCI's approach was to ensure that improvement work be led from the outset by host country actors and institutions, with HCI playing an advisory role and being phased out as quickly as possible.

Institutionalization of country improvement capacity was thus a major HCI focus in both TOs 1 and 3. Early in the

Above: Quality improvement team member demonstrating the implementation of improvement activities to MOHSW, USAID and CDC officials during their supportive supervision visit at Mahuta Health Center – Tandahimba, Tanzania. Photo by Delphina Ntangeki, URC.

project, HCI set out to develop more robust measures of institutionalization to better understand when institutionalization occurred and to identify factors that facilitate or inhibit institutionalization. The project considered improvement to be institutionalized when there was in place an ongoing effort to use data to identify problems, implement changes to address problems, and measure results. Institutionalization was thus defined as “establishing and maintaining quality improvement as an integral, sustainable part of a health system or organization’s routine activities” [3].

In FY11, drawing on country-specific descriptive studies of institutionalization, HCI developed a framework laying out the key elements that were believed to contribute to the institutionalization of quality improvement at the national, regional, and service delivery levels (see Table 1). In 2011, the project research and evaluation team conducted an assessment in 15 countries to document the type and level of institutionalization in the countries where HCI had worked for at least a full year [3].

The study found that the level and forms of institutionalization were highly variable across the 15 countries. While almost all the countries had made a commitment at the national level to improve the quality of services—most often manifested as written policies, strategies, standards, plans, or guidelines—fewer countries had the means to provide ongoing performance feedback to the regional/ provincial or lower levels.

At the facility level, respondents in 10 of the 15 countries reported providing some form of recognition for performance. Facilities in all countries had staff or teams dedicated to improvement and track improvement indicators. New staff members at facilities in most countries were oriented to improvement methods. Transfer of improvement methods to new areas of service appears to have been most successful at the facility level, occurring in at least one facility in nine of the 15 studied countries.

In all, the study found that 91% of HCI-assisted countries had documented implementation of improvement interventions independent of HCI assistance.

The assessment also showed that while HCI had done much at both the national and service delivery levels to institutionalize improvement, there was less evidence of institutionalization at the middle levels of the health system—at the district and regional levels.

These results showed that further research is needed to validate the elements of the framework as measures of institutionalization and to identify the characteristics of an improvement intervention that are most conducive to institutionalization and sustainability of results. The study also concluded that HCI should make more deliberate efforts to institutionalize improvement methods at the middle levels of health systems to ensure a functioning, supportive, and cohesive system across all levels. Future research should also explore why certain facilities, districts, and regions/ provinces move more quickly than others in the institutionalization process.

2. Understanding factors that contribute to or hinder institutionalization

Building on the institutionalization framework, in FY13, the project completed a retrospective qualitative assessment to examine what actions HCI had taken to try to institutionalize improvement methods in 17 HCI-assisted countries [4]. This second global institutionalization study also explored the facilitating factors and barriers to institutionalization through review of quarterly and annual reports from each country and in-depth interviews with the HCI Chiefs of Party. The study included all 15 countries that participated in the March 2012 assessment (Afghanistan, Bolivia, Cote d'Ivoire, Ecuador, Guatemala, Honduras, Mali, Namibia, Nicaragua, Niger, Russia, South Africa, Swaziland, Tanzania, and Uganda) plus Ethiopia and Kenya, whose programs had developed and appeared to have made some gains in institutionalization.

Chiefs of Party reported HCI's playing an important role supporting the institutionalization of improvement at the national level in five key ways:

- 1) Bringing together key government, non-government, and sometimes private stakeholders to address quality improvement;
- 2) Raising awareness and knowledge among these key stakeholders, not only about quality improvement but also about technical areas, such as tuberculosis;
- 3) Playing an important role in advocating for quality improvement, often by using data and demonstrating results or participating in national working groups;
- 4) Supporting ministries in integrating quality improvement into their existing systems by developing and testing standards, guidelines, and policies; and
- 5) Working to incorporate improvement into pre- and in-service training.

These efforts helped put quality on the national health care agenda and, in the case of the last two ways, institutionalized tools and mechanisms to support quality improvement. For example, in many countries, including Nicaragua, Niger, South Africa, Swaziland, Tanzania, and Uganda, HCI mentored and built the capacity of regional and district supervisors to support improvement as part of their regular supervision. In Georgia, HCI provided evidence that supported changes mandated by the Ministry of Labour, Health and Social Affairs in services covered under private insurance plans to include cardiovascular disease screening and treatment.

Table 1. HCI quality improvement institutionalization framework

Level	Element	Description
National	Political Will / Leadership	Commitment to include improvement as an activity; advocate for funding
		Policy and guidelines/ strategic plan/ standards
		Recognition of improvement
		Communication with regions on policies/ plans/ standards/ etc. and performance feedback
	Roles and Responsibilities	Assignment of improvement responsibilities. This could include appointment of official(s) to follow up on improvement or establishment/ maintenance of an improvement unit/ division/ committee in the MOH
	Organization	Meetings and visits to province/ district
	Orientation	Improvement induction by non-HCI staff
	Resources	Financial support included in budget (meetings, transport, etc.)
	Data	Monitoring and tracking data, identification of problems
	Transfer	Application of improvement activities to other clinical areas
Regional	Political Will / Leadership	Commitment to include improvement as an activity; advocate for funding
		Policy and guidelines/ strategic plan/ standards
		Recognition of improvement
		Communication with facilities on policies/ plans/ standards/ etc. and performance feedback
	Roles and Responsibilities	Assignment of improvement responsibilities. This could include appointment of official(s) to follow up on improvement or establishment/ maintenance of an improvement unit/ division/ committee in the MOH
	Organization	Regular meetings and visits to facilities
	Orientation	Induction of new staff into improvement by non-HCI staff
	Resources	Financial support included in budget (meetings, transport, etc.)
	Data	Monitoring and tracking data, identification of problems
	Transfer	Application of improvement activities to other clinical areas
Facility	Political Will / Leadership	Recognition of improvement
	Roles and Responsibilities	Assignment of improvement responsibilities
		Indicator monitoring and promoting changes
	Orientation	Induction of new staff into improvement
	Data	Monitoring and tracking data, identification of problems
		Documentation of activities/ changes to address problems identified
	Transfer	Application of improvement activities to other clinical areas

In Afghanistan, HCI supported the creation of a dedicated unit responsible for quality in the Ministry of Public Health; this unit was given the task of supporting provinces with ongoing improvement activities once HCI provincial-level support was phased out. In Ecuador, HCI supported the creation of an EONC quality monitoring system wherein a designated EONC quality coordinator hired by the MOH received and provided feedback each quarter on provincial compliance with EONC quality standards. In Namibia, HCI re-vitalized existing district infection control committees to address injection safety and waste management issues on an ongoing basis, once HCI assistance ended.

Chiefs of Party were also asked their views on factors that facilitated or hindered institutionalization of improvement. Key facilitating factors included:

- Strong leadership and champions within the ministry and clear roles and responsibilities, including having individual positions or units/ divisions dedicated to improvement;
- Regular meetings and visits between national level actors and those at other levels of the health system; and
- The use of data and evidence supporting the benefits of quality improvement, which garnered support among national level actors to institutionalizing quality improvement.

Challenges to institutionalization that were cited by HCI Chiefs of Party included:

- Lack of political will and buy-in at the national level in some countries. Even when there was tacit political support for improvement, financial and human resources were absent or insufficient.
- Poor organization and structure within the health system impair the ability to institutionalize.
- Conflicting priorities sometimes hindered institutionalization of improvement methodologies.

While there were several limitations to this study, it provided interesting exploratory insight into how to better support institutionalization of quality improvement. It concluded that further research was needed to identify and validate indicators as well as to identify the human factors that contribute to institutionalization, such as characteristics of leaders or champions of quality improvement.

HCI also conducted an in-depth study of the degree of institutionalization achieved by the national EONC collaborative in Niger [5]. That study compared facilitators and barriers to institutionalization of improvement in three regions that had had varying experiences in terms of improvement efforts. The study aimed to shed light on the factors associated with institutionalization of improvement and continued

improvement activities in order to understand how these factors can be enhanced and inform the development of strategies to promote institutionalization of improvement as well as future studies on institutionalization.

The study explored two proxies for institutionalization: expansion of improvement activities to new services or professional groups and expansion to new technical domains not previously supported by implementing partners. Data were collected on the degree of institutionalization and factors that promote or inhibit it from three regions (Tahoua, Tillabéri, and Maradi), eight districts, and 47 facilities. Interviews were conducted with facility-, district-, and region-level respondents.

The study found that all health facilities in Tahoua and Tillabéri and nearly all of them in Maradi (17 out of 18) reported that they had received support from various partners for the implementation of improvement activities. Health facilities, including those not previously supported by HCI, reported implementing improvement activities in several areas and involving a wide range of professional categories, from health personnel to social workers. A little less than half of these health facilities (41%) had expanded improvement activities initiated by partners to additional services or categories of personnel within the facility, with a larger number of those in the Tahoua Region (8 out of 14). In addition, 68% of the health facilities reported having applied improvement to new clinical domains not previously initiated by partners.

Key informants reported observing important improvements in key indicators, client access to services, and satisfaction following the implementation of improvement in new domains. Leadership; shared responsibilities; engagement of health personnel and community stakeholders; and financial, material, and personnel support were reported as key to facilities' success in implementing improvement in new domains. Inabilities to analyze and interpret data, personnel shortages, and resistance to change were reported as important barriers to implementing activities in new domains.

Recommendations made by key informants to promote institutionalization included: conducting ongoing training on improvement for health personnel, documenting improvement activities and monitoring indicators to sustain and institutionalize improvement, creating a position or team dedicated to improvement, conducting regular supervision, evaluating improvement activities implemented throughout the region, instituting a system for improvement teams to exchange best practices, and instituting training of all health personnel in improvement as part of their regular in-service training.

The Niger findings suggest that while there are promising signs of institutionalization in the three regions, particularly Tahoua, important barriers to institutionalization exist and need to be addressed, specifically in the areas of political will and defining clear roles and responsibilities for improvement.

3. Key learning

- **Preparing for institutionalization requires deliberate design:** The major lesson coming out of HCI's institutionalization work is that building the capacity of country health systems to continuously improve requires deliberate attention and planning as part of the improvement strategy. While HCI country programs implemented many activities that supported institutionalization, institutionalization objectives were usually secondary to clinical improvement aims. Aligning improvement aims with country priorities, building country ownership for improvement structures and processes, and developing regional and in-country partnerships favor successful scale-up and institutionalization of improvement gains.
- **Importance of leadership at all levels:** Another implication of the second HCI institutionalization study was the need to explicitly look at leadership for improving health care quality and safety. Leadership creates the will

Leadership creates the will needed to improve health systems and has a crucial role in facilitating and enabling change

needed to improve health systems and has a crucial role in facilitating and enabling change [6]. Leadership is recognized as a key ingredient for success of improvement work but is often not explicitly included in strategies to improve outcomes. Activities to develop leadership of quality improvement work throughout all levels of the health care system need to be part of improvement strategy design.

- **Prospective studies are needed to validate the factors identified in the HCI institutionalization framework:** The elements in the HCI institutionalization framework need to be validated through prospective studies that establish clearer associations between individual elements and outcomes. An ideal study would be longitudinal, examining the work of field teams alongside valid measures of institutionalization from the start of a program up through several years after assistance had been concluded.

Objective 3:

Expand the evidence base for the application of quality improvement to human resources planning and management



1. Applying collaborative improvement to address factors affecting performance

Building on human resources assessments and pilot studies implemented under the Quality Assurance Project, HCI broke new ground in the field of health care improvement with the application of collaborative improvement methods to identify and address factors affecting human resources for health (HRH) performance (also known as “human performance factors”), beginning in Niger and then expanding the work to Tanzania, Ethiopia, and Uganda. As described in Box 3 from the perspective of the implementers in Niger, this work demonstrated that addressing human

Above: A nurse/midwife in Niger points to performance objectives (“Objectifs de performance” in the insert), which starts with the objective of ensuring that all deliveries (“Accouchement”) are assisted by qualified personnel. This is followed by a description of her individual (“Individu”) tasks. *Photo by URC.*

performance factors as part of an improvement approach enhances health care delivery in low-resource settings and empowers health workers to manage and improve their own performance, by rationalizing and clarifying individual roles and tasks and addressing competencies gaps [7].

Building on the lessons from the Niger HRH collaborative, HCI applied a similar approach in a high HIV prevalence

BOX 3.

VOICES FROM THE FIELD:

The Niger HRH collaborative improvement experience

Before the HR Collaborative, we worked in unclear and cloudy conditions, but when we started aligning goals and objectives with those of the Ministry, we saw a clear direction.

– Moustapha Boukary, Head of Tsernaoua Health Post, Tahoua, Niger

Faced by a severe shortage of health care professionals throughout Niger, the country's Ministry of Public Health requested assistance from HCI in 2009 to implement a program to address the health workforce crisis within the country. In response, my team and I recognized this was an exceptional opportunity to implement a program to improve the management of human resources in selected facilities and management offices within the Tahoua Region.

As a part of the collaborative approach we adopted, quality improvement teams tested and implemented changes within their own facilities, while simultaneously monitoring performance with quality improvement advisors and coaches from both HCI and the Ministry of Public Health. We began by aligning and clarifying tasks, and we measured progress in performance by tracking clinical indicators.

We realized exceptional results from this innovative approach—specifically understanding that focusing upon human performance factors positively impacted health worker performance and resulted in improved health outcomes. Specific outcomes that impressed us evolved in only two years—between 2009 and 2011:

- *Deliveries by qualified health workers rose from 27% to 45%*
- *Contraceptive prevalence increased from 9.6% to 36%*
- *Post-partum hemorrhage fell from 2% to 0.06%*
- *Mortality from severe malaria in children under five dropped from 15% to 4% at the pediatrics hospital*

We recognized the need for making major changes to existing supervisory practices and the self-management of health workers. With increased understanding on part of the health workers of their own work processes at the service level, they were instrumental in helping to guide the assessment of each human performance factor and design changes to address weaknesses and improve care. As the health care providers became more comfortable with this approach, they were better able to assess their own performance and make associated improvements.

Our team also recognized the need to closely involve facility managers and supervisors as part of the improvement process. As a result, we also focused efforts upon strengthened supervisory and feedback mechanisms, which served to further increase the engagement of health care workers and led to improved clinical outcomes.

The feedback we received from both health workers and managers was extremely encouraging, in that they felt as though the human resources improvement work led to enhanced working conditions and performance.

– Maina Boucar, HCI Regional Director, West Africa

setting, Tandahimba District in the Mtwara Region of Tanzania, where the HRH intervention linked improvements in performance management to HIV care indicators, such as ensuring HIV-positive pregnant women are enrolled in care and treatment, assessing all HIV-positive patients for TB, and providing HIV-exposed infants with daily Cotrimoxazole prophylaxis [8].

The teams in both countries implemented significant changes in how health workers were managed and supervised, including:

- Redesigning tasks and jobs to improve communication/coordination between different types of providers, ensuring a more balanced distribution of tasks, defining responsibilities for each person, and simplifying work processes
- Analyzing and addressing staff skill gaps
- Improving supervision practices, including use of performance checklists and observation
- Creating meaningful feedback mechanisms for individual staff and teams on performance
- Better daily time management for both individuals and teams

Following on the Tanzania HRH collaborative, HCI also supported smaller workforce-related collaboratives in Ethiopia (to improve performance of CHWs), Lindi Region of Tanzania (to improve the performance of district management teams), and three districts in Uganda (to improve the performance of pharmacy staff and improve medicines availability and use). In all, HCI supported five applications of collaborative improvement to improve human resources management and performance.

2. Tools, research, and other improvement methods to strengthen health worker engagement, performance, and productivity

HCI used a combination of research and other tools such as self- and peer-assessment to expand the evidence base for and promote the application of interventions to strengthen health worker engagement, performance, and productivity at the community, service delivery, and management levels. Another important area of achievement of HCI was the development and field testing of tools to help assess and better understand community health workforce gaps in and develop strategies for improvement.

Key HCI studies, tools, and applications of other improvement methods to HR management included:

- **Community Health Worker Program Assessment and Improvement Matrix (CHW AIM):** This tool was developed at the request of the USAID Maternal and Child Health team to support the Global Health Initiative call for training and supporting 100,000 community health worker to extend and improve health services to communities. Drawing on expert guidance and field testing in Nepal and Benin, HCI developed a tool that defines a set of 15 programmatic elements needed for CHW programs to function effectively and measures how well programs meet these criteria. The 15 CHW program components addressed by CHW AIM are: recruitment; the CHW role; initial training; continuing training; equipment and supplies; supervision; individual performance evaluation; incentives; community involvement; referral system; opportunity for advancement; documentation and information management; linkages to the health system; program performance evaluation; and community ownership. The assessment process provides evidence-based guidance on way to strengthen programs and support CHWs to meet health needs. Originally published in 2010, the tool was revised twice based on user feedback. The original tool was translated to French and Spanish. The final version, published in 2013, includes a guide explaining how to use the tool and more streamlined worksheets for easier field application [9]. CHW AIM has been used in many countries to assess and improve CHW program functionality, including Benin, Ethiopia, Kenya, Madagascar, Mauritania, Rwanda, and Zambia.
- **In-service Training Improvement Framework:** Investments to address the health worker crisis in low- and middle- income countries have been significant, with a large portion of this funding spent on in-service training to rapidly build health worker competence to provide quality services. However, documented challenges such as unnecessary duplication in training and significant service disruptions have raised questions of the effectiveness, efficiency and sustainability of training investments. These challenges and the lack of global overarching guidance provided the impetus for HCI to convene global experts and partners from 26 countries to jointly develop the Global Health Worker In-service Training Improvement Framework. The framework codifies 40 recommendations under the themes of 1) strengthening IST systems, 2) coordination of training, 3) continuum of learning, 4) design and delivery of training, 5) support for learning and 6) evaluation and improvement of training [10]. The framework was used by HCI in Ethiopia to develop a national in-service training strategic framework [11]. The framework

has also been used by the CapacityPlus Project to inform an assessment of health worker in-service training investments in Nigeria [12].

- **Tools from the HR collaboratives:** The HR collaborative improvement work in Niger yielded a number of tools that were subsequently applied in Tanzania and other countries, including a tool for assessing the status of performance factors, a client flow observation form, job description models, a health worker time utilization observation form, and a process mapping approach that stratifies steps in the process by health worker.
- **Tanzania Health Worker Engagement Study:** While research shows that employees in health and other sectors who are more engaged perform better and are more productive, almost all the evidence comes from middle- or high-income countries and may not be generalizable to low-resource contexts. This study examined the engagement of health workers providing HIV services and explored the relationship between engagement and performance. Survey and facility performance data were collected from 1330 health workers and 183 health facilities across six regions. Qualitative data were collected through 50 semi-structured interviews (see Box 4 for comments from one interviewee). Four characteristics of an engaged health worker were identified: change agent, accountable, job satisfaction, and client-centered. Cluster analysis found that health facilities that had health workers with below average levels of engagement had three times the proportion of clients that were lost to follow-up (35%) and lower proportion of children born to HIV-infected mothers started on cotrimoxazole (76% vs 44%). No relationship was found between health worker engagement and other performance indicators. This study found that engagement may be independent of the level of resources a health facility has and that it could potentially be influenced by strengthening relationships with immediate supervisors and the adequacy of competencies.
- **Madagascar Community Health Volunteer Program Functionality and Performance Assessment:** This mixed methods assessment included a qualitative component led by HCI, a quantitative performance assessment led by CDC, and a synthesis of both led by HCI. The qualitative component utilized the CHW AIM toolkit to assess the functionality of the program and interviews and focus group discussions with volunteers and their supervisors to examine supervision practices. Based on the synthesized findings from the two assessments on community health volunteer (CHV) program functionality, the study made recommendations about how linkages

BOX 4.

VOICE FROM THE FIELD: The Tanzania health worker engagement study

You know, when you are not in good terms with your boss, in-charge, and co-workers at work place, you cannot feel good about it, you can't even go to work on time, but if you are in good terms (with boss and co-workers) even if you have your own challenges, then you even get that desire to come...so this makes someone feel that she is being valued.

– Assistant Nursing Officer, Tanzania Health
Worker Engagement Study

with the communities and the health system could be strengthened, including clarifying CHV roles; budgeting for ongoing trainings and supportive supervision; and periodically assessing CHV knowledge and competency [13].

- **Zambia CHW AIM evaluation:** This operations research study was designed as a field intervention to compare the process of applying the CHW AIM tool twice over 13 months in a purposeful sample of six organizations (five “intervention” groups who used the CHW AIM tool and one “control” organization that did not) and 156 CHWs. The results indicate that the CHW AIM process contributed to program functionality improvement, but that improvement was neither linear nor consistent. Only two organizations improved their total program functionality scores, but every organization made gains in at least two program functionality elements that were direct results of plans made in response to findings of the first CHW AIM workshop. The intervention organizations felt the CHW AIM process was useful and helped them take stock of their program and develop constructive actions to address issues. The study also showed that the CHW AIM process is fairly inexpensive to implement and should be feasible for most organizations to fund if it is incorporated in project plans and budgets [14].
- **CHW Central:** CHW Central (www.chwcentral.org) is an online community of practice developed to foster the exchange of ideas, best practices, and promising

...addressing human performance factors in improving quality of care and services added value to the improvement process.

strategies to improve the effectiveness and efficiency of CHW programs. Originally developed under HCI in 2011 and hosted as a community on the HCI Portal, the site was designed to respond to the growing need for a central data repository of information, topic discussions, professional networking, and research that impact and involve global development issues around CHWs. In August 2013 CHW Central was migrated to an independent site managed by Initiatives Inc. and supported by member partners. The design and content of the new, updated site builds on the strength of the USAID investment through HCI and adds features that were suggested during consultations and focal group discussions online and discussions at the CORE Group 2013 spring meeting.

- **Uganda expert patient study:** In Uganda, many health facilities and implementing partners have adopted strategies to shift some facility and community-based tasks to “expert patients”, clients who are recruited and trained to provide support services for other clients in facilities and in communities. Yet little is known about the range of tasks expert patients perform; how they are recruited, trained and supervised; how communities are involved in the selection and use of expert patients; and how they contribute to improving access to and the quality of health care. This qualitative study documented how expert patients are being used in HIV care in Uganda, what organizational support is provided to expert patients, and what are the perceptions of actors most closely affected by the use of expert patients. The study recommended the development of a national policy on expert patients that included clear guidance on the organizational support that a new cadre of worker requires, including role definition, recruitment process, standardized training, supervision and monitoring, and financial and non-financial rewards [15].
- **Task-shifting in Benin:** This research study, completed in 2009, examined whether a pictorial set of job aids could improve the quality of maternal and newborn care counseling by skilled providers and whether similar performance levels could be achieved by clinic-based lay providers as part of a task shifting initiative to expand their role. Findings demonstrated that the quality of

counseling by nurse aides when supported by job aids was comparable or “non-inferior” to counseling provided by skilled providers (nurse midwives) in areas such as birth preparedness and danger sign recognition and even superior to that by nurses for messages related to general antenatal care and healthy home practices [16].

3. Key learning

- **Improvement methods offer an effective and potentially sustainable strategy for strengthening performance of management-level, facility-based, and community-level health workers:** HCI’s applications of improvement methods to address factors affecting performance through team-based approaches demonstrated that by using improvement methods, health workers and managers developed the capacity to test changes that would address performance factors and improve their team performance. Strengthening their capacity to identify gaps, test changes, document effects on indicators of care quality, and make further adjustments, health workers learned to manage their own performance as a team. The capacity for team-based performance management continued beyond the life of the project in both Niger and Tanzania.
- **Addressing human performance can further enhance improvements in clinical care and outcomes.** HCI’s HRH collaboratives showed that the improvement approach of iteratively testing changes can be applied not only to clinical processes but also to address factors affecting performance. These applications also demonstrated that addressing human performance factors in improving quality of care and services added value to the improvement process. According to the health workers, addressing such factors significantly shifted their perspective on their own ability to guide their work and impact outcomes. Through the practice of meeting as improvement teams and understanding their own roles and providing feedback and peer-to-peer support or training when needed, the teams were able to continue to track performance and make adjustments when necessary. The result was continual improvement in quality of services.
- **Investment in improving health worker performance can support universal health coverage:** The evidence gained from HCI’s demonstration collaboratives shows that investment in health worker performance through improvement science can lead to gains in service coverage. Once teams develop the capacity to manage their performance and use improvement science to

continually monitor the quality of the care they deliver, then access to quality care can be improved even within resource constraints and health worker shortages. This is particularly important as countries work towards universal health coverage. Maximizing health workforce performance, empowering teams to self-manage—particularly in areas where supervision is inconsistent—and raising the level of engagement can be powerful short-term interventions that will extend access to quality care and move countries more rapidly toward achievement of their health goals.

- **Health worker engagement matters:** Evidence gathered from an in-depth study on factors influencing engagement in Tanzania suggest that, with the persistent severe shortages of human resources for health in many low-resource settings, improving the engagement of existing health worker teams in their work and in taking responsibility to provide the best quality of care to the greatest number of patients is important and can make a difference in care quality.
- **Core improvement competencies should be developed in pre-service and in-service training:** HCI's experience mobilizing health workers to work together in improvement teams to innovate and test practical ways that better utilize existing resources to strengthen quality of care showed the value of these skills to health

Equipping health workers with the necessary competencies to identify quality gaps, analyze root causes of these gaps, brainstorm and test changes, and use and analyze data to inform decisions are critical competencies for improvement that should be integrated into pre-service and in-service training.

systems strengthening. Equipping health workers with the necessary competencies to identify quality gaps, analyze root causes of these gaps, brainstorm and test changes, and use and analyze data to inform decisions are critical competencies for improvement that should be integrated into pre-service and in-service training. Improvement competencies build the capacity of health workers to be active change agents—a key precondition to strengthening health systems to identify and address the implementation challenges of scaling up quality care.

Objective 4:

Expand experience with the improvement collaborative approach in USAID-assisted countries



1. Designing and implementing demonstration (phase I) collaboratives

During its seven years, HCI supported the design and implementation of 59 “demonstration” or “phase I” improvement collaboratives. A collaborative is considered a demonstration collaborative if it addresses a topic that has not been addressed before in that setting or is the first collaborative implemented by an implementing partner.

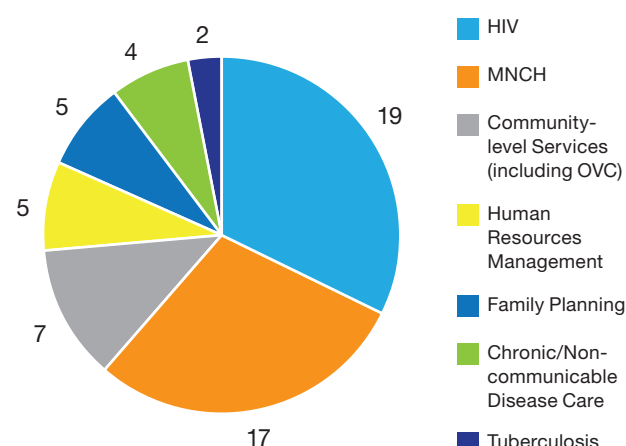
USAID requested that HCI apply improvement methods to address several health topics of particular interest to USAID and the field of health care improvement. Consequently, the 59 collaboratives addressed the topics listed in Figure 6, with most addressing HIV care and maternal, newborn, and

Above: Primary neonatal resuscitation training in Tambov Oblast, Russia. HCI supported a demonstration collaborative to achieve better maternal and newborn outcomes in Tambov and two other regions of Russia. *Photo by Tambov Oblast Children's Hospital, Tambov, Russia.*

child health (MNCH). HCI also sought opportunities to develop demonstration collaboratives to improve the chronic care of HIV/AIDS, HR performance management, and district management, all topics that were of keen interest to country implementers as well as USAID.

As noted in the section on HCI's HRH work under Objective 3, applications of collaborative improvement to new areas, such as chronic care for HIV/AIDS, team-based performance management, and CHW performance,

Figure 6. Number of HCI-supported demonstration collaboratives, by topic (n=59)



helped to broaden the health care improvement field globally and were ground-breaking in many respects.

While the HCI TO1 contract set fairly modest goals for the results that these collaboratives should achieve (for example, “average improvement of at least 10% within 18 months”), data in Appendix B show that collaborative improvement, applied to priority health services in low- and middle-income countries, can achieve sizeable percentage point gains in compliance with standards. For example, teams in the Cote d’Ivoire PMTCT demonstration collaborative achieved improvements of 15 to 88 percentage points; in Kenya’s Kwale District, teams improving ANC achieved gains of 13 to 75 percentage points; and teams in Tanzania’s HRH collaborative achieved improvements in compliance of 20 to 100 percentage points.

The number of improvement teams associated with each demonstration collaborative was small, averaging about 18 teams per collaborative, with a range of 4 to 49 teams. In all, 1,065 improvement teams participated in demonstration collaboratives from 2007-2014, with most in Africa (Figure 7). Appendix C provides a list of HCI-supported collaboratives by country and topic.

2. Research on collaborative improvement

Both HCI global task orders called for refining the state of the art of collaborative improvement through descriptive and intervention studies. Under both TOs combined, HCI completed 12 descriptive studies on the design and implementation of improvement collaboratives.

A key research study was a multi-country evaluation of the results of 27 collaboratives that had been implemented over 10 years (1998-2008) in 12 countries under HCI’s predecessor, QAP, which was the first to apply the collaborative improvement approach at large scale in USAID-assisted countries. The study broke ground in that it compared results from collaboratives addressing different topics by assessing the magnitude, rate, and duration of improvements achieved in compliance with standards [17]. The study was based on time series charts that had been developed by more than 1,300 facility- and community-based teams of health care providers. The analysis encompassed 81 measures of compliance with standards and outcomes for MNCH, HIV/AIDS care, family planning, and malaria and tuberculosis diagnosis and treatment.

The study team was particularly intrigued to learn that no matter how low the baseline level was at the start of the collaborative, achieving a level of at least 80% compliance within 18 months was common. Across all the studied collaboratives, the time series charts showed average increases of 51.9 percentage points (SD = 28.0, range 0-100%), regardless of baseline level and topic. The average relative or percentage increase was 210% (SD = 350%; range 0-2400%). Almost two-thirds of the collaboratives produced consistently high levels of quality across all indicators tracked (all at levels above 80%). Figure 8 shows the variation in average absolute improvement for four ranges of baseline levels.

The study also looked at how quickly collaboratives achieved their results. Across clinical topics, collaboratives with indicators starting at performance levels below 50% reached levels of 80% or higher in an average of 13 months,

Figure 7. Number of teams participating in HCI-supported demonstration improvement collaboratives, by region (n=1065)

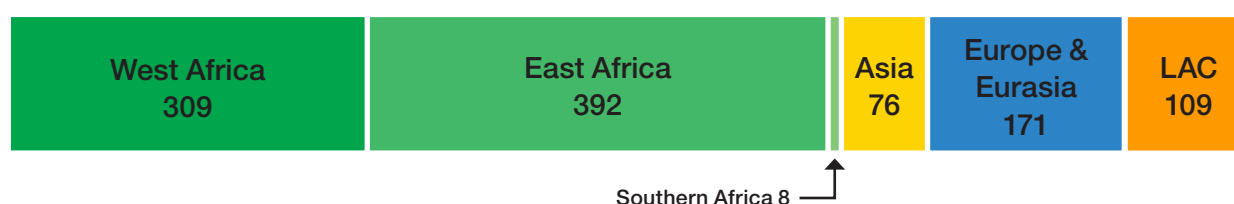
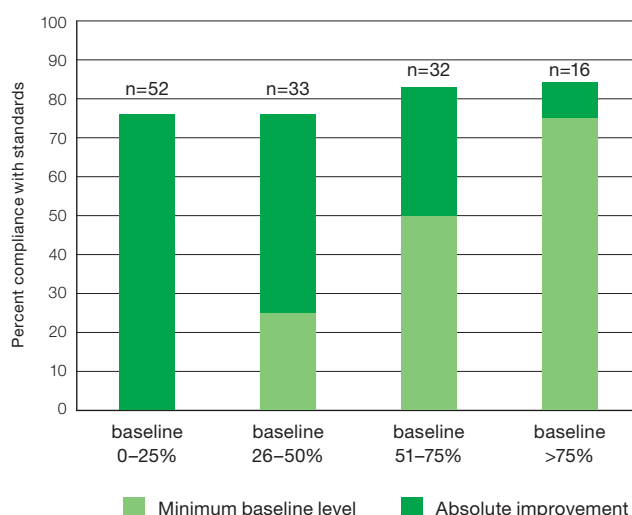


Figure 8. Absolute improvement seen in 135 time series charts (27 collaboratives, 1998–2008)



while those starting at performance levels above 50% exceeded 80% in an average of six months. The study also looked at the evidence for whether the gains in care quality achieved by these collaboratives were maintained over time and found that the collaboratives studied sustained quality levels of at least 80% for an average of 13.4 consecutive months, representing 72% of the months for which data were available.

HCI also carried out evaluations and descriptive studies of collaboratives in Afghanistan, Cote d'Ivoire, Ecuador, Ethiopia, Guatemala, Niger, and Uganda to document their results and draw lessons for how to increase the potential to institutionalize the gains achieved. Several of these studies also explored how coaching and team functionality were linked to results. Qualitative data from some of these studies provide some insight into how collaborative improvement approaches lead to increases in compliance with standards. They suggest that participating in a collaborative 1) fosters the engagement of health staff in the process of improvement and 2) helps them understand how processes work and how to make operational changes to achieve quality for every patient.

Appendix D lists HCI's research and evaluation studies; related publications are listed in Appendix E.

3. Key learning

- **HCI's work showed that collaborative improvement methods can be effective for improving both clinical and non-clinical processes, at facility and community levels.** While most of the improvement collaboratives addressed preventive and curative care processes at facilities, HCI also supported more than a dozen collaboratives applied to non-clinical areas like human resources management, information systems, supply management, community-based care for vulnerable children, and social services, with equally strong results.
- **Raising performance above the 80–85% threshold requires different strategies to make care delivery more reliable.** Results from demonstration collaboratives showed that most were able to achieve performance levels near 80% through a few key actions: standardizing basic processes, skills building and awareness raising (including engaging health workers in interpreting their own data), and establishing feedback mechanisms. These actions go beyond simply providing inputs (e.g., training, supplies) and focus on clarifying

Drawing and annotating time series charts, analyzing data, and testing changes are areas where teams tend to need more training and support through coaching visits and learning sessions.

standards and advocating for their implementation, testing changes in care organization, and garnering feedback through the collection and analysis of data. HCI's experience suggests that moving beyond this basic level may require a focus on addressing situations where care is not provided in accordance with standards and on taking deliberate steps to make improved processes the routine way of doing things.

- **Improvement teams need more support in data analysis and interpretation.** The in-depth studies on the performance of quality improvement teams generally found that teams' skills were adequate with respect to working as a team, analyzing processes, documenting results, and sharing ideas and results with others. However, teams' skills in data analysis and in developing mechanisms to enable institutionalization of improvements tended to be low. Drawing and annotating time series charts, analyzing data, and testing changes are areas where teams tend to need more training and support through coaching visits and learning sessions.

Objective 5:

Expand experience with the spread collaborative approach in USAID-assisted countries



1. Designing and implementing spread (phase II) collaboratives

The developmental impact of quality improvement depends on large-scale implementation. The collaborative model includes a distinct second phase that focuses on spreading the improvements developed in the first phase to more facilities and providers. HCI supported the design and implementation of 22 spread or phase II improvement collaboratives that sought to scale up (or “spread”) tested changes and better care practices that had been developed in the prior demonstration collaborative in the same setting. Spread collaboratives took many different forms, from a collaborative in a new region but supported by the same implementing partner (as in the Lindi ART-PMTCT spread

Above: Health worker in Bolivia gives a TB patient his prepackaged medication as part of directly observed treatment. Making the full pre-packaged treatment course available in a box designated for each new patient was a strategy tested in the TB demonstration collaborative that was then implemented at larger scale in the TB spread collaboratives in El Alto and Cochabamba. *Photo by URC.*

collaborative in Tanzania), to expansion “waves” that applied lessons learned in the initial regions to the introduction of improvement activities in new regions (as in the two spread waves of the Afghanistan maternal and newborn facility collaborative), to large-scale national transfer of learning from small demonstration collaboratives (as in the Uganda ART Framework spread collaborative).

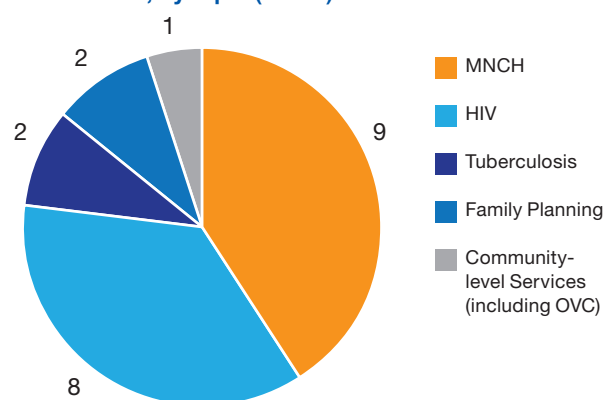
Appendix C provides a list of HCI-supported spread collaboratives, organized by country and topic. As may be expected, the topics of these collaboratives mirrored those of the demonstration collaboratives, with most addressing HIV and MNCH-related aims (see Figure 9).

In all, 846 improvement teams participated in spread collaboratives, with the largest number of teams concentrated in Latin America followed by Europe and Eurasia (see Figure 10). This regional concentration was the result of a spread strategy planned in the Bolivia tuberculosis collaboratives and the Russia maternal and newborn health collaboratives. The number of improvement teams associated with the spread collaborative was higher than with the demonstration collaboratives—averaging about 38 teams per (spread) collaborative (range: 10 to 143 teams).

As with the demonstration collaboratives, USAID initially set modest achievement goals for spread collaboratives: to achieve 75% of the improvement achieved in the demonstration collaborative upon which the spread was based, reaching a population of at least 100,000. However, an evaluation of collaborative results in Rwanda, Uganda, and Ecuador (see Figure 11) that HCI undertook in 2009 provided initial evidence that spread waves achieved as good or better results than their demonstration collaboratives and usually in a shorter time frame [18]; this tendency also appeared in the Afghanistan spread waves (see Figure 2 on page 5). Spread collaboratives also tended to exceed the 100,000 population threshold.

The logic of collaborative improvement holds that a spread phase should be initiated only when a demonstration has completed a synthesis and consolidation phase that determined which tested changes actually warranted being spread. In practice, host governments often pressured HCI to begin the spread phase before the demonstration stage was complete (these governments wanted to increase the geographic coverage of the successful programs). This resulted in some “spread collaboratives” (in quotation marks here to reflect the fact that they were not technically spread collaboratives) repeating to some degree the demonstration collaborative’s activities, rather than building on proven best practices.

Figure 9. Number of HCI-supported spread collaboratives, by topic (n=22)



Nevertheless, the spread collaboratives were largely successful in reaching sizeable population groups and scaling up the achievements in a shorter period than in the demonstration work.

2. Research on spread

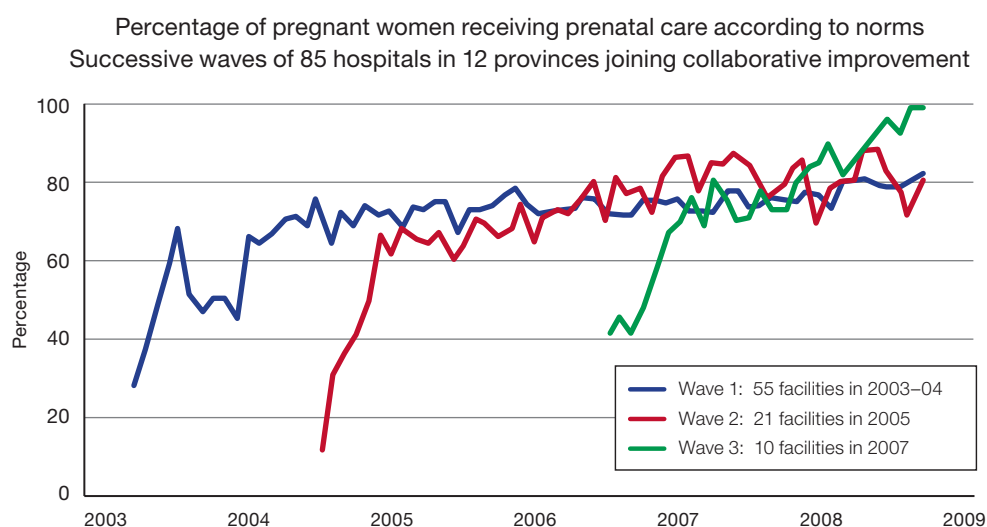
To better understand the factors that facilitated or inhibited scale-up of better care practices, including at the team level, USAID identified spread as a key topic for HCI’s research component. In the performance targets set for both TOs, the statement of work called for specific studies on the “role of documentation, direct exchanges between teams, and facilitation by experts” in spread. In all, HCI completed 18 descriptive studies related to spread.

Three of these studies looked broadly at spread. The above-described evaluation of 27 collaboratives quantified the speed and magnitude of results achieved by spread waves [17]. A second study reviewed evidence from spread experiences in health care in the United States, Russia, Niger, Ecuador, and Rwanda and proposed a conceptual framework for spread that has since guided activities in other HCI-supported countries [18]. A third study, completed in 2011, was a review of experiences with spread in low- and middle-income countries; these included HCI’s spread experiences during its first four years [19]. The last found some

Figure 10. Number of teams participating in HCI-supported spread improvement collaboratives, by region (n=846)



Figure 11. Ecuador: Increase in delivery of ANC according to standards in facilities participating in demonstration and two spread waves (2003–2009)



Note: This figure uses the term “Wave 1” in place of “demonstration collaborative.”

evidence that improvement collaboratives are more effective than other methods of spread, both for enabling personnel to use quality methods and for making improvements. The study posed several possible explanations for the apparent success of collaboratives, including that they focus on changes that can be implemented with the resources and skills available; they teach health workers how to measure whether (and the extent to which) the changes they introduce are effective, with such data giving teams feedback; and the expectation of shared learning may motivate teams, spread ideas, and stimulate teams to make changes.

Several studies looked at how teams shared learning, the factors that influenced the uptake of changes, and the contribution of different information transfer methods, while others described spread processes and compared results between demonstration and spread sites. (See Appendix D for the list of spread-related country studies.) Because these were descriptive rather than intervention studies, they largely documented the predominant forms of information transfer used in HCI-supported collaboratives (namely, sharing during learning sessions and information transferred by coaches during site visits) but could not demonstrate that one information spread method was superior to another.

One of the insights derived from HCI’s research on the spread collaborative approach was that in some cases the successful changes from the demonstration phase were not transferred to the spread sites. For example, a qualitative study in Guatemala evaluated the ProCONE improvement collaborative for maternal and neonatal health in health

posts designated as spread sites. It found that none of the interviewed auxiliary nurses at the health posts knew of the “best practices” document from the demonstration phase. According to health center directors who coordinated the health districts, health posts were not exposed to the ProCONE strategy through documents, but instead through meetings and informal discussions with coordinators or professional nurses from the health centers to which the auxiliary nurses reported. The study found that of all the changes implemented by health posts, only 13% were identical or similar to changes implemented in the demonstration phase; thus, 87% were new changes [20].

One study documented the transfer process and uptake of changes tested in one country (Niger) in a neighboring country (Mali). It found that such transfer could occur with moderate external support when the new country is similar to the original country in terms of their socio-economic and health situations and when the intervention addresses a clinical area deemed a priority by the local health system and stakeholders [21].

3. Key learning

- **Sharing of ideas across waves of a collaborative or between demonstration and spread collaboratives in the same country increases the speed of improvements.** Whether the spread of ideas happened informally through coaches or were transferred in a deliberate spread process, HCI’s experience indicates that the

sharing of ideas speeds improvement: Teams in subsequent waves or collaboratives generally achieved results at levels of 80% in about half the time that the original site teams needed to achieve the same results.

- **More deliberate spread strategies, drawing on knowledge management principles and processes, may accelerate spread even further.** In the final two years of HCI TO3, the project made more deliberate use of techniques like knowledge exchanges and harvests and emphasized the development of written change packages and documents that summarized the key learning from the demonstration phase. More effective ways are needed to ensure that teams participating in collaboratives that build on an earlier collaborative both receive and use materials developed by the earlier teams. Deliberate spread of consolidated and synthesized learning, packaged as guidance for new sites, may further reduce the time needed to achieve results near 80% or higher. Prospective studies are needed to identify improvements in the learning methods used in collaboratives between or during learning sessions and test their cost-effectiveness, including the role of planned knowledge hand-overs, written guidance, site visits, and organized interaction between participants in the demonstration and later collaboratives.

Whether the spread of ideas happened informally through coaches or were transferred in a deliberate spread process, HCI's experience indicates that the sharing of ideas speeds improvement.

- **Spread sites benefit from improvement capacity building.** Another key learning is that even when the transfer of change ideas from a demonstration site to a spread sites was purposeful, a degree of adaptation still occurred in the newly initiated sites. Several HCI studies found that spread sites adapted change ideas and did not simply apply ideas from the demonstration sites. This finding highlights the importance of not only spreading change ideas but also ensuring that new sites understand and apply iterative testing during implementation to enable effective adaptation.

Objective 6:

Expand the experience base for other specific QI approaches



1. Implementing and evaluating improvement approaches other than collaboratives

While the HCI statement of work emphasized USAID's interest in collaboratives, the project also supported or evaluated applications of other improvement approaches, such as implementing standards, job aids, training (including computer-based training), quality assessments (with or without strategies to address gaps revealed by an assessment), certification, and accreditation. Many of these approaches—particularly standards, job aids, and training—are also often part of collaborative improvement interventions.

Key applications and studies of other improvement methods HCI supported included:

Above: Health workers in a neonatal ward in Nicaragua apply alcohol gel for hand hygiene. HCI supported the scale-up of infection prevention measures in Ministry of Health hospitals in Nicaragua through training and on-site coaching. *Photo by Sergio Lopez, URC.*

- **Development of standards for OVC services:** The application of improvement methods to make OVC services more effective and tailored to the children's needs was a major HCI contribution to strengthen PEPFAR's programming for vulnerable children and families affected by HIV. Through the Africa regional Care that Counts initiative, HCI supported nine countries to develop, validate through field testing, and communicate minimum care standards for services for vulnerable children in seven domains: health, education, shelter, nutrition, psychosocial support, legal

protection, and household economic strengthening. HCI added value to programs supported by other implementing partners by introducing a systematic approach to standards development that engaged stakeholders at all levels, including the children themselves. HCI developed the **Facilitator's Guide to Establishing Service Standards** [22] to articulate a process that helped countries revise or develop uniform standards of OVC care.

- **Accreditation:** USAID asked HCI in 2012 to evaluate the quality of care and patient outcomes in Indonesian hospitals. The Hospital Accreditation Process Impact Evaluation (HAPIE), a longitudinal comparison study, is examining changes in quality and safety performance in nine hospitals: three undergoing the Joint Commission International (JCI) accreditation process, two undergoing the new accreditation process of the Indonesian Hospital Accreditation Commission (KARS), and four that are not due for accreditation until 2015. HAPIE is being conducted in three phases: baseline, mid-term (18 months after baseline), and end-line (36 months after baseline). The baseline clinical chart audit revealed, overall in all hospitals, very poor compliance with standards for the recording of medical history, clinical examination, and course of treatment. Quality among the hospitals varied substantially as indicated by the clinical charts, and important deviations from accreditation practice standards were observed. The general view of accreditation from key informants is that accreditation by either JCI or KARS has some benefits in seeking to improve service quality but that both have substantial flaws that need to be addressed before accreditation can achieve improvements in service quality. HCI supported the study design and baseline, completed in FY13. The mid-term and end-line evaluations will be conducted through the ASSIST Project.
- **Certification using ISO 9001:2008:** HCI assisted the Ministry of Health of Guatemala in 2009–2012 to apply the ISO 9000:2008 quality management standards to achieve improvements in processes for administrative and financial management and, on a pilot basis, for delivery of maternal and newborn care in one health center. Although certification targeted two specific units within the MOH structure—the Department of Finance at the central level and one clinic at the service delivery level—the ISO certification scope ultimately analyzed, documented, and made improvements in over 110 MOH processes. ISO certification was achieved for clinical care processes at the San Pedro Health Center in August 2010 and for the central MOH financial processes in October 2010. The costs and complexity of preparing facilities for external certification using ISO standards

made the MOH consider a less complex certification or accreditation system for health facilities going forward, such as the development of national certification criteria for care processes.

- **In-service training:** In-service training programs represent a significant proportion of investments made by Ministries of Health and development partners to build the capacity of health workers to competently, safely, and efficiently provide health services. At the request of PEPFAR, HCI conducted evaluations of three HIV training programs in 2010 to inform PEPFAR efforts and ultimately improve the efficiency of HIV-related training. The evaluations identified several common areas of weakness, especially related to participant selection, disruptions in service delivery, and limited effect of the training program on trainee and organizational practices. HCI recommended that to achieve the greatest gains from investments, in-service training programs should strive toward greater effectiveness (in training outcomes at all levels), efficiency (in training processes, training modalities, reducing waste, and improving cost-effectiveness), and sustainability (to support in-country institutional and national systems for continuing education). The evaluations' recommendations fed into the development of the In-Service Training Improvement Framework discussed on page 20.
- **HIV quality of care assessments:** Several USAID Missions requested HCI assistance in implementing quality of care assessments for HIV services. HCI conducted three between 2008 and 2011: the first in Cote d'Ivoire, the next in private sector facilities in Uganda, and the third in Malawi. To assess retention in care over time, the assessments used a cohort design to identify groups of pre-ART and ART patients and PMTCT clients who entered the care system within a certain time frame and documented both compliance with treatment standards and patient retention in care over a 12-month period. The assessments generally found that compliance with selected care standards was good at the patient's first visit but declined in the second six-month period of care. For example, in Cote d'Ivoire, only 32% of pre-ART patients had a second visit within six months (the target was 100%). Moreover, retention in care was poor: Only 46% of ART patients had a clinic visit in months 10–12 (100% target), and pharmacy records showed that only 38% picked up ART (100% target). The assessment found that only 67% of HIV-infected pregnant women received prophylaxis; only 12% of exposed infants received Cotrimoxazole; and only 9% were tested for HIV in the first 12 months [23]. Using these findings, HCI worked with the national HIV program and implementing partners

in Cote d'Ivoire to design an improvement collaborative to improve the quality of HIV care and treatment and PMTCT services.

- **The CHW Assessment and Improvement Matrix (CHW AIM):** The CHW AIM tool HCI developed includes, as part of the suggested agenda of a one-day workshop to apply the tool, an action planning framework to list problem areas noted in a CHW AIM assessment, identify improvement activities, and the actions planned to implement them. The operations research study in Zambia on the impact of CHW AIM found that all five organizations that applied the CHW AIM tool completed an action plan and made some progress on at least two program functionality elements; these efforts were direct results of plans made in response to findings of the first CHW AIM workshop [14]. Participants interviewed in the study expressed that more support was needed to carry out actions identified in the CHW AIM assessment: Organizations required additional tools and examples related to the different CHW AIM elements to help them develop creative and successful approaches in their contexts.
- **Computer-based training:** USAID requested HCI assistance in 2009 in adapting, for use in Indonesia, a computer-based training program on tuberculosis diagnosis and case management that QAP had developed. HCI partnered with the National Tuberculosis Program, the Indonesian Medical Association, Indonesia Midwife Association, and Indonesian National Nurses Association to develop job aids and a training package for health professionals on TB and multidrug-resistant TB. The training package, completed in 2011, includes a TB computer-based training CD-ROM in the Bahasa Indonesia language with nine modules for doctors and six for nurses and midwives. The package was disseminated by the professional associations, which awarded certification to those who successfully completed the course.
- **Job aids:** Pictorial or procedural job aids have long been part of many improvement interventions and were used in many HCI-supported improvement activities. In Benin, HCI supported controlled research to evaluate whether job aids could improve the performance of lay health workers in counseling pregnant women as part of prenatal care [16]. The study found that job aids enabled lay workers to achieve the same level of counseling performance as nurses.

2. Comparing results of collaboratives with other improvement approaches

USAID requested that HCI's research program conduct studies to compare collaborative improvement to other improvement methods and specifically to training and supervision. Two such studies were completed, and a third looked at the cost-effectiveness of adding a collaborative improvement intervention to a conditional cash transfer intervention intended to increase service utilization.

- **Uganda maternal-newborn care comparison study:** The first comparison study was carried out in Uganda in the context of the maternal and newborn health facility collaborative implemented in Luwero and Masaka districts from November 2010 to November 2012. The study evaluated the impact and cost-effectiveness of the collaborative improvement intervention by comparing pre- and post-implementation quality of care indicators on samples of patients from 44 health care facilities. The facilities were randomly allocated to either intervention or control arms at the sub-county level. All study sites received clinical training and the basic inputs needed for the care of mothers and newborns: newborn resuscitation bags and masks, resuscitation tables, and other accessories. Both study arms received registers to document indicators and clear instructions to maintain accurate and complete records. Intervention sites differed from control sites in that they also participated in the improvement collaborative, which included basic training in improvement methods, coaching visits, and learning sessions. The evaluation found a 32%–59% improvement in compliance with the 10 measures of quality of care delivery attributable to the collaborative improvement intervention versus clinical training alone. Noteworthy, however, is that the results showed statistically significant improvement in only half of the indicators because record-keeping in the control facilities was weak, so the case for attribution was not as strong as it might have been [24].
- **Mali maternal care comparison study:** A similar controlled design was used in Mali in 2011–2013 to compare a collaborative improvement intervention to improve diagnosis and treatment of eclampsia and pre-eclampsia (PE/E) with clinical training and routine supervision alone. Intervention sites were facilities participating in the EONC and PE/E improvement collaborative in the Diéma District (seven community health centers and the district referral hospital); the control sites were facilities in neighboring Yélimané District (six community health centers and the

district referral hospital), which at the time were not part of the collaborative improvement intervention. As part of the study, control facilities received basic clinical training on PE/E. Additional trainings were subsequently conducted by the Ministry of Health at some control sites.

While the evaluation demonstrated a positive effect of the collaborative improvement intervention on PE/E care, it was weaker than expected. Several factors may have contributed to underperformance of the intervention, including the 2012 coup d'état, which disrupted HCI support and led to modifications of both the intervention and evaluation design, as well as implementation by the Ministry of Health of additional PE/E interventions in the control district. The findings suggest that the relatively low level of inputs invested in the intervention may not yield acceptable improvement [25].

- **Guatemala conditional cash transfer cost-effectiveness study:** The 2011 Guatemala study looked at the effect of adding a collaborative improvement intervention to sites participating in a demand-generating conditional cash transfer (CCT) scheme that gives families payments that are tied to their use of preventive maternal and child health care services. HCI used a quasi-experimental design to test the effect of implementing the improvement collaborative on compliance with clinical norms at centers covered by the CCT program. The analysis compared differences in compliance at 38 centers covered by both the improvement collaborative and CCT programs and 12 centers covered by only the CCT program. The study found that for six out of 13 prenatal care process criteria, compliance was statistically significantly higher in CCT+collaborative sites compared to CCT-only sites. Compliance with prenatal care norms was 10 percentage points higher in the CCT+collaborative group (94%) compared to CCT-only facilities (84%). Full compliance, defined as “all 10 technical criteria performed in a clinical visit,” was 58% at CCT+collaborative sites and 0% of the CCT-only sites. Compliance with preventive child health care norms was also significantly higher in the CCT+collaborative sites. Most non-collaborative facilities scored very low, demonstrating their need for major improvements in child health service quality. The proportion of cumulative compliance with child health criteria, based on nine criteria, was 36 percentage points higher in the CCT+collaborative group (86%) than CCT-only facilities (50%).

Relative to cost-effectiveness, the study showed that the total cost of the improvement collaborative was \$293,385 and resulted in 60,102 additional prenatal care consultations performed with clinical norms and

It is clear that future improvement strategies should build in comparison groups to strengthen the evidence base for improvement methods.

122,900 additional child health consultations done with full compliance. This translates to an additional cost per fully compliant prenatal visit of only \$1.25 and only \$1.78 additional per child health visit fully compliant with norms. With such low additional costs and the high level of effectiveness in improving compliance with clinical norms for prenatal and child health services, the study concluded that expanding the EONC improvement collaborative to other health facilities where the CCT program operates would be a cost-effective strategy for improving maternal and child health in Guatemala [26].

Two other controlled studies were begun under HCI and continue under ASSIST: one in the Republic of Georgia on NCDs and one in Uganda on managing HIV patients using the Chronic Care Model.

3. Key learning

- **Comparison groups help establish the case for attribution of collaborative improvement results and should be incorporated wherever feasible:** A weakness seen in many studies of improvement interventions is the absence of a valid comparison group for the intervention groups; having such comparison would strengthen the case for attributing changes in quality indicators to the improvement intervention. Unfortunately, neither of the HCI studies that used concurrent, non-intervention comparison groups to address attribution yielded strong evidence for the effectiveness of collaborative improvement, though for different reasons: missing data in the control sites (Uganda) and a weak application of collaborative improvement (Mali). Nevertheless, it is clear that future improvement strategies should build in comparison groups to strengthen the evidence base for improvement methods.
- **Regardless of method, to impact service quality and outcomes, improvement approaches need a strong engine for introducing change in processes and systems:** Standards alone do not lead to improvement, but they can help guide service providers toward desired care delivery. Quality assessment tools like CHW AIM reveal weaknesses and can suggest best practices, but

the assessment process alone cannot drive improvement. Similarly, Guatemala's ISO certification was linked to the development of improved procedures and manuals, but the results from piloting such certification in the delivery of care did not point to remarkably higher performance. In addition, an important learning from the study on accreditation in Indonesia is that the process of attempting to achieve accreditation by itself does not give a health facility the practical methods or tools to change, and that without change, it is unlikely that improvements in patient care and consequent improvements in health outcomes can be achieved. While certification and accreditation processes may focus initial efforts on changing processes and ensuring inputs needed to meet standards, they do not provide a strong engine for continuous improvement once certification or accreditation is achieved. A similar phenomenon was found with CCTs, where incentives to increase demand for services with no strategy to improve the quality of those services diminished the intervention's potential impact. HCI's experience is that many improvement approaches that alone cannot drive improvement are valuable adjuncts to any improvement method that will

Standards alone do not lead to improvement, but they can help guide service providers toward desired care delivery.

spur improvement at the point of service delivery. Self-assessments, for example, supplement collaborative improvement by measuring the results of changes but alone do not stimulate appreciable improvement.

- **Sustained application of improvement methods is hampered when they require external audit or assessment:** While the Ministry of Health of Guatemala was pleased with the progress it made through the ISO documentation and certification processes, it ultimately did not pursue expanded application of ISO certification due to the cost. An additional challenge with the ISO model is that the standards and results are not in the public domain, making lessons learned and best practices more difficult to share across countries.

Objective 7:

Improve the cost-effectiveness of QI in USAID-assisted countries



1. Developing knowledge management for improvement

The development of a knowledge management (KM) system to create, capture, synthesize, and share knowledge about how to improve health care, with a focus on the priorities of USAID-assisted countries, was a major HCI activity throughout the project. USAID sees KM as a vehicle to leverage the project's documentation of improvement activities and make that information readily available to implementers worldwide through the web and, in so doing, make improvement work more cost-effective.

The Health Care Improvement Portal (www.hciproject.org) was the hub of HCI's KM system. Launched at the end of FY09, it leveraged USAID's considerable investment in other health-related KM websites through its design and

Above: Reproductive and Child Health Coordinator facilitating a mock village health committee meeting in Tanzania to prepare community representatives to be able to compare and identify gaps between their community data and facility data. Photo by Rhea Bright, University Research Co., LLC

maintenance by the Johns Hopkins University Center for Communication Programs. At the time of the portal's closure in April 2014 (when all its content was transferred to the USAID ASSIST Project website, www.usaidassist.org), it offered more than 80 resources related to improvement methods and more than 180 for improving care (all HCI and QAP publications and more than 60 outside resources). The portal organized resources by eight topic areas, including tested methods and interventions for improving specific areas of care and improvement experiences from around the world.

Beyond the technical resources it offered, the portal's unique feature was a database of improvement reports: short reports about specific improvement experiences. In addition, the portal provided collaborative profiles—descriptions of improvement collaboratives and their related tools and information—for those interested in developing a collaborative on a similar topic. The web-accessible database was designed as an open forum for implementers to share short reports, tools, and lessons learned about their improvement efforts with others anywhere in world. To encourage implementers (especially those outside the project) to share their improvement experiences, HCI held two “best improvement report” contests, one in 2011 and another in 2012. These contests attracted 87 improvement reports from 20 countries, and all were added to the portal.

Other elements of the HCI KM system include region- and topic-specific websites with similar missions of gathering and sharing learning about how to improve health care. The main HCI-developed regional websites were the Spanish-language maternal and newborn care site, www.maternoinfantil.org, launched in 2009 and operating today under the USAID ASSIST Project, and the Russian-language maternal and child health site (www.healthquality.ru). The latter was funded from 2011-2012 as a resource for HCI-supported maternal and child health collaboratives in Russia and is now managed as a public web portal on improvement methods by the Federal Research Institute for Healthcare Organization's Central for Quality in Moscow. HCI also developed and operated from 2010-2012 a website in Spanish and English for the Latin American Newborn Health Alliance: www.alianzaneonatal.org.

Over the life of the project, these KM websites received over 280,000 visits (Table 2).

Beyond gathering and making available through the HCI Portal improvement insights and materials, HCI's KM component sought to incorporate KM practices and techniques in improvement activities to enhance shared learning. To help inform new strategies to make more effective use of knowledge assets and enhance the impact of activities to manage knowledge around improving health care in developing countries, HCI convened a two-day “Health Care Improvement Knowledge Management Deep Dive” in March 2011 to bring together international KM experts and health care improvement experts for a thoughtful conversation on what strategies and lessons from outside and inside health care could enhance the project's KM system.

Key learning for HCI that emerged from the deep dive was the need to shift the project's KM strategies from primarily pushing information out to those who might be interested to

Table 2. HCI KM system usage through FY13

KM web site	Timeframe	Number of visits
www.hciproject.org	FY10	18,500
	FY11	51,029
	FY12	71,050
	FY13	65,774
www.maternoinfantil.org	FY08-FY10	48,000
	FY11	5,827
	FY12	7,126
www.healthquality.ru	FY11-FY12	14,958
www.chwcentral.org	FY11-FY12	(n/a—part of HCI portal visitors)
Cumulative, HCI TO1 and TO3	FY10-FY13	282,264

placing more emphasis on fostering connections between and among people who have knowledge and those who need it. The deep dive also called attention to the value of social media in connecting the project's knowledge resources to implementers and to the need to create more opportunities in learning sessions and other face-to-face exchanges for providers to share what they know. The deep dive also recommended that HCI provide training and support to develop staff competency in using KM techniques.

In its last three years, HCI made strides in providing support to HCI country teams in applying KM techniques, such as storytelling, knowledge cafés, after-action reviews, and knowledge harvests, in learning sessions and coaching visits to draw out key insights about what changes were most effective in an improvement collaborative. HCI created Twitter and Facebook pages to increase opportunities to share knowledge about improvement science and create connections among those implementing related activities.

2. Conducting research aimed at improving the efficiency of improvement methods: Cost-effectiveness studies

HCI's research and evaluation agenda was comprehensive, examining several aspects of improving health system functioning as well as improvement strategy implementation. Several focus areas of HCI research—such as institutionalization, spread, and use of comparison groups—are discussed above. This section addresses

another HCI priority research area: conducting research aimed at improving the efficiency of improvement methods. Appendix D offers a complete list of the research and evaluation studies HCI carried out.

Most of the studies that examined efficiency of improvement interventions were based on pre/post-intervention assessments of the effectiveness and basic economic consequences of improvement activities. While this basic design, used in studies in Niger (2012), Ecuador (2011), Nicaragua (2012), Uganda (2010–2011), Kenya (2011), and Afghanistan (2011), produced promising results indicating that the interventions were either cost-effective by WHO-recommendation standards or even cost-saving, they required that assumptions be made as to the degree of change seen in health outcomes attributable specifically to the intervention rather than just a secular trend. For example, the study of implementing kangaroo mother care for pre-term and low-birth weight infants in maternal hospitals in Nicaragua showed that the cost of the implementation would be offset within three months by savings from the decreased use of incubators and some medication [27].

Most of the evaluations of HCI work had positive results showing that the interventions were successful in achieving superior care delivery in the settings where they were implemented. In most cases the interventions were efficient relative to WHO standards of cost-effectiveness of health interventions. Studies on the validity of data collected in the course of improvement activities generally showed that while there were some inaccuracies and a slight tendency to err on the side of enhancing performance indicators, these tendencies were not sufficient to affect the overall results.

Studies that refined the collaborative method include one conducted in Uganda in 2010 that examined whether using personnel from the central MOH as coaches for facility-based improvement teams was more effective and efficient than using district health officers. It found that the level of effectiveness in improving the quality of care was not significantly different but that using district coaches was much more efficient [28].

It is clear that spreading an improvement to a larger number of facilities can be substantively more efficient than limiting it to the demonstration phase. For example, a study in Ecuador published in 2013 found that the spread phase of a project to improve uptake of essential maternal and newborn practices produced much greater coverage and more rapid achievement of compliance with care standards and did so using fewer resources [29].

In determining the efficiency of improving the health system to deliver better care, it became clear that it was difficult to

capture all of the beneficial effects of improvement activities because the effects were often in many aspects of patient care rather than just one, as in the case of a disease-specific vaccination. For example, in a study of the efficiency of implementing a treatment bundle to reduce the incidence of ventilator-associated pneumonia, the intervention likely had beneficial effects outside averting hospital-acquired pneumonia, although this was not part of the economic analysis [30]. Other assumptions also need to be made in these economic studies, including guessing how long the changes from the improvement activities will continue to achieve better health outcomes if the technical assistance that facilitated the change ends. In most of HCI analyses, conservative assumptions were made both about the scope of the improvements and the attenuation of the effect upon curtailment.

Despite weaknesses in the design or execution of some studies, the project wrote and published, often in peer-reviewed health journals, a large number of studies on advances in the field of health care improvement. The number (see publications list in Appendix E) is impressive, especially in light of the previous dearth of publicly available studies on improvement in low- and middle-income countries.

3. Key learning

- **Managing knowledge gained through improvement is a fundamental part of collaborative improvement, and doing it more efficiently raises the cost-effectiveness of improvement methods:** HCI has found that using KM techniques (e.g., storytelling and knowledge cafés in learning sessions to complement the presentation of quantitative results) engages people in determining how results were achieved and which tested changes resulted in improvement. This requires designing gatherings of improvement teams in ways that allow participants to share and process ideas in small group conversation and then integrate and synthesize that knowledge in large groups. Doing a better job of synthesizing key learning from improvement activities also supports the development of knowledge products that communicate that knowledge to others.
- **Specific knowledge products are needed to convey advice to others:** Compilations of tested changes are useful reference documents, but additional guidance products are needed to effectively convey what teams have learned about how to improve services in specific care areas. HCI found that such learning is best conveyed as recommendations and advice to others, rather than detailed documentation of what teams actually

did. The advice needs to be expressed as what teams would recommend to others based on what they learned from their implementation experience. Such framing of advice is different from traditional ways of reporting and requires a change in perspective, as well as some testing to determine the keys pieces of improvement information that are most helpful to other implementers.

- **Organizing knowledge, making it readily available, and connecting it to interested users are key:** HCI found that using social media is effective for stimulating the uptake of knowledge products on the web, particularly Facebook and Twitter, which are used extensively by health workers and health care organizations in Africa, Asia, and Eastern Europe for professional communication. Connecting through social media with individuals and organizations who are interested in improving health care creates ready channels for promoting content posted on web portals.
- **Adding economic analysis of improvement interventions builds the case for improvement methods:** Building in costing of improvement interventions should stimulate interest in and uptake of improvement approaches. An important learning from HCI's cost-effectiveness studies is the difficulty in reporting efficiencies achieved in terms of expenditures per health outcome (most improvement activities measure achievement of program goals in terms of process indicators, such as the change in the proportion of patients provided evidence-based treatment, rather than the proportion

HCI's economic analyses of improvement activities and the collaborative method found that either can lead to significant cost savings and therefore improved efficiency

achieving better health outcomes). Epidemiological modeling is often required to change the intermediate outcomes into clinically meaningful endpoints such as episodes of illness or deaths averted. Longer study periods are required to measure endpoint outcomes, especially in chronic conditions. (It is generally easier to measure health outcomes in maternal and neonatal health because they occur in a relatively short period.)

- **Take steps in improvement intervention design to reduce costs:** HCI's economic analyses of improvement activities and the collaborative method found that either can lead to significant cost savings and therefore improved efficiency by substituting the technical assistance from outside the health system with assistance from within, assuming no significant attenuation of the effectiveness of the assistance. More studies that examine the costs and effects of specific elements of an improvement strategy will inform the design of more impactful improvement strategies.

Objective 8:

Provide global technical leadership for QI in lower- and middle-income countries



1. Developing partnerships and advocacy to encourage the adoption of improvement methods

HCI pursued partnerships with international, regional, and national organizations to encourage the adoption of improvement methods and to develop improvement initiatives focused on specific technical areas. Frequently at the country level, many other implementing partners were working in the same technical areas as HCI, and in many countries, HCI was tasked with building capacity of those partners to conduct improvement activities. Further, since improvement work requires coordination with many different health sector actors, establishing mutually beneficial partnerships with other implementing partners, donor agencies, and host country institutions enabled much more effective ways to improve health outcomes. Key partnerships and advocacy efforts HCI developed include:

Above: REPSSI, ANPPCAN, and URC staff planning upcoming activities at a partners meeting in February 2013 in Johannesburg, South Africa. Photo by Charles Kienzie, URC.

- **Partnership for Child Protection in Africa:** HCI initiated a partnership with two African organizations in FY12 to develop their technical capacity to support improvement of child protection programs: the Regional Psychosocial Support Initiative (REPPSI) for East and Southern Africa and the African Network for the Protection and Prevention of Child Abuse and Neglect (ANPPCAN), headquartered in Nairobi. HCI provided technical mentorship and training to both in the areas of improvement, research and evaluation, and KM and supported the organizations' activities in Kenya, Tanzania, Uganda, and Swaziland to strengthen child protection programs. HCI supported the two organizations to host district-level meetings to introduce improvement methods in national child protection programs, conduct community conversations on improving child protection, and convene national meetings to strategize

on findings from the communities and districts. Both organizations collaborated with HCI to develop approaches to strengthen community partnerships for child protection based on using improvement principles to identify gaps or bottlenecks in the ways communities and organizations protect children and make changes to those processes to reduce such bottlenecks. Other improvement concepts HCI helped ANPPCAN and REPSSI apply were promoting working in multidisciplinary teams; having those who are affected, including children, participate in decision making; and using data to understand processes. Both organizations enthusiastically embraced the use of improvement methods in child protection programming (see Box 5 for comments from ANPPCAN's Executive Director).

- **National Policy Seminars on Health Care Quality Improvement:**

Beginning in January 2010 in Afghanistan, in June 2010 at the regional Health Care Accreditation Council Quality Health Care Conference in Jordan, and followed by a national seminar in Uganda in 2011, HCI convened a series of health care improvement policy seminars for government officials, civil society representatives, professional associations, donors, and implementing partners. The purpose of the seminars, which featured international experts and health care leaders, was to examine relevant international health care improvement experiences in light of local quality issues. Instead of prepared presentations, HCI Director M. Rashad Massoud designed the meetings as a forum for thoughtful dialogue in which both local and international expertise could be brought to bear in identifying strategies to address national quality issues.

- **Salzburg (Austria) Global Seminar:** The USAID Contracting Officer's Representative for HCI James Heiby, M. Rashad Massoud, and eight other HCI staff participated in the Salzburg Global Seminar April 22-27, 2012, on "Making Health Care Better in Low and Middle Income Countries: What are the next steps and how do we get there?" The seminar brought together 58 health leaders from 33 countries in an intensive dialogue about how to improve the performance of health systems in even the most resource-constrained settings. The event was designed by a committee of experts from USAID, URC, the Institute for Healthcare Improvement, University of North Carolina, WHO Patient Safety, HEALTHQUAL International, Heidelberg University, and Salzburg Global Seminar. The seminar's product was the Salzburg Statement, "Better Care for All, Every Time: A Call to Action," which focuses on what strategies and policies can be implemented now and with available resources to make care better for all patients [6]. The Call to Action was translated into French, Portuguese, Russian, and Spanish and publicized on the

BOX 5.

Reflections from ANPPCAN on HCI support

At organization level, there is improvement of identifying different skills available in the organization and tapping them instead of just treating programmes independently. This has not only reduced the costs, but provided other staff with opportunity to demonstrate the skills they have as they are also learning from each other. Thus, great enhancement of team work.

Again at the organizational level, although there were tools on monitoring and evaluation, they were not used effectively. The programme staff have embraced the tools and even improved on them, generating information useful for the development of the organization.

As far as the network is concerned, [quality improvement] has rejuvenated the spirit of working together, and quite a number of Chapters participated in the training, such as Ethiopia, Kenya, Liberia, Mauritius, Nigeria, Rwanda, Somalia, Tanzania, and Uganda.

– Philista Onyango, Executive Director, ANPPCAN

Salzburg Global Seminar and HCI websites. Outcomes from the seminar and its Call to Action were presented at the World Health Assembly in May 2012.

- **Chronic Care Design Meeting and BMJ Satellite Conference:** HCI co-sponsored, with the Ministry of Health of Uganda and PEPFAR, a four-day event in Kampala, May 31-June 3, 2010, with the aim of highlighting key health system redesign issues for appropriately managing chronic conditions and the quality improvement methods to support implementation of such redesigned systems. The four-day workshop included: 1) a one-day seminar on the proposed redesign of the Ugandan health system that had been developed in a three-day Chronic Care Design Workshop held the week before, applying the WHO Care for Chronic Conditions Model to Uganda; 2) a two-day Satellite International Forum featuring selected presentations (both live and videotaped) from the 2010 International Forum on Quality and Safety in Health Care held in Nice, France; and 3) a one-day quality improvement skill-building workshop on how to apply the project's

ART Improvement Framework to address gaps in care for patients on ART. The event drew some 250 participants from 10 African countries: Cote d'Ivoire, Nigeria, Ethiopia, Rwanda, Kenya, Tanzania, Namibia, Malawi, South Africa, and Uganda.

- **International Society for Quality in Health Care (ISQua):** URC signed a collaborative agreement in September 2011 with ISQua to establish an alliance between URC and ISQua based on their shared goal of improving health care in developing countries. They agreed to join forces to: i) provide expertise in quality and patient safety management through regional meetings in developing countries; ii) showcase improvement work from developing countries at workshops and other sessions as part of ISQua's annual conference; and iii) disseminate knowledge and support professional development in developing countries via ISQua's Knowledge Portal, an online global platform for sharing information about quality in health care, and HCI's Health Care Improvement Portal. HCI was asked to join with ISQua in convening a regional conference in Africa in 2013 on health care improvement. HCI Director Dr. Massoud and Communications Coordinator Ms. Feza Kikaya participated on the ISQua-led organizing committee throughout the year to plan the meeting, held in Ghana in February 2013.
- **Gender and Health Systems Strengthening eLearning course:** Beginning in FY11, HCI significantly expanded its activities to incorporate gender considerations in health care improvement activities. An implementation guide on how to integrate gender issues and considerations in improvement activities was published in September 2012 and includes definitions of key concepts of gender integration and how they relate to quality improvement; information on international agencies' perspectives on gender; guidance on how to integrate gender into improvement activities; and how, when, and why to conduct gender analysis [31]. The project, relying on the specialized expertise of HCI partner WI-HER LLC [Women Influencing Health, Education, and Rule of Law], presented trainings on gender for field offices in Uganda, Nicaragua, Swaziland, Honduras, Niger, and Mali in FY11 and in Tanzania and Kenya in FY12. The goal of these trainings was to build staff skills in gender considerations within the quality improvement process, including identifying local gender disparities affecting improvement activities and health outcomes; conducting a gender analysis to inform new activity development; and the collection and analysis of sex-disaggregated data and gender-sensitive indicators.

In FY13, the USAID Office of Health Systems asked HCI to work with the USAID Gender team and CapacityPlus

to contribute to the development of an eLearning course, "Gender and Health Systems Strengthening." HCI contributed to the course outline and was responsible for developing the second module on gender and health service delivery, incorporating examples from HCI work in Afghanistan and Swaziland as well as HCI gender integration tools. The final eLearning course was launched June 2014 on the Global Health eLearning Center: <http://www.globalhealthlearning.org/course/gender-and-health-systems-strengthening>.

- **East, Central, and Southern Africa (ECSA) Community:** In FY10 and FY11, HCI worked with the ECSA Community Health Ministers' Conference and Directors' Joint Consultative Meeting, the highest technical and policy-making organs of ECSA countries, to gain endorsement for the application of improvement methods to successfully implement and scale up changes in health care practices for maternal and child health, reproductive health and family planning, HIV/AIDS, and other infectious diseases. The resolutions from the 50th ECSA conference held in 2010 explicitly endorse the implementation and scale-up of changes in health care practices; these were reinforced by resolutions from the 51st ECSA conference, held in November 2011 in Mombasa, Kenya.

2. Disseminating results through publications and media

HCI was prolific in publishing on improvement methods, applications, and research and evaluation studies. By project end, staff and partners had published 26 articles in peer-reviewed journals on project-supported work, 74 technical reports, and 67 research and evaluation reports (see Appendix E). The project intentionally published in a variety of peer-reviewed publications, ranging from quality improvement journals like the *International Journal of Quality in Health Care* to topical journals like the *Maternal and Child Health Journal*.

To increase the visibility of health care improvement results and activities, in January 2012 HCI launched a project Facebook page and in April 2012 a Twitter account. Making use of these social media platforms allowed HCI to extend its reach by tapping into larger global networks, leveraging formats people in USAID-assisted countries were already using. Through FY13, HCI continued to expand its social media reach and gain new followers. The top countries represented in terms of "reach," excluding USA, were Georgia, Nigeria, Cambodia, Jordan, Bangladesh, and Kyrgyzstan. Top new "likes" were acquired from visiting the page itself and from Facebook recommendations. The HCI Portal and

maternoinfantil.org were the top external referrers to the HCI Facebook page.

The HCI Twitter page was synched to the HCI Facebook Timeline, so that HCI Facebook followers not on Twitter could still see recent HCI tweets. The Twitter page ended FY13 with over 340 followers. During 2013, tweets promoted HCI's OVC e-learning module, the HCI Uganda maternal health video posted on the HCI Vimeo page, and the relaunch of the CHW Central website as an independent community of practice. The @usaidhcuproject Twitter handle was referenced the most in April 2013 during the Global Newborn Health Conference, a phenomenon that highlights the value of using Twitter during events. Throughout the year, the HCI Twitter page also supported and promoted announcements on behalf of partners, such as REPSSI and CHW Central.

HCI's team in Georgia used Facebook to link medical professionals there to evidence-based medicine articles and resources, which were posted on a special page of the HCI Portal where the Georgia team could upload materials in Georgian and then link to them on the HCI Georgia Facebook page.

In September 2013, the HCI Twitter page was transferred to the USAID ASSIST Project and relaunched as @usaidassist. HCI's Facebook page was retired in April 2014 when the HCI Portal was closed. The over-500 followers of the HCI Facebook page were encouraged to "like" the new ASSIST Facebook page.

3. Developing graduate training in improvement methods

To complement HCI's extensive work with Ministries of Health and implementing partners to deliver in-service training on improvement, USAID requested that the project actively seek opportunities to partner with host country training institutions to develop graduate training in improvement methods. Over the life of the project, HCI developed short courses on improvement methods with institutions in three countries: a short course on improvement for medical students with the Afghanistan Public Health Institute, a distance learning course on improvement with the Methodological Center for Quality of the Ministry of Health and Social Development in Russia, and a week-long course on improvement with the School of Public Health of the University of Witwatersrand in Johannesburg.

In addition, HCI assisted medical and nursing schools in two countries to incorporate improvement methods in their core curricula. In 2010, HCI developed a curriculum on health care quality improvement for the new Kenya Methodist University

Medical School, which opened in 2011. However, the largest experience of HCI in pre-service training in improvement methods occurred in Nicaragua, where HCI developed a national curriculum for pre- and in-service training in quality improvement that was officially adopted by the MOH in 2011. During 2012-2014, HCI worked with the faculty of eight of the 13 universities in Nicaragua to incorporate improvement methods and competency-based training in MNCH in medical and nursing school curricula. With the technical assistance provided to these eight universities, HCI covered 62% of universities conducting training in medicine and nursing; 83% of medical school graduates in the country; and 100% of nursing school graduates in the country.

HCI collaborated with the People's Open Access Education Initiative (Peoples-Uni) to develop an online module on patient safety and health care quality improvement. The Peoples-Uni (<http://www.peoples-uni.org/>) aims to build public health capacity in low- and middle- income countries via e-learning. During FY13, HCI staff worked with the People's Uni team to finalize the improvement module. The course was conducted from March 3-June 16, 2013. Twenty-four students enrolled, representing Afghanistan, India, Zambia, Swaziland, Switzerland, Sudan, Cameroon, Nigeria, and South Africa.

4. Key learning

- **A partnership model of mentoring, training, and funding activities proved to be highly effective for building capacity in improvement:** Both with child protection organizations in Africa and medical and nursing schools in Nicaragua, a strategy of ongoing mentoring, training, and joint activities over a one-two-year period is the most effective approach for developing sustainable capacity to apply improvement methods. While short training courses can be easily developed and offered as additional coursework for medical and nursing students, HCI found that a longer term engagement with the training and technical support institutions yielded a deeper and (we believe) sustained commitment to incorporating improvement methods in their work.
- **The demand for pre- and in-service training in improvement methods is growing:** HCI found that health care training institutions in many countries were keenly interested in receiving support to expand their curricula to add improvement methods to pre-service training. Work with the Regional Center for Quality in Health Care in Uganda under the USAID ASSIST Project to define core competencies in improvement for health workers may lead to greater uptake of improvement capacity building in health training institutions in East Africa.

III. Legacy of the USAID Health Care Improvement Project



Mainstreaming quality improvement

If QAP (1990-2008) was the proof of concept of how modern quality improvement methods could be feasibly and productively applied in low- and middle-income countries, HCI proved that large-scale implementation was possible and worthwhile. The breadth and depth of collaborative improvement interventions HCI implemented were unprecedented and constitute the largest body of experience to date relative to applying modern improvement methods to health care and related social services in USAID-assisted countries.

HCI's results show that collaborative improvement is a mainstream system-strengthening approach that can be applied in virtually any health system and health care area to address diverse aspects of health system performance—not only

Above: Improving service delivery for vulnerable children involves working with stakeholders of orphans and vulnerable children programs to ensure that more children are provided support according to their needs. School children in Nigeria. Photo by Bashir Balogun.

clinical care, but also health worker performance, supply management, community linkages, district management, community-based social services, and behavior change communication.

The project's work sparked interest in quality improvement and the collaborative improvement approach on the part of many international and local organizations, and HCI spawned similar improvement activities by other USAID implementing partners. PEPFAR drew importantly on HCI's

experience and evidence base in the development of the PEPFAR Quality Strategy, released in March 2014 [32]. Furthermore, WHO has selected Health Care Quality as the theme of its 2015 Global Health Report. HCI's results also support current global discussions of how to advance universal health coverage by improving health worker productivity and performance.

HCI's work also helped to put on the global agenda recognition that most health professions' education and training systems are not equipping health workers with the competencies to brainstorm, test, study, implement, and spread changes. As a consequence, improvement initiatives rely on ad hoc in-service training to develop improvement capacity, yet rapid staff turnover often dilutes the capacity of improvement teams. A key precondition to the sustainability of current and future investments in health care improvement is the availability of a current and future workforce across the health system that has the competence to lead and participate in improving care. Achieving this precondition requires new thinking about health worker education and training to integrate basic improvement competencies.

Influencing HCI's successor: USAID Applying Science to Strengthen and Improve Systems (ASSIST)

The design of the USAID ASSIST Project (2012-2017) builds directly on HCI's learning about how to design and implement improvement strategies yet takes a broader view to address system-level factors that affect the quality of care and institutionalize the capacity to continuously improve care. HCI's experience informed the following key themes that ASSIST is applying in the design and implementation of country programs:

- **Integrated design of country improvement strategies:** In ASSIST's new field activities, a deliberate design process is used to link improvement objectives with larger health system-strengthening initiatives and to intentionally plan for the effort's scale-up, sustainability, and institutionalization. All country improvement plans are being negotiated with, agreed upon, and signed by both USAID and host country government counterparts. These agreements build country capacity and ensure country ownership of objectives and strategies.
- **Connecting point-of-care improvement work with strategies to address health system gaps and linkages:** ASSIST country improvement plans identify the health system-level gaps that may deter the proposed

Collaborative improvement is a mainstream system-strengthening approach that can be applied in virtually any health system and health care area to address diverse aspects of health system performance.

improvement activities—that is, gaps in policy, health workforce, supply chain, and resource allocation—and identify stakeholders and partners that can help ASSIST overcome these issues. By coordinating improvement approaches at multiple health system levels (e.g., district health management team, facility, and community levels), ASSIST improvement strategies take a whole-system approach.

- **Giving explicit attention to the learning agenda:** ASSIST country programs look at how each improvement activity will contribute to local and global learning—how the project will purposefully create, gather, synthesize, share, and use insights and experiences to improve work, and how this learning will be shared and disseminated within the country and beyond. ASSIST country programs also have a mandate to incorporate comparison groups where possible to strengthen the evaluation of the intervention's impact and to selectively validate provider-reported data. ASSIST country programs are also asked to incorporate economic evaluation to provide information on the impact and cost-effectiveness of their improvement programs.
- **Stronger content design:** Many of HCI's best results came when high-impact, evidence-based technical content was linked with a strong improvement design to phase in clinical content and systematically address barriers to its implementation. ASSIST is making the content design process more deliberate by developing consensus across country teams on improvement aims and indicators that are closely linked to high-impact interventions.
- **Addressing human performance factors and management and leadership in the design of improvement strategies:** Human performance technology (HPT) provides ways to analyze health workforce performance gaps to identify interventions that can support improved human performance at organizational, process, and individual levels. HCI combined HPT with collaborative improvement, stimulating better health worker performance, productivity, and quality of care. ASSIST country programs are incorporating human performance factors

by identifying policy and performance gaps and their causes at the policy, district management, and service delivery levels and building in appropriate HPT interventions as part of the improvement strategy.

- **Identifying and addressing gender-related barriers to health outcomes:** ASSIST is building on HCI's pioneering work to incorporate gender considerations into health care improvement work by routinely disaggregating and analyzing data by sex, analyzing gender gaps in service delivery, and testing changes related to gender factors as part of the country improvement strategies.
- **Planning for how the work will create the conditions for sustaining and spreading results:** Initial improvement plans in each ASSIST country program address how the improvement strategy will create the conditions for sustaining results—holding the gains in the results that will be achieved through the improvement plan—and specify how progress toward sustainability will be measured. The plans also describe the eventual scale to which the country wishes to implement the improvement strategy and how the implementation plan will create the conditions for spread. ASSIST improvement plans also address how the assistance program will create host country capacity to conduct other improvements without external assistance.

Generating insights on continuing challenges for the field of improvement

The HCI-led Salzburg Global Seminar on Making Health Care Better was a watershed moment for the global field of health care improvement, bringing together key actors and leaders from countries around the world to identify the key actions needed at global, national, and local levels to make health care better for all people [6].

Many of HCI's best results came when high-impact, evidence-based technical content was linked with a strong improvement design

Seminar participants agreed on the five top challenges to making health care better: 1) human resources for health, 2) community and civil society engagement in improvement health and health care, 3) poor planning and inadequate harmonization, 4) making care people-centered, and 5) conflicting perceptions of quality among providers, policy-makers, and the public.

They also identified the confusion surrounding the terminology and methods that are used to promote and execute health care improvement in low- and middle-income countries, with many competing terms in use that are plagued by jargon and proprietary methods describing essentially similar approaches and concepts.

HCI influenced the Salzburg Call to Action to chart the way forward, urging better and more efficient ways to improve care for patients and to engage policymakers, health workers, patients, and communities in making health care more value- and patient-centered and linking improvement in health care delivery processes to outcomes.

Conclusion

HCI made significant contributions to quality of care and health outcomes in a large number of countries, affecting hundreds of thousands of people and thousands of health workers. Its results reflect well on the priorities of USAID and the generosity of the American people in supporting better health care worldwide.

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Appendices

Appendix A.

HCI life-of-project activities by country

Country	Activity/Intervention
AFRICA	
Benin	<ol style="list-style-type: none"> 1. EONC collaborative (1 district) 2. Field testing of the CHW AIM tool
Botswana	<ol style="list-style-type: none"> 1. Rapid assessment of existing quality improvement initiatives being implemented within the Ministry of Health
Burundi	<ol style="list-style-type: none"> 1. PMTCT baseline assessment activity (4 provinces)
Cote d'Ivoire	<ol style="list-style-type: none"> 1. ART/ PMTCT collaborative with 41 sites (27 of the country's 83 districts) 2. Expansion of ART/ PMTCT collaborative to 80 new sites 3. Developing and piloting of standards for peer prevention of HIV transmission (4 regions) 4. Developing and piloting of draft standards for vulnerable children (4 regions) 5. Laboratory strengthening and accreditation (25 labs in 14 regions) 6. Pharmacy improvement activity (13 pharmacies in Abidjan)
Ethiopia	<ol style="list-style-type: none"> 1. Support to piloting of standards for services for OVC affected by HIV and activities to improve quality of OVC services (Dire Dawa, Ethiopia); part of HCI work under the Africa Regional OVC Care that Counts Initiative 2. CHW demonstration collaborative involving 18 health posts and their surrounding communities in 2 districts of Oromia Region
Kenya	<ol style="list-style-type: none"> 1. Piloting of draft standards for OVC programs (7 districts in 4 provinces) 2. ANC/PMTCT integration demonstration collaborative (1 district) 3. Nutrition care in HIV demonstration collaborative (Nyanza Province)
Lesotho	<ol style="list-style-type: none"> 1. Improve quality of TB-HIV services (16 TB diagnostic centers)
Madagascar	<ol style="list-style-type: none"> 1. Assess the functionality of CHW programs (3 regions)
Malawi	<ol style="list-style-type: none"> 1. Improve quality of services for OVC as part of piloting of standards (4 districts) 2. Improve nutritional status of HIV patients (2 districts)
Mali	<ol style="list-style-type: none"> 1. Facility EONC demonstration collaborative (Keyes Province) 2. Community EONC demonstration collaborative (Keyes Province) 3. Postpartum family planning collaborative (Kayes Province) 4. Anemia prevention and control demonstration collaborative (Bougouni District, Sikasso Region) 5. Injection safety demonstration collaborative (Bamako and Sikasso regions)
Mozambique	<ol style="list-style-type: none"> 1. Piloting of draft OVC standards (3 provinces)

Country	Activity/Intervention
Namibia	<ol style="list-style-type: none"> 1. Improve injection safety and reduce unnecessary injections (nationwide) 2. Improve waste management through guidelines, training, waste management committees, reporting and supervision (nationwide) 3. Improve infection control through guidelines, training, infection prevention and control committees, reporting, and supervision (nationwide)
Niger	<ol style="list-style-type: none"> 1. Human resources management collaborative (Tahoua Region) 2. Pre-eclampsia/eclampsia case management collaborative (EONC Phase II) (6 regions)
Nigeria	<ol style="list-style-type: none"> 1. Piloting of standards for care for vulnerable children (12 states)
Senegal	<ol style="list-style-type: none"> 1. Community case management of childhood illness collaborative (2 districts)
South Africa	<ol style="list-style-type: none"> 1. District-based quality improvement support for PMTCT, palliative care, and TB-HIV services, HIV counseling and testing, and comprehensive ART care in five provinces (Eastern Cape, KwaZulu-Natal, Limpopo, Mpumalanga, and North West) 2. Support KwaZulu-Natal Province to improve the quality of family planning services
Swaziland	<ol style="list-style-type: none"> 1. Support to TB diagnostic units and hospitals to improve quality of TB services and TB-HIV co-infection case management
Tanzania	<ol style="list-style-type: none"> 1. Tanga Region ART-PMTCT partner collaborative 2. Morogoro Region ART-PMTCT partner collaborative 3. Mtwara Region ART-PMTCT partner collaborative 4. Lindi Region ART-PMTCT partner collaborative 5. Infant Feeding demonstration collaborative in Iringa 6. Piloting of home-based care standards and standard operating procedures in Tanga and Dodoma regions 7. Improving chronic care of patients with HIV through patient self-management in Morogoro Region (1 rural and 1 urban district) 8. Iringa Region infant feeding partner demonstration collaborative with EngenderHealth 9. Demonstration collaborative on most vulnerable children services in Bagamoyo District, Pwani Region 10. Human resources collaborative in Tandahimba District, Mtwara Region 11. Kilimanjaro Region PMTCT partner spread collaborative 12. District health management collaborative (Lindi Region) 13. Assuring infants and mothers get all PMTCT services (AIMGAPS) improvement activity (Iringa Region) 14. WHO PMTCT and infant feeding guidelines prototype (Njombe District, Iringa Region)

Country	Activity/Intervention
Uganda	<ol style="list-style-type: none"> 1. Support to demonstration, first wave spread and second wave spread sites in HIV/AIDS Quality of Care Initiative 2. District health management demonstration collaborative (39 districts) 3. Coverage demonstration collaborative 4. Retention demonstration collaborative 5. Clinical outcomes demonstration collaborative 6. Laboratory demonstration collaborative 7. Data management demonstration collaborative 8. Nutrition demonstration collaborative (29 districts) 9. Private sector demonstration collaborative 10. Palliative care demonstration collaborative (2 districts) 11. ART Framework spread collaborative (96 sites in 45 districts) 12. MNH facility demonstration collaborative, including introduction of Helping Babies Breathe (2 districts) 13. MNH community demonstration collaborative in 2 districts 14. Chronic care demonstration collaborative (Buikwe District) 15. Saving Mothers, Giving Life maternal and newborn care improvement intervention (2 districts) 16. Strengthen the performance of pharmaceutical human resources (3 districts) 17. Integrating family planning with ART and maternal-newborn health (MNH) services (1 district) 18. Community support for CHWs (1 district)
Zambia	<ol style="list-style-type: none"> 1. Support for the development of OVC standards
ASIA	
Afghanistan	<ol style="list-style-type: none"> 1. Maternal and newborn health facility demonstration collaborative (Balkh and Kunduz provinces) 2. Maternal and newborn health community demonstration collaborative (Balkh, Kunduz, Herat, Parwan, and Bamiyan provinces) 3. Maternity hospital demonstration collaborative (begun in 5 hospitals in Kabul Province, expanded to include 5 provincial hospitals and 2 private hospitals in Balkh, Parwan, Bamiyan, Wardak, Logar, and Herat provinces) 4. First wave spread of maternal and newborn health facility collaborative (Parwan, Bamiyan, and Herat provinces) 5. Second wave spread of maternal and newborn health facility collaborative (Saripul, Samangan, Wardak, and Logar provinces) 6. Postpartum family planning demonstration collaborative (5 hospitals in Kabul) 7. Hospital medical records system pilot (3 hospitals in Kabul) 8. Training and implementation support for Helping Babies Breathe
India	<ol style="list-style-type: none"> 1. Quality improvement coaching and training for facility providers of TB services and community-level communication and social mobilization (4 sub-districts of Rangareddy District, Andhra Pradesh State)
Indonesia	<ol style="list-style-type: none"> 1. Development of computer-based training on TB diagnosis and treatment 2. Evaluation of Indonesian accreditation program
Nepal	<ol style="list-style-type: none"> 1. Field test CHW AIM tool

Country	Activity/Intervention
Pakistan	1. Injection safety improvement intervention in 3 union councils of the city of Karachi in Sindh Province
Vietnam	1. TB case management and TB-HIV improvement collaborative (Thai Binh Province) 2. TB case management and TB-HIV improvement in 2 provinces (Nam Dinh and Hai Duong)
EUROPE AND EURASIA	
Albania	1. Assessment of MNH and NCD care practices for women of reproductive age
Armenia	1. Assessment of MNH and NCD care practices for women of reproductive age
Georgia	1. Assessment of MNH and NCD care practices for women of reproductive age 2. Imereti Region NCD demonstration collaborative with 21 sites 3. Improve access to and use of evidence-based medicine by Georgian physicians
Russia	1. HIV/AIDS treatment, care and support and TB-HIV co-infection case management spread collaborative (St. Petersburg) 2. Demonstration collaborative on social services for families affected by HIV (St. Petersburg) 3. Spread collaborative on social services for families affected by HIV (St. Petersburg) 4. Prevention of hypothermia and respiratory disorders among newborns demonstration collaborative (Tambov, Yaroslavl, and Kostroma oblasts) 5. Prevention of hypothermia and respiratory disorders among newborns spread collaborative (Kostroma, Yaroslavl, Ivanovo, Tambov, Tula, and Tver oblasts) 6. Breastfeeding promotion demonstration collaborative (Tambov, Yaroslavl, and Kostroma oblasts) 7. Breastfeeding spread collaborative (Ivanovo, Tula, Tambov, Ivanovo, and Kostroma oblasts) 8. Optimizing labor management collaborative (Tambov, Yaroslavl, and Kostroma oblasts) 9. Optimizing labor management spread collaborative (Kostroma, Yaroslavl, Ivanovo, Tambov, and Tula oblasts) 10. Prevention of unwanted pregnancies, abortion, and sexually transmitted diseases among teenagers demonstration collaborative (Tambov, Yaroslavl, and Kostroma oblasts) 11. Prevention of unwanted pregnancies, abortion, and sexually transmitted diseases among teenagers spread collaborative (Kostroma, Tambov, Ivanovo, and Tula oblasts) 12. Primary neonatal resuscitation demonstration collaborative (Tambov, Yaroslavl, Kostroma) 13. Primary neonatal resuscitation spread collaborative (Ivanovo, Tver, Tula, Tambov, Yaroslavl, and Kostroma oblasts) 14. Regionalization of perinatal care demonstration collaborative (Tambov, Kostroma, Tver, and Ivanovo oblasts) 15. Regionalization of perinatal care spread collaborative (Ivanovo, Tver, Tula, Tambov, Yaroslavl, and Kostroma oblasts) 16. Improvement in early detection of TB and TB treatment outcomes (Bryansk and Saratov oblasts) 17. Technical assistance to Leningrad Oblast for the organization of HIV care at the oblast and rayon levels 18. Technical assistance to Sverdlovsk Oblast for the organization of HIV care at the oblast and rayon levels 19. Assessment of MNH and NCD care practices for women of reproductive age
Ukraine	1. Implementation of brief physician intervention to reduce alcohol consumption and smoking among pregnant women (1 oblast)

Country	Activity/Intervention
LATIN AMERICA	
Bolivia	<ol style="list-style-type: none"> 1. TB DOTS spread collaborative (El Alto, La Paz Province) 2. TB DOTS spread collaborative (city of Cochabamba)
Ecuador	<ol style="list-style-type: none"> 1. Strengthen the institutionalization of a CQI system for essential obstetric care within the MOH structure in approximately 91 facilities in 12 (of 24) provincial MOH offices 2. Support the MOH in harvesting lessons from the EOC and Obstetric Complications collaboratives and organize their spread to the entire country 3. Support expanded application of “Humanization and Cultural Adaptation of Delivery Care” and complete manual on how to make delivery services more culturally acceptable 4. Carry out descriptive studies on institutionalization, spread, validity of self-assessment, and cultural adaptation of delivery care
El Salvador	<ol style="list-style-type: none"> 1. Support to the Ministry of Health to develop new quality standards and indicators 2. Support to the 28 national hospitals in monitoring quality indicators for 21 standards and implementing continuous quality improvement 3. Support for continuous quality improvement implementation at Salvadoran Social Security Institute facilities 4. Introduction of Kangaroo Mother Care programs at four national hospitals
Guatemala	<ol style="list-style-type: none"> 1. Basic Promotion of Essential Obstetric and Neonatal Care (ProCONE) spread collaborative (8 health areas) 2. Community ProCONE demonstration collaborative (22 districts of San Marcos Health Area) 3. Activities to improve the quality of services provided in Conditional Cash Transfer Program 4. Development of Quality Management System in the MOH for certification of management and clinical processes under ISO:9001, 2008 (nationwide and in San Marcos Health Area) 5. Complications ProCONE demonstration collaborative (9 health areas) 6. Training and implementation support for Helping Babies Breathe 7. Training and implementation for support for Kangaroo Mother Care (1 hospital) 8. Assist hospitals to achieve Baby Friendly Hospital certification 9. Promote essential nutrition actions (7 health areas)
Haiti	<ol style="list-style-type: none"> 1. Improve quality of services for orphans and vulnerable children as part of piloting of standards in 3 departments

Country	Activity/Intervention
Honduras	<ol style="list-style-type: none"> 1. Support for EONC continuous QI work in 11 regions, focusing on obstetrical and newborn complications 2. Support for pneumonia and diarrheal disease case management collaborative in the La Paz Health Region 3. Support for the Obstetric Referrals Demonstration Collaborative in the Comayagua Health Region 4. Support for improvement in the management of obstetrical complications at the hospital and ambulatory levels (5 USAID priority health regions) 5. Implement Helping Babies Breathe to reduce deaths due to newborn asphyxia (5 health regions) 6. Support the Secretariat of Health to develop a national quality system and policy
Nicaragua	<ol style="list-style-type: none"> 1. Humanization of delivery care intervention 2. HIV screening among high risk groups and those with STIs demonstration collaborative 3. Post-obstetric event family planning demonstration collaborative 4. Intervention to reduce infections related to use of catheters and mechanical ventilators 5. Spread collaborative on maternal and newborn complications (8 regions) 6. ART demonstration collaborative 7. Training and implementation support for Kangaroo Mother Care in Bertha Calderon National Hospital 8. Spread of better practices for voluntary counseling and testing, reducing stigma, and integration of HIV testing and counseling in treatment of sexually transmitted infections 9. Support for hospitals to achieve Mother and Baby Friendly certification 10. Infection prevention in neonatal and pediatric intensive care units (5 regions) 11. Improve diarrhea and pneumonia case management in children under five (continuous quality improvement intervention) (4 hospitals) 12. Support improvements in the offer of quality family planning services and contraceptive methods in 16 regions 13. Post-obstetric event family planning spread collaborative 14. Increase voluntary counseling and testing among TB patients (1 region)

Appendix B.

Improvement in targeted indicators

Table B1. HIV and AIDS: Improvement in targeted indicators

Indicators	Baseline	Achievement	Difference
AFRICA			
Cote d'Ivoire			
ART demonstration collaborative, 27 districts, 38 sites			
% patients with all items filled in the medical record	12% (July 2008)	83% (June 2011)	71
% of follow-up visits with CD4 test results recorded according to follow-up standards	49% (July 2008)	86% (Sept. 2010)	47
% HIV+ patients who did the initial check-up visit	92% (July 2008)	77% (Sept. 2010)	15
% HIV+ patients lost to follow-up (LTFU) during ART	27% (July 2008)	26% (June 2011)	1
% HIV+ patients LTFU before starting ART	47% (July 2008)	2711% (June 2011)	36
% eligible HIV+ patients who initiated ART treatment	41% (July 2008)	82% (Sept. 2010)	41
ART spread collaborative, 40 districts, 78 sites			
% patients with all items filled in the medical record	33% (June 2010)	80% (Sept. 2012)	47
% HIV+ patients who did the initial check-up visit	77% (June 2010)	80% (Sept. 2012)	3
% HIV+ patients LTFU during ART	16% (June 2010)	8% (Sept. 2012)	8
% HIV+ patients LTFU before starting ART	19% (Oct. 2010)	25% (Sept. 2012)	6
PMTCT demonstration collaborative, 40 districts, 34 sites			
% infants tested who had been born to HIV+ women	15% (Aug. 2008)	88% (June 2011)	73%
PMTCT spread collaborative, 40 districts, 62 sites			
% pregnant women counseled and tested on site	46% (March 2011)	98% (Sept. 2012)	52
% HIV+ women who received ART to reduce MTCT	68% (Jan. 2011)	87% (Sept. 2012)	19
% infants tested who had been born to HIV+ women	40% (June 2010)	62% (Sept. 2012)	22

Indicators	Baseline	Achievement	Difference
Mali			
Injection safety demonstration collaborative			
% adherence to infection control and injection safety standards at facility level	74% (125/170) (8 sites; June 2013)	92% (423/460) (23 sites; Nov. 2013)	18
% adherence to standards for waste management	71% (90/126) (8 sites; June 2013)	84% (271/322) (23 sites; Nov. 2013)	13
Namibia			
13 Regions			
% syringes and needles taken out of sterile package for each injection	76% (2005)	98% (2011)	22
% needle and syringe discarded without recapping	56% (2005)	99% (2011)	43
South Africa			
District-based quality improvement support for PMTCT, palliative care, and TB-HIV services, HIV counseling and testing, and comprehensive ART care (5 provinces)			
PMTCT			
HIV pre-test rate ANC clients (%)	91% (120 sites; Q2'07)	95% (320 sites; Q4'12)	4
HIV test rate among ANC clients (%)	86% (120 sites; Q2'07)	100% (320 sites; Q4'12)	14
CD4 count test rate among HIV+ ANC (%)	84% (196 sites; Q2'10)	99% (320 sites; Q4'12)	15
HIV counseling and testing (HCT)			
HIV testing rate (%)	91% (124 sites; Q2'07)	93% (320 sites; Q4'12)	2
HIV clients tested and received test results (%)	99% (124 sites; Q2'07)	100% (320 sites; Q4'12)	1
HIV and TB care and support			
Referral for TB screening rate among newly HIV-positive clients (%)	45% (198 sites; Q4'09)	90% (320 sites; Q4'12)	45
TB screening rate among new HIV-positive clients	76% (193 sites; Q2'10)	90% (320 sites; Q4'12)	14
Referral rate for CD4 test among TB & HIV+ patients (%)	84% (193 sites; Q2'10)	92% (320 sites; Q4'12)	8
ART			
% of eligible HIV-infected clients provided with ART	5% (12 sites; Q2'08)	85% (30 sites; Q4'12)	80

Indicators	Baseline	Achievement	Difference
Swaziland			
ART uptake among TB HIV co-infected patients	16% (296/1501) (65 diagnostic clinics; Q1 FY08)	64% (926/1879) (65 diagnostic clinics; Q4 FY12)	48
Tanzania			
ART-PMTCT collaborative (AIDS Relief), Tanga Region			
% of HIV-exposed infants under 18 months of age receiving Cotrimoxazole prophylaxis	0% (8 sites; Jan. 2008)	63% (8 sites; Sept. 2009)	63
% of patients started on ART within previous six months showing clinical improvement	45% (8 sites; Jan. 2008)	100% (8 sites; Sept. 2009)	55
ART-PMTCT collaborative (FHI), Morogoro Region			
% of HIV-exposed infants under 18 months of age receiving Cotrimoxazole prophylaxis	59% (11 sites; Oct. 2008)	92% (11 sites; Sept. 2009) (Sustained improvement by Sept. 2010: 99%)	33
ART-PMTCT collaborative (Clinton Foundation and EGPAF), Mtwara Region			
% of HIV+ pregnant mothers diagnosed at RCH clinics and labor wards enrolled in care and treatment center	82% (9 sites; June 2010)	86% (9 sites; Aug. 2010)	4
% of HIV-exposed infants under 18 months of age receiving Cotrimoxazole prophylaxis	8% (9 sites; June 2009)	20% (9 sites; Aug. 2010)	12
ART-PMTCT spread collaborative (Clinton Foundation and EGPAF), Lindi Region			
% HIV+ pregnant mothers diagnosed at RCH clinics and labor wards enrolled in care and treatment center (CTC)	60% (10 sites; May 2009)	79% (10 sites; Aug. 2011)	19
% HIV-exposed infants under 18 months of age receiving Cotrimoxazole prophylaxis	5% (10 sites; May 2009)	63% (10 sites; Aug. 2011)	58
% HIV positive patients on ART that are lost to follow up by the end of the month	17% (10 sites; June 2009)	12% (10 sites; Aug. 2011)	5
% patients from CTC receiving CD4 test once every 6 months	4% (10 sites; June 2009)	42% (10 sites; Aug. 2011)	38
% HIV-exposed infants tested by DNA PCR by two months of age	18% (10 sites; June 2009)	67% (10 sites; Aug. 2011)	49
PMTCT spread collaborative (EGPAF), Kilimanjaro Region			
% pregnant mothers booking at ANC at 14 weeks of gestation	9% (11 sites; May 2011)	29% (11 sites; Sept. 2012)	20
% women from ANC who bring partner in for HIV testing	16% (11 sites; May 2011)	20% (11 sites; Sept. 2012)	4
% HIV + pregnant women screened for TB at ANC in the month	0% (11 sites; May 2011)	88% (11 sites; Sept. 2012)	88

Indicators	Baseline	Achievement	Difference
% HIV + pregnant women counseled for FP at ANC in the month	13% (11 sites; May 2011)	85% (11 sites; Sept. 2012)	72
% HIV+ pregnant women assessed for eligibility using CD4 (at least once during current pregnancy)	74% (11 sites; May 2011)	79% (11 sites; Sept. 2012)	5
% HIV + pregnant women counseled for FP at CTC in the month	1% (11 sites; May 2011)	90% (11 sites; Sept. 2012)	89
% of mothers seen at RCH services practicing exclusive breast feeding	48% (11 sites; May 2011)	83% (11 sites; Sept. 2012)	35
% HIV-exposed infants who enrolled in PMTCT follow-up care	63% (11 sites; May 2011)	63% (11 sites; Sept. 2012)	0
% of HIV-exposed children below 18 months whose status has not been determined on prophylaxis	25% (11 sites; May 2011)	34% (11 sites; Sept. 2012)	9
% of HIV-exposed children receiving PCR results	63% (11 sites; May 2011)	57% (11 sites; Sept. 2012)	-6
Infant feeding collaborative (EngenderHealth, Clinton Foundation, EGPAF), Iringa Region			
% of mothers seen at RCH services practicing exclusive breastfeeding	42% (6 sites; Aug. 2010)	70% (6 sites; Sept. 2011)	28
% of HIV-infected women pregnant or lactating who receive infant feeding counseling by a trained counselor	6% (6 sites; Aug. 2010)	80% (6 sites; Sept. 2011)	74
AIMGAPS, Iringa Region			
% HIV-exposed infants receiving a confirmatory HIV test	8% (1/13) (5 sites; Jan. 2011)	79% (27/34) (8 sites; Feb. 2013)	71
% HIV-positive pregnant women started on or receiving ART (treatment) or ARV prophylaxis	43% (35/82) (11 sites; Jan. 2011)	90% (100/111) (9 sites; Feb. 2013)	47
% HIV-positive women initiating ARVs during pregnancy	43% (11 sites; Jan. 2011)	85% (11 sites; Feb. 2013)	42
% male partner testing for HIV at ANC	17% (11 sites; Jan. 2011)	31% (11 sites; Feb. 2013)	14
Uganda			
Coverage demonstration collaborative			
Number of clients started on ART	87% (7 sites; Oct. 2009)	35% (4 sites; Aug. 2010)	52
Retention demonstration collaborative, 8 districts			
Proportion of ART patients retained in care	82% (12 sites; Nov. 2009)	86% (12 sites; Aug. 2010)	4
Clinical outcomes demonstration collaborative, 7 districts			
% of ART clients seen in the month that have shown clinical improvement	83% (1 site; Jun. 2009)	95% (10 sites; Aug. 2010)	12

Indicators	Baseline	Achievement	Difference
% of patients with good clinical outcomes	83% (1 site; Jun. 2009)	95% (10 sites; Aug. 2010)	12
Data management collaborative, central-east Uganda			
Number of minutes to retrieve a patient's file	10.7 minutes (9 sites; Dec. 2009)	3.1 minutes (9 sites; Jul. 2010)	7.6 min
Palliative care demonstration collaborative, 2 districts			
% of clients who attended the HIV clinic asked about pain	30% (10 sites; July 2010)	94% (10 sites; Aug. 2011)	64
% of HIV-positive patients with pain whose pain was scored	74% (9 sites; July 2010)	89% (10 sites; Aug. 2011)	15
% of patients with pain who were prescribed pain medicines	75% (9 sites; July 2010)	83% (10 sites; Aug. 2011)	8
Private sector demonstration collaborative			
% of sites utilizing MOH tools for patient management	23% (13 sites; Oct. 2009)	85% (13 sites; Mar. 2010)	62
First wave spread collaborative in HIV/AIDS Quality of Care Initiative			
% of HIV+ patients seen in the clinic who are in general care and/or receiving ART who are assessed for active TB at every visit	45% (19 sites; May 2006)	96% (19 sites; Nov. 2007)	51
Second wave spread collaborative in HIV/AIDS Quality of Care Initiative			
% of HIV+ patients seen in the clinic who are in general care and/or receiving ART who are assessed for active TB at every visit	45% June 2007 (Mean number of sites reporting: 17)	99% Sept. 2008 (Mean number of sites reporting: 17)	54
ART coverage, retention, and outcomes spread collaborative			
% of clients on ART who pick up ARV drugs monthly	78% (26 sites; June 2011)	94% (1 site; Sept. 2012)	16
% of clients with good clinical outcomes	88% (34 sites; June 2011)	97% (3 sites; Sept. 2012)	9
ASIA			
Pakistan			
Injection safety improvement intervention, 3 union councils			
% injections observed being given with a sterile single-use syringe or needle	31% (4/13 observations) (May 2012)	100% (12/12) (Sept. 2013)	69
Medications drawn immediately prior to use	75% (9/12 facilities) (May 2013)	92% (11/12 facilities) (Sept. 2013)	17

Indicators	Baseline	Achievement	Difference
No needles are left in multi-dose vials	92% (11/12 facilities) (May 2013)	100% (12/12 facilities) (Sept. 2013)	8
Bottles of intravenous fluids are not used as a common source for multiple patients	83% (10/12 facilities) (May 2013)	100% (12/12 facilities) (Sept. 2013)	17
Vietnam			
TB-HIV collaborative/Thai Binh Province			
HIV counseling rate among new TB patients	27% (The provincial hospital of TB and 13 district hospitals; 2006)	92% (The provincial hospital of TB and 13 district hospitals; 2009)	65
Proportion of active TB screening among PLWHA who received TB screening	0% (Entire province; 2006)	84% (Entire province; 2009)	84
EUROPE AND EURASIA			
Russia			
Social services for families affected by HIV demonstration collaborative, St. Petersburg			
Number of HIV-infected mothers with children under three years old born to them, and HIV-infected pregnant women who received social support case management (cumulative by each year)	103 (2007)	1,130 (2008)	1,027
Social services for families affected by HIV spread collaborative, St. Petersburg			
Number of families affected by HIV-infection newly enrolled in the social services case management program	32 (9 districts; Sept. 2009)	61 (18 districts; Sept. 2010)	29
HIV/AIDS treatment, care, and support and TB-HIV co-infection case management spread collaborative, St. Petersburg			
Number of individuals tested for HIV	211,990 (2007)	336,025 (Dec. 2009)	124,035
Number of service outlets providing counseling and testing	51 (2007)	73 (Dec. 2009)	22
Number of service outlets providing screening for TB	123 provide palliative care; of them, 48 provide screening for TB (2007)	182 provide palliative care; of them, 73 provide screening for TB (Dec. 2009)	59
Number of patients enrolled on ART (cumulative by each year)	1,654 (2007)	3,241 (Dec. 2009)	1,587

Indicators	Baseline	Achievement	Difference
LATIN AMERICA			
Nicaragua			
HIV screening among high-risk groups and those with STIs			
% of patients with sexually transmitted infections who accepted counseling for HIV testing	17% (20 sites, 5 regions; May 2008)	55% (20 sites, 5 regions; Aug. 2009)	38
% of patients with sexually transmitted infections who accepted testing for HIV	9.6% (20 sites, 5 regions; May 2008)	34% (Aug. 2009)	24
% of expected patients who are retained in care and on ART	75.1% (5 sites; Oct. 2009)	78.5% (5 sites; Sept. 2010)	3.4
% of ART patients retained in who show good clinical status improved	90% (5 sites; Sept. 2009)	98% (5 sites; Sept. 2010)	8
% of TB patients tested for HIV	50% (4 sites; Feb. 2010)	92% (4 sites; Sept. 2011)	42

Table B2. Maternal, newborn, and child health: Improvement in targeted indicators

Indicators	Baseline	Achievement	Difference
AFRICA			
Benin			
Essential obstetric and newborn care (EONC) collaborative, Aplahoue-Dogbo-Djakotome District			
% of delivered women counseled at every ANC visit	0% (10 sites; Jan. 2008)	61% (10 sites; June 2008)	61
% of babies with a temperature >36.5C	10% (9 sites; Jan. 2007)	92% (9 sites; May 2008)	82
Kenya			
Antenatal care-PMTCT collaborative, Kwale District			
% of pregnant women completing four antenatal visits	26% (21 sites; Jan. 2011)	57% (283/496) (21 sites; Aug. 2012)	31
% of pregnant women with first ANC visit at <16 weeks of gestation	6% (21 sites; Jan. 2011)	19% (94/496) (21 sites; Aug. 2012)	13
% of health facility deliveries	23% (21 sites; Jan. 2011)	51% (2810/5510) (21 sites; Aug. 2012)	28
% of pregnant women receiving three months supply of iron supplements	23% (21 sites; Jan. 2011)	98% (1458/1488) (21 sites; Aug. 2012)	75
% of pregnant women receiving three months supply of folate supplements	49% (21 sites; Jan. 2011)	98% (1458/1488) (21 sites; Aug. 2012)	49
% of pregnant women whose blood pressure was documented	32% (21 sites; Jan. 2011)	100% (1479/1479) (21 sites; Aug. 2012)	68

Indicators	Baseline	Achievement	Difference
% of pregnant women whose hemoglobin level was documented	34% (21 sites; Jan. 2011)	68% (1011/1489) (21 sites; Aug. 2012)	34
% of pregnant women whose blood group was documented	29% (21 sites; Jan. 2011)	64% (954/1419) (21 sites; Aug. 2012)	35
% of pregnant women with first ANC visit at <16 weeks of gestation	6% (21 sites; Jan. 2011)	19% (94/496) (21 sites; Aug. 2012)	13
% of health facility deliveries	23% (21 sites; Jan. 2011)	51% (2810/5510) (21 sites; Aug. 2012)	28
% of pregnant women receiving three months supply of iron supplements	23% (21 sites; Jan. 2011)	98% (1458/1488) (21 sites; Aug. 2012)	75

Mali

Community maternal and newborn health collaborative, Diema District

% births covered by AMTSL	22% (41 sites; Nov. 2009)	99% (41 sites; May 2011) (Sustained improvement by Sept. 2011: 100%)	77
% compliance to essential newborn care norms	40% (41 sites; Nov. 2009)	96% (41 sites; May 2010) (Sustained improvement by Sept. 2011: 100%)	56

EONC facility collaborative, Diema and Kayes districts, Kayes Region

% of deliveries with AMTSL	48% (17 sites; Nov. 2009)	100% (64 sites; April 2013)	52
% of newborns (NB) receiving correct immediate NB care	56% (17 sites; Nov. 2009)	100% (64 sites; April 2013)	44
% compliance to PE/E diagnostic standards	30% (17 sites; Nov. 2009)	85% (64 sites; April 2013)	55
% compliance to PE/E treatment standards	41% (17 sites; Nov. 2009)	85% (64 sites; April 2013)	44

EONC facility collaborative (scale-up), Bafoulabé, Nioro and Yelimané districts, Kayes Region

% of deliveries with AMTSL	16% (85 facilities; Oct. 2012)	85% (85 facilities; Apr. 2013)	69
% of NB receiving correct immediate NB care	48% (85 facilities; Oct. 2012)	81% (85 facilities; Apr. 2013)	33
% compliance to mothers' surveillance norms	10% (85 facilities; Oct. 2012)	80% (85 facilities; Apr. 2013)	70

Indicators	Baseline	Achievement	Difference
% compliance to newborn surveillance norms	68% (85 facilities; Oct. 2012)	89% (85 facilities; Apr. 2013)	21
Anemia prevention and control demonstration collaborative, Bougouni District, Sikasso Region			
% of pregnant women for whom conjunctivitis, pallor, and hemoglobin were checked and documented	37% (10 facilities; Dec. 2012)	45% (13 facilities; Apr. 2013)	8
% of women 4-8 months pregnant who received iron, folic acid, sulfadoxine/pyrimethamine, and deworming	48% (10 facilities; Dec. 2012)	58% (13 facilities; Apr. 2013)	10
% of children under 5 for whom pallor was checked and documented during curative care	0% (10 facilities; Dec. 2012)	26% (13 facilities; Apr. 2013)	26
Niger			
EONC pre-eclampsia collaborative* (6 regions)			
% of pre-eclampsia/eclampsia case management standards achieved	31.4% (31 sites; Dec. 2007)	80.7% (15 sites; Oct. 2008)	49.3
Senegal			
Community case management of childhood illness demonstration collaborative, Mbour and Tivaouane districts			
% of children aged 0-5 years with malaria/diarrhea/acute respiratory infection (ARI) seen within 24 hours by the CHW	28% (18/64) (Oct. 2010)	97% (62/64) (May 2011)	89
% of children aged 0-5 years with uncomplicated malaria/simple diarrhea/simple ARI that received the appropriate treatment	98% (259/263) (Oct. 2010)	100% (69/69) (May 2011)	2
% of case management criteria met for all 3 diseases (malaria, diarrhea, ARI) in children 0-5	56% (570/1014) (Oct. 2010)	99% (333/337) (May 2011)	43
% of cases of malaria, diarrhea, ARI seen by CHWs with signs of severity that have been referred to the health post	100% (4/4) (Oct. 2010)	62% (8/13) (May 2011)	38
Uganda			
Maternal-newborn care facility collaborative, Masaka and Luwero districts			
% of deliveries where AMTSL was applied	10% (88/865) (Dec. 2010)	95% (1151/1208) (Aug. 2012)	85
% of newborns who receive ENC	11% (207/1013) (Dec. 2010)	86% (1254/1457) (Aug. 2012)	75
% of newborns breastfed within one hour of birth	17% (168/1013) (Dec. 2010)	88% (1084/1233) (Aug. 2012)	71
% of newborns who have been examined by skilled attendant at 2-3 and 4-7 days post-partum	0.7% (7/998) (Dec. 2010)	25% (365/1437) (Aug. 2012)	24

Indicators	Baseline	Achievement	Difference
% of newborn care providers who can correctly perform newborn resuscitation	28% (36/137) (Baseline: June 2011)	89% (138/155) (Aug. 2012)	61
Maternal and newborn care community collaborative, Masaka and Luwero districts			
% of mothers able to state at least three newborn danger signs	23% (8/35) (Oct. 2011)	100% (27/27) (Aug. 2012)	77
% of newborns who have been examined by skilled attendant at 2-3 after delivery	70% (38/54) (Oct. 2011)	100% (27/27) (Aug. 2012)	30
% of newborns who have been examined by skilled attendant at 4-7 days after delivery	59% (32/54) (Oct. 2011)	96% (26/27) (Aug. 2012)	37
ASIA			
Afghanistan			
Maternity hospital collaborative¹			
% partographs completed	34%	88%	54
% mothers who were monitored post-partum	22%	74%	52
% compliance with essential newborn care standards	53%	89%	36
% births in which newborns put to the breast within 1 hour after birth	32%	93%	61
% births for which 3 AMTSL elements performed	36%	99%	63
% compliance with resuscitation standards	64%	83%	19
% mothers able to cite 2+ maternal and newborn danger signs	64%	84%	20
% of newborns examined by skilled provider before discharge	21%	31%	10
Community maternal and newborn health collaborative¹			
% pregnant women within the catchment area of a health post who received an antenatal visit from a community health worker	24%	79%	55
% of pregnant women referred for tetanus toxoid (TT) vaccine by CHWs	3%	28%	25
% pregnant women who went to a health facility after they were referred for antenatal care by CHWs	24%	23%	-1
% of total estimated number of pregnant women within the catchment area of a health post who are referred for routine delivery by CHWs	5%	33%	28

¹ The indicator values for the maternity hospital and community maternal and newborn health collaborative were calculated by taking the average of the first (baseline) and last (end line) values for each individual facility to account for different starting dates. Overall, the hospital collaborative ran from April 2010-Mar. 2013 with some facilities joining as late as Dec. 2011 (in Wardak and Logar provinces). The provincial facilities stopped reporting data in December 2012, before the Kabul facilities. Overall, the community collaborative ran between the following dates in these six provinces: Balkh: Dec. 2010-Dec. 2012; Bamyan: May 2011-Nov. 2012; Herat: Feb. 2011-Aug. 2012; Kunduz: Dec. 2010-Dec 2011; Parwan: May 2011-Oct. 2012, with some facilities starting reporting later than others.

Indicators	Baseline	Achievement	Difference
% expected number of pregnant women provided with a postnatal visit by a CHW within 48 hours after delivery	54%	55%	1
% pregnant women who went to a health facility after they were referred for postnatal care by CHWs	22%	20%	-2
% of married couples who were provided birth spacing counseling and methods by CHWs	9%	24%	15
% of obstetric complications reached to health facilities after they were referred by CHWs	27%	16%	-9
% pregnant women who are referred to the health facility by a CHW whose births are attended by a skilled birth attendant in the health facility	24%	17%	-7
Facility maternal and newborn health demonstration collaborative, Balkh and Kunduz provinces			
% vaginal deliveries for which a partogram was completed	17% (29 sites; Jun. 2009)	99% (29 sites; Dec. 2012)	82
% deliveries in catchment areas attended by a skilled birth attendant	21% (29 sites; Apr. 2009)	47% (Dec. 2012)	14
% vaginal births for which 3 AMTSL elements were performed	46% (29 sites; Jun. 2009)	99% (29 sites; Dec. 2012)	53
% compliance with ENC standards	52% (29 sites; Jun. 2009)	99% (29 sites; Dec. 2012)	47
% compliance with postnatal care standards	2% (29 sites; Jun. 2009)	99% (29 sites; Dec. 2012)	97
Facility maternal and newborn health spread collaborative (Wave 1: Parwan, Bamiyan, Herat provinces, 26 sites); Wave 2: Saripul, Samangan, Wardak, and Logar provinces, 26 sites)			
% vaginal deliveries for which a partogram was completed	Wave 1: 24% (Apr. 2010) Wave 2: 15% (Feb. 2011)	Wave 1: 97% (Dec 2012) Wave 2: 100% (Dec. 2012)	Wave 1: 73 Wave 2: 85
% deliveries in catchment areas attended by a skilled birth attendant	Wave 1: 21% (Apr. 2010) Wave 2: 65% (Feb. 2011)	Wave 1: 40% (Dec. 2012) Wave 2: 62% (Dec. 2012)	Wave 1: 19 Wave 2: -3
% vaginal births for which 3 AMTSL elements were performed	Wave 1: 0% (Apr. 2010) Wave 2: 0% (Feb. 2011)	Wave 1: 99% (Dec. 2012) Wave 2: 10% (Dec. 2012)	Wave 1: 98 Wave 2: 10
% compliance with ENC standards	Wave 1: 0% (Apr. 2010) Wave 2: 0% (Feb. 2011)	Wave 1: 97% (Dec. 2012) Wave 2: 99% (Dec. 2012)	Wave 1: 97 Wave 2: 99

Indicators	Baseline	Achievement	Difference
% compliance with postnatal care standards	Wave 1: 26% (Aug. 2010) Wave 2: 19% (Apr. 2011)	Wave 1: 89% (Dec. 2012) Wave 2: 10% (Dec. 2012)	Wave 1: 63 Wave 2: -9
% vaginal deliveries for which a partogram was completed	Wave 1: 24% (Apr. 2010) Wave 2: 15% (Feb. 2011)	Wave 1: 97% (Dec 2012) Wave 2: 100% (Dec. 2012)	Wave 1: 73 Wave 2: 85
% deliveries in catchment areas attended by a skilled birth attendant	Wave 1: 21% (Apr. 2010) Wave 2: 65% (Feb. 2011)	Wave 1: 40% (Dec. 2012) Wave 2: 62% (Dec. 2012)	Wave 1: 19 Wave 2: -3
% vaginal births for which 3 AMTSL elements were performed	Wave 1: 0% (Apr. 2010) Wave 2: 0% (Feb. 2011)	Wave 1: 99% (Dec. 2012) Wave 2: 10% (Dec. 2012)	Wave 1: 98 Wave 2: 10
% compliance with ENC standards	Wave 1: 0% (Apr. 2010) Wave 2: 0% (Feb. 2011)	Wave 1: 97% (Dec. 2012) Wave 2: 99% (Dec. 2012)	Wave 1: 97 Wave 2: 99
% compliance with postnatal care standards	Wave 1: 26% (Aug. 2010) Wave 2: 19% (Apr. 2011)	Wave 1: 89% (Dec. 2012) Wave 2: 10% (Dec. 2012)	Wave 1: 63 Wave 2: -9

EUROPE AND EURASIA

Russia

Prevention of newborn hypothermia and respiratory disorders demonstration and spread collaboratives, Kostroma, Yaroslavl, Ivanova, Tambo, Tula, and Tver oblasts

% compliance with recommendation of mother-to-child skin-to-skin contact for 2 hours after birth among 33 hospitals	0% (median) (15 sites; Jan 2009)	74% (median) (8 sites; Sept 2011)	74
% newborns with T< 36.5 C	3.8% (median) (8 sites; Jan 2009)	0% (median) (6 sites; Sept 2011)	3.8
% hypothermia after transfer to ward	6.3% (median) (11 sites; Jan2009)	0% (6 sites; Sept 2011)	6.3

Breastfeeding promotion demonstration and spread collaborative, Ivanovo, Tula, Tambov, Ivanovo, and Kostroma oblasts

% babies exclusively breastfeed at discharge	51% (14 sites; Jan 2009)	96% (14 sites; Sept. 2011)	45
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Optimizing labor management through use of the partograph demonstration and spread collaborative, Kostroma, Yaroslavl, Ivanovo, Tambov, and Tula oblasts

Partograph completion rates among maternity hospitals as a percent of births begun vaginally	0% (median) (7 sites; Jan 2009)	100% (median) (3 sites; Sept 2011)	100
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Indicators	Baseline	Achievement	Difference
Prevention of unwanted pregnancies and STDs among teenagers demonstration and spread collaboratives, Tambov, Yaroslavl, Kostroma, Ivanovo, and Tula oblasts			
Uptake of contraception among teens counseled on reproductive health (Tambov City Family Planning Center)	27 (1 site; Jan 2009)	200 (1 site, June 2010)	173
% of abortion clients receiving post-abortion counseling on contraception (Luki City Hospital, Tambov)	51% (1 site; Q3 2009)	100% (1 site; Q1 2011)	49
Number of teen births per 1000 girls (ages 15-17)	8.9 (Kostroma Oblast; 2007)	9.4 (Kostroma Oblast; 2010)	-0.5
Number of abortions per 1000 girls (ages 15-17)	14 (Kostroma Oblast; 2007)	8.8 (Kostroma Oblast; 2010)	5.2
Primary neonatal resuscitation demonstration and spread collaboratives , Tambov, Yaroslavl, Kostroma, Ivanovo, Tver, and Tula oblasts			
Number of neonatal deaths from asphyxia and intrauterine hypoxia	19 (Kostroma Oblast; 2008)	9 (Kostroma Oblast; 2009) (Sustained improvement by 2010: 7)	10
% of newborns experiencing intrauterine hypoxia or asphyxia	Kostroma: 7.4% Tambov: 5.4% Yaroslavl: 1.0% (2009)	Kostroma: 5.9% Tambov: 4.2% Yaroslavl: 1.2% (2010)	1.5 1.2 -0.2
Compliance with neonatal resuscitation procedures: effect of introducing an audit at Tver Oblast Perinatal Center	4% (Dec 2009)	0.4% (August 2011)	3.6
Regionalization of perinatal care demonstration and spread collaboratives, Kostroma, Tambov, Yaroslavl, Tula, and Tver oblasts			
% of premature births from 22-27 weeks gestation taking place at level 1 maternity hospitals	Tver: 26% Tula: 9% Yaroslavl: 1% Tambov: Not available Kostroma: Not available (2009)	Tver: 19% Tula: 4% Yaroslavl: 0% Tambov: 8% Kostroma: 10% (2010)	Tver: -7 Tula: -5 Yaroslavl: -1
% of premature births from 28-33 weeks gestation taking place at level 1 maternity hospitals	Tver: 42% Tula: 5% Yaroslavl: Not available Kostroma: Not available (2009)	Tver: 17% Tula: 3% Yaroslavl: 1% Kostroma: 12% (2010)	Tver: -25 Tula: -2

Indicators	Baseline	Achievement	Difference
LATIN AMERICA			
Guatemala			
Complications ProCONE demonstration collaborative, 8 health areas			
% hospital compliance with case management for premature infants	10% (16 sites; Sept. 2009)	50% (8 sites; July 2010)	45
% compliance with case management standards for obstetric hemorrhage	4% (8 sites; Jan. 2010)	24% (8 sites; July 2010)	20
% compliance with case management standards for preeclampsia or eclampsia	2% (8 sites; Jan. 2010)	42% (8 sites; July 2010)	40
% compliance with standards for management of sepsis	5% (8 sites; Jan. 2010)	43% (8 sites; July 2010)	38
% compliance with standards for management of neonatal infections	7% (8 sites; Jan. 2010)	37% (8 sites; July 2010)	30
% compliance with case management standards for respiratory distress	21% (8 sites; Jan. 2010)	54% (8 sites; July 2010)	33
Basic EONC (ProCONE) spread collaborative, 16 districts in 8 health areas			
% use of partograph (normal deliveries)	16% (37 sites; Jan. 2009)	76% (75 sites; Jul. 2010)	60
% deliveries receiving active management of third stage of labor	37% (37 sites; Jan. 2009)	95% (75 sites; Jul. 2010)	58
% newborns receiving immediate postpartum care	33% (37 sites; Jan. 2009)	97% (12 municipalities; May 2012)	64
Community ProCONE spread collaborative, 16 health districts in 8 health areas			
% mothers who identified danger signs during pregnancy, delivery, and postpartum	27% (15 sites; Jan. 2010)	66% (15 sites; Aug. 2010)	39
% mothers who recognize neonatal danger signs	19% (15 sites Jan. 2010)	49% (15 sites; Aug. 2010)	30
% pregnant women with emergency plan	27% (15 sites Jan. 2010)	49% (15 sites; Aug. 2010)	22
Communities with community emergency plan	35% (15 sites; Jan 2010)	90% (15 sites; Aug. 2010)	55
Community ProCONE demonstration collaborative, 22 districts San Marco			
% mothers recognized danger signs during pregnancy, delivery, and postpartum	Group 1: 40% (14 sites; Jan 2008) Group 2: 8% (15 sites; June 2008)	Group 1: 85% (14 sites; Sept 2009) Group 2: 84% (15 sites; Sept 2009)	Group 1: 45 Group 2: 76

Indicators	Baseline	Achievement	Difference
Honduras			
Pneumonia and diarrheal disease case management collaborative (La Paz)			
% children who received treatment for pneumonia and were managed according to norms	73% (Jan. 2009)	100% (Sept. 2011)	27
% compliance with integrated management of childhood illness protocol	51% (Jan. 2009)	88% (March 2010)	37
Obstetric referral collaborative (Comayagua)			
% referrals sent to Santa Teresa Hospital of Comayagua for which a counter-referral for follow-up care was sent and received by the referring facility	5% (6 sites; Jan. 2010)	57% (6 sites; Sept. 2011)	52
Nicaragua			
Maternal and newborn complications spread collaborative, 9 hospitals and 29 health centers, 9 regions			
% of deliveries resulting in obstetric hemorrhage	1.9% (8 hospitals; Feb. 2009)	0.3% (8 hospitals; July 2010)	-1.6
% of live births with severe asphyxia	1.35% (8 hospitals; Feb. 2009)	0.3% (8 hospitals; July 2010)	-1.05

Table B3. Family planning: Improvement in targeted indicators

Indicators	Baseline	Achievement	Difference
Mali			
Post-partum FP demonstration collaborative, 2 districts, Kayes Region			
% of post-partum women who received FP counseling	1% (n=903 women who delivered at facility) (March 2011)	95% (n=1211 women who delivered at facility) (Oct. 2011)	94
% of post-partum women who accepted use of a modern FP method	14% (n=7 women who received PPFP counseling at facility) (March 2011)	94% (n=1153 women who received PPFP counseling at facility) (Oct. 2011)	80
% of post-partum women who leave the facility with a modern method of FP	Not enough data to calculate (n=1) (March 2011)	33% (n=354 women who accepted and left the facility with a modern FP method/ 1080 women who accepted a modern FP method) (Oct. 2011)	NA

Indicators	Baseline	Achievement	Difference
Uganda			
Integrate FP with ART services collaborative, 1 district			
% of HIV + women counseled in FP	29% (4 sites; Nov. 2011; n=106/368)	84% 4 sites (4 sites; Feb. 2013; n=960/1149)	55
% of HIV+ women received a modern method of FP before leaving the clinic	16% (4 sites; Nov. 2011; n=47/296)	60% (4 sites; Feb. 2013; n=592/893)	44
ASIA			
Afghanistan			
Post-partum FP demonstration collaborative			
% of post-partum women leaving hospitals with preferred method of FP	12% (5 sites; Jan. 2012; n=180/1497)	95% (5 sites; May 2013; n=2153/2268)	83
EUROPE AND EURASIA			
Russia			
Prevention of unwanted pregnancies and STDs among teenagers, 3 oblasts			
Abortion rate per 1000 girls age 15-17	11.7 (per 1000 girls) (3 oblasts; 2009)	8.7 (per 1000 girls) (3 oblasts; 2010)	-3
Teen birth rate per 1000 girls age 15-17	11.1 (per 1000 girls) (Kostroma oblast; 2009)	9.4 (per 1000 girls) (Kostroma Oblast; 2010)	-1.8
LATIN AMERICA			
Nicaragua			
Post-obstetric event family planning demonstration collaborative, 7 regions			
% of women discharged after delivery with a contraceptive method	71% Jan. 2009 (23 sites)	85% Sept. 2009 (23 sites)	14
Post-obstetric event family planning spread collaborative, 18 regions			
% providers who used medical eligibility criteria to guide informed choice of FP method	78% (91 sites; Jan. 2009)	92% (91 sites; June 2010)	14
% post-partum women who accept IUD	1.3% (46 sites; Jan. 2009)	4.1% (46 sites; June 2010)	2.8

Table B4. Health workforce development: Improvement in targeted indicators

Indicators	Baseline	Achievement	Difference
AFRICA			
Niger			
Human resources management collaborative			
Contraceptive prevalence	10% (20 sites, Mar. 2009)	26% (20 sites; July 2010)	16
Have job descriptions (indicator addressed in the first cycle of improvement activities)	8% (20 sites; Mar. 2009)	98% (20 sites; Nov. 2011)	90
Worker engagement	3.2 (scale of 0-5) (n=153) (20 sites; March 2009)	3.9 (n=90) (20 sites; Nov. 2011)	0.7
Productivity	Physicians 73% Midwives 63% Nurses 44% (20 sites; Mar. 2009)	64% 46% 44% (20 sites; Nov. 2011)	-9 -17 0
Assisted deliveries by qualified personnel	12% (20 sites; Mar. 2009)	30% (20 sites; Jul. 2010)	18
Uganda			
Strengthen performance of pharmaceutical human resources, 3 districts			
% clients with good adherence to ART	72% (14 facilities, April 2012)	89% (14 facilities, Sept. 2013)	17
District health management collaborative			
Proportion of districts documenting improvements using a journal	13% (39 districts; FY09)	92% (39 districts; FY09)	79
Proportion of districts conducting independent coaching visits	31% (39 districts; FY09)	95% (39 districts; FY09)	64
Tanzania			
HR collaborative, Tandahimba District, Mtwara Region			
% HIV clients assessed for active TB at every visit	35% (12 sites; July 2010)	93% (12 sites; Feb. 2012)	58
% HIV-exposed children under 18 months receiving daily Cotrimoxazole prophylaxis	13% (12 sites; July 2010)	100% (12 sites; Feb. 2012)	87
%pregnant women tested positive for HIV and enrolled in care	80% (12 sites; July 2010)	100% (12 sites; July 2010)	20
# of workers with job descriptions	2 (12 sites; July 2010)	57 (12 sites; July 2010)	55

Indicators	Baseline	Achievement	Difference
% staff highly motivated	67% (12 sites; July 2010)	88% (12 sites; July 2010)	21
District health management, Lindi Region			
% of facilities that submitted supply orders on time to the CHMT	76% (March 2011)	96% (Sept. 2013)	20
% of district level reports that were processed and submitted to the region within two weeks of receipt from the facilities	71% (March 2011)	91% (Sept. 2013)	30
% of supply orders which were processed by the CHMT within two weeks of receipt and sent to the RHMT	91% (March 2011)	98% (Sept. 2013)	7
% of management team members that have clear and rationalized job descriptions	0% (March 2011)	100% (Sept. 2013)	100
% of newly recruited staff that received a technical orientation within two weeks of reporting	53% (March 2011)	69% (Sept. 2013)	16
% of newly recruited staff that are retained at 6 months	69% (March 2011)	97% (Sept. 2013)	28
% of CHMTs that have QI competencies (self-reported) according to an 11-point questionnaire.	0% (March 2011)	75% (Sept. 2013)	75
% of health facilities applying improvement approaches to improve quality of health services (out of 192 facilities)	3% (March 2011)	13% (Sept. 2013)	10
% of staff at district hospital that have undergone an annual performance appraisal	0% (March 2011)	55% (Sept. 2013)	55

Table B5. Orphans and vulnerable children: Improvement in targeted indicators

Indicators	Baseline	Achievement	Difference
Cote D'Ivoire			
Piloting draft standards for vulnerable children, 4 regions			
Percent of OVC care essential actions performed by NGOs	45% (June 2010)	97% (Dec 2010)	52
Kenya			
Piloting OVC service standards (Nyanza province, Westlands, Eastern province, North Eastern province, Kasarani, Starehe district)			
% of children scoring "fair" or "good" on select CSI indicators: Food security	42% (Maua Methodist, July 2010) 51% (Catholic Relief Services, Oct 2010)	100% (Maua Methodist, June 2011) 81% (Catholic Relief Services, Feb 2011)	Maua: 58 Catholic: 30
% of children scoring "fair" or "good" on select CSI indicators: Health care services	96% (Speak for the Child, Sept., 2010) 83% (SIMAHO APHIA Plus, Oct 2010)	97% (Speak for the Child; April 2011) 90% (SIMAHO APHIA Plus, May 2011)	Speak: 1 SIMAHO: 7
% of children scoring "fair" or "good" on select CSI indicators: Psychosocial support (emotional)	13% (HOPE Worldwide, Sept. 2010)	53% (HOPE Worldwide, June 2011)	40
% of children scoring "fair" or "good" on select CSI indicators: Psychosocial support (social)	6% (HOPE Worldwide, Sept. 2010)	73% (HOPE Worldwide, June 2011)	67
% of children scoring "fair" or "good" on select CSI indicators: Legal protection	42% (Maua Methodist, July 2010) 54% (Catholic Relief Services, Oct. 2010)	88% (Maua Methodist, June 2011) 90% (Catholic Relief Services, Feb. 2011)	Maua: 46 Catholic: 36
Tanzania			
Most vulnerable children demonstration collaborative, Bagamoyo District			
Key indicators being tracked	Baseline (May 2011) (n=25 sites)	February 2012 (n=25 sites)	
% of most vulnerable who get two or more meals a day	62	100	38
% of most vulnerable children ages 0-5 whose health cards/charts reflect normal growth for age	35	100	65

Indicators	Baseline	Achievement	Difference
% of most vulnerable children household living in secure, dry and adequate shelter	43	85	42
% of most vulnerable children who have birth certificates	6	44	38
% of MVC reported to be abused in last month	1	0	-1
% of most vulnerable children who are sleeping under insecticide treated mosquito nets	15	100	85
% of most vulnerable children who were sick and referred to a health facility	37	100	63
% of most vulnerable children in the program who are attending school regularly	76	98	22
% of MVC caregivers who are able to meet their households basic needs as a result of economic strengthening interventions	12	8	-4

Table B6. Community health: Improvement in targeted indicators

Indicators	Baseline	Achievement	Difference
AFRICA			
Ethiopia			
Community health worker (CHW) demonstration collaborative, 2 districts, 18 health posts, and surrounding communities			
% of pregnant women who received ANC services at health post	72% (Oct. 2011)	86% (June 2012)	14
% of pregnant women who received HIV test at health center	55% (Oct. 2011)	86% (June 2012)	31
Uganda			
Community support to CHWs by strengthening community health system			
Patients on ART identified as community system vs. village health teams alone	15 vs. 5 (June 2012)	257 vs. 135 (Sept. 2012)	242 vs. 130

Table B7. Non-communicable diseases: Improvement in targeted indicators

Indicators	Baseline	Achievement	Difference
AFRICA			
Tanzania			
Improving chronic care of patients with HIV through patient self-management (1 region)			
% of new ART patients with good adherence	82% (n=8) (Feb. 2011)	96% (n=10) (Aug. 2012)	14
% of new ART patients keeping appointments	76% (n=2) (Feb. 2011)	96% (n=9) (Aug. 2012)	20
% of patients attending HIV education sessions led by peer mentor	0% (n=6) (Feb. 2011)	87% (n=11) (Aug. 2012)	87
% who have confidence to self-manage	0% (n=4) (Feb. 2011)	80% (n=11) (Aug. 2012)	80
% of new ART patients with goals & action plans	0% (n=1) (Feb. 2011)	83% (n=11) (Aug. 2012)	83
Uganda			
Chronic care demonstration collaborative, Buikwe District			
% of patients with hypertension meeting their blood pressure targets (110/60- 140/90mmHg)	5% (15 sites; Feb. 2011)	66% (15 sites; Aug. 2011)	61
% of patients with diabetes that meet their fasting blood sugar targets (4-7.5mmol/L)	15% (6 sites; Feb. 2011)	74% (6 sites; Aug. 2011)	59
Number of patients with hypertension enrolled in care	136 (15 sites; Mar. 2011)	930 (15 sites; Aug. 2011)	794
Number of patients with diabetes enrolled in care	62 (6 sites; March 2011)	482 (6 sites; Aug. 2011)	420
EUROPE AND EURASIA			
Georgia			
NCD collaborative, Imereti Region			
Cardiovascular disease (CVD) risk-factor screening and modification	(March 2012) (average n=100 medical charts)	(May 2014) (average n=100 medical charts)	
Current updated list of chronic medications (or documentation of their absence)	0%	99%	99
Body mass index (BMI) documentation	6%	99%	93
Counseling on diet and physical activity during last 12 month	6%	100%	94
Smoking status documentation at last visit	1%	97%	96
Tobacco cessation intervention (counseling or medication) at last visit if smoker	—	100%	100

Indicators	Baseline	Achievement	Difference
Blood pressure measured at last visit	93%	100%	7
Antihypertension treatment prescribed/adjusted at last visit if hypertension	84%	100%	16
Cholesterol/lipid measurement during last 5 year if ≥ 1 CVD risk factor or diabetes, heart failure, myocardial infarction	9%	29%	20
10-year CVD risk calculated if two or more CVD risk factors	0%	100%	100
Primary prevention of CVD: ASA+antihypertensive+statin prescribed if CVD risk $\geq 20\%$ or diabetes	0%	100%	100
Secondary prevention of CVD: ASA, B-blocker, ACE-I/ARB, Statin prescribed if coronary artery disease	6%	100%	100
Acute coronary syndrome management	April 2012 (average n=50 medical charts)	May 2014 (average n=50 medical charts)	
Initial assessment			
Vital signs documented in 10 minutes at presentation	26%	93%	67
EKG and interpretation in 10 minutes at presentation	27%	100%	73
Cardiac enzymes measurement performed according to diagnosis	NA	83%	NA
Documentation of acute pre-hospitalization course	12%	69%	57
EKG tracking requirements fulfilled according to diagnosis	50%	86%	36
Severity of early risk documented	0%	0%	0
Initial treatment: MONA (all components documented)	2%	67%	65
Morphine (Use of adequate pain reliever)	54%	90%	36
Oxygenation (if pulseoxymetry < 95% or not measured)	16%	81%	65
Nitrate (or contraindication documented)	44%	76%	32
Aspirin (or contraindication documented)	80%	98%	18
On-going treatment			
Aspirin (or contraindication documented)	74%	95%	21
Beta-blocker (or contraindication documented)	36%	36%	0
ACE Inhibitor (or contraindication documented)	55%	62%	7
Thienopyridines (or contraindication documented)	38%	88%	50

Indicators	Baseline	Achievement	Difference
<i>Discharge planning and discharge</i>			
Lipids measured prior to discharge	NA	43%	NA
Screened for tobacco and received tobacco cessation intervention if smoker	-	36%	NA
Standard discharge form fully completed	0	24%	24
Discharged home with post-myocardial infarction high-impact treatment bundle	9%	12%	3
Controlled blood pressure at discharge	NA	98%	NA
<i>Ambulatory management practices of respiratory tract infections</i>	<i>April 2012 (average n=100 charts reviewed)</i>	<i>May 2014 (average n=100 charts reviewed)</i>	
% of medical charts of children diagnosed with acute RTI for whom diagnosis is supported by medical chart documentation	37%	100%	63
% of medical charts of children diagnosed with respiratory tract infection for whom vital signs recorded in medical record	60%	95%	35
% of medical charts of children treated with antibiotic for RTI for whom chart documentation supports antibiotic use	14%	100%	86
Average # of antibiotics prescribed for each child treated for RTI with an antibiotic	1.03	1	-0.03
% of medical charts of children treated with antibiotic for RTI for whom 1st line antibiotic is used	15%	100%	85
Average # of non-evidence-based medications prescribed per child treated for RTI	0.82	0	-0.82
Proportion of injectable medication in therapy of children treated for RTI in the past month	0	0.01	0.01
% of medical charts of children treated for RTI diagnosis for whom adequate follow up visit/contact is recorded in chart	30%	100%	70
% of medical charts of children evaluated for RTI referred to hospital if acute illness signs recorded in chart	67%	—	NA
% of medical charts of children treated for RTI diagnosis for whom recommendations, prescription with dosages and their duration documented in the chart	73%	91%	18
% of medical charts of children treated for pneumonia or asthma counseled for influenza vaccination within the past year	68%	82%	14

Indicators	Baseline	Achievement	Difference
<i>Compliance with best hospital management practices of respiratory tract infections (RTI) in children</i>	<i>(March 2012; n=40 charts average)</i>	<i>(May 2014; n=40 charts average)</i>	
% of charts of children hospitalized respiratory tract infection with diagnosis justified by chart documentation	49%	100%	51
% of charts of children hospitalized for RTI with vital signs (HR, RR, temp) documented	97%	100%	3
% of charts of children hospitalized for RTI administered oxygen if indicated (respiratory distress or low pulseoxymetry)	0	100%	100
% of antibiotic justification in of charts of children treated with antibiotics during RTI hospitalization	47%	100%	53
% of charts of children hospitalized for RTI treated with evidence-based first-line antibiotic (if antibiotics used)	32%	97%	65
Average # of antibiotics prescribed for each child treated with antibiotics during RTI hospitalization	1.37	1	-0.37
Average # of non-evidence-based medications prescribed per RTI hospitalization	5.95	0	-5.95
Average number of X-rays per child per RTI hospitalization	0.76	0.63	-0.13
% of charts of children hospitalized for RTI for whom unnecessary diagnostic tests ordered.	76%	3%	-73
% of charts with standard discharge form fully completed for children hospitalized for RTI	0	50%	50
<i>Compliance with best clinical practices in ambulatory management of asthma and COPD</i>	<i>Baseline (April 2012; n=10 charts average)</i>	<i>Achievement (May 2014; n=10 charts average)</i>	
% of charts of patients for asthma/COPD last month, with current updated list of regular medications	0	100%	100
% of charts of patients seen for asthma/COPD last month, with classification/severity status documented	50%	100%	50
% of charts of patients seen for asthma last month, for whom status of asthma control is recorded	0	100%	100
% of charts of patients seen for COPD last month for whom severity of disease is assessed according to validated questionnaire	0	100%	100
Average number of non-evidence-based medications	4.20	0	-4.20

Indicators	Baseline	Achievement	Difference
Treatment plan adjusted to severity/ control status	20%	100%	80
% of charts of patients seen for persistent asthma last month, for whom controller medication is prescribed	100%	100%	0
% of charts of patients seen for symptomatic COPD last month for whom LABA, anticholinergic or ICS is initiated	50%	100%	50
% of charts of patients seen for asthma/COPD last month, for whom risk factors (BMI, diet) is assessed and modification plan recorded	0	100%	100
% of charts of patients seen for asthma/COPD last month, for whom triggers (pets, viral infections, dust, smokers at home) is assessed and modification plan is recorded	0	100%	100
% of charts of patients seen for asthma/COPD last month, for whom smoking status is assessed and counseling/treatment provided	10%	100%	90
% of patients seen for asthma last month who report good control	0%	50%	50
<i>Ongoing compliance with best hospital management practices of asthma and COPD exacerbation</i>	<i>Baseline (April 2012; n=5 charts average)</i>	<i>Achievement (May 2014; n=5 charts average)</i>	
% of charts of patients discharged for asthma/ COPD last month, with HR, BP, RR, temp recorded at admission	50%	100%	50
% of charts of patients discharged for asthma/COPD last month, with pulseoxymetry measured at admission	0	100%	100
% of charts of patients discharged for asthma/COPD last month, for whom oxygen is given if indicated	50%	100%	50

Indicators	Baseline	Achievement	Difference
% of charts of patients discharged for asthma/COPD last month, with severity of respiratory status recorded	0	100%	100
Average number of non-EB medications in patients discharged for asthma/COPD last month	1	0.33	-0.67
% of charts of patients discharged for asthma/COPD last month, with oral steroid started at the day of admission	100%	100%	0
% of charts of patients discharged for asthma/COPD last month, for whom oxygen is given if indicated	50%	100%	50
Average number of nebulizer treatments during first two days of admission in patients discharged for asthma/COPD last month	0	8	8
% of charts of patients discharged for asthma/COPD last month, with spirometry results recorded	0	100%	100
% of charts of patients discharged for asthma/COPD last month, for whom smoking status is assessed and respective intervention performed	0	100%	100
% of charts of patients discharged for asthma/COPD last month, for whom bronchodilator was prescribed at discharge	0	67%	67
% of charts of patients discharged for asthma/COPD last month, for whom controller was prescribed at discharge	0	67%	67
% of charts of patients seen for asthma/COPD last month, with fully completed standard discharge form	0	0	0

Table B8. Nutrition assessment, counseling, and support: Improvement in targeted indicators

Indicators	Baseline	Achievement	Difference
Kenya			
Nutrition care in HIV collaborative, 1 county, Nyanza Province			
% of HIV-infected clients assessed for nutritional status and categorized accordingly	86% (8 sites, Sept. 2011)	100% (14 sites; Oct. 2012)	14
% of HIV-infected clients (or caregivers) severely or moderately malnourished who receive nutrition counseling	100% (8 sites, Sept. 2011)	100% (14 sites; Oct. 2012)	0
% of HIV-infected clients categorized as moderate acute malnutrition who receive supplementary feeding	0% (8 sites, Sept. 2011)	33% (14 sites; Oct. 2012)	33
% of malnourished HIV clients enrolled in RUTF who return for scheduled follow-up visits	0% (8 sites, Sept. 2011)	100% (14 sites; Oct. 2012)	100
% of malnourished HIV clients enrolled in supplementary feeding who return for scheduled follow-up visits	100% (8 sites, Sept. 2011)	87% (14 sites; Oct. 2012)	-13
% of the clients enrolled in RUTF who have been discharged to receive supplementary feeding	0% (8 sites, Sept. 2011)	0% (14 sites; Oct. 2012)	0
% of clients enrolled for supplementary feeding who have been discharged as cured	0% (8 sites, Sept. 2011)	20% (14 sites; Oct. 2012)	20
Malawi			
Improve nutritional status of HIV patients, 2 districts			
# of clients seen at HIV clinic	1100 (2 sites; Jan. 2013)	9622 (8 sites; Aug 2013)	8522
# (%) of clients whose nutrition was assessed and categorized	75 (7%) (2 sites; Jan 2013)	8637 (90%) (8 sites; Aug 2013)	83
Uganda			
Nutrition integration in HIV, demonstration collaborative			
% of clients whose nutritional status is assessed and categorized	34% (44 sites; Apr. 2009)	89% (44 sites; Aug. 2010)	55

Table B9. Tuberculosis: Improvement in targeted indicators

Indicators	Baseline	Achievement	Difference
AFRICA			
Lesotho			
% of TB patients tested for HIV	19% (1493/7775) (10 sites; 2006)	83% (2016/2435) (10 sites; Q3 2008)	64
Swaziland			
Treatment success rates	48% (national rate; Q1 FY08)	72% (national rate; Q4 FY12)	24
LATIN AMERICA			
Bolivia			
Tuberculosis spread collaborative, El Alto, La Paz			
% of essential TB drugs, equipment and supplies available at facilities	88% (47 sites; Apr-June 2009)	97% (47 sites; Apr-June 2011)	9
% of sputum samples that were unusable by the laboratory due to their poor quality	38% (47 sites; Jan. 2009)	27% (47 sites; Sept. 2011)	-11
% of pulmonary TB cases identified, as percentage of those expected	63% (47 sites; Jan. 2009)	44% (47 sites; Sept. 2011)	-19
Tuberculosis spread collaborative, Cochabamba City			
% of sputum samples that were unusable by the laboratory due to their poor quality	34% (29 sites; Sept. 2010)	19% (29 sites; Sept. 2011)	-15
% of pulmonary TB cases identified, as percentage of those expected	31% (29 sites; Sept. 2010)	37% (29 sites; Sept. 2011)	6
TB cure rate	50% (29 sites; Sept. 2010)	81% (29 sites; Sept. 2011)	31

Appendix C.

Scale and topics of demonstration and spread collaboratives supported by HCI

Table C1. Demonstration improvement collaboratives supported by HCI (T01 and T03)

Country	Demonstration collaborative topic	Time Period	Scale	Numbers of improvement teams
AFRICA				
Benin	Essential obstetric and newborn care (EONC)	FY08	1 of 34 districts; 10 facilities	10
Cote d'Ivoire	ART/PMTCT	FY10	27 of 83 districts; 41 facilities	41
	Pharmacy services for PLHIV	FY13	Abidjan; 13 pharmacies	13
Ethiopia	CHW performance	FY12	2 districts in Oromia Region; 18 health posts and surrounding communities	18
Kenya	Nutrition care in HIV	FY11-12	1 county in 1 of 8 provinces (Nyanza); 8 facilities	8
	Antenatal care-PMTCT	FY11-12	1 of 46 districts (Kwale); 21 facilities	21
Malawi	Improve nutritional status of HIV patients	FY13	2 of 28 districts; 8 facilities	8
Mali	Facility EONC	FY10-13	2 of 7 districts in 1 of 8 regions (Kayes); 41 facilities	41
	Community EONC	FY11-13	26 villages surrounding 4 of the 21 peripheral facilities in Diema district of Kayes Region	26
	Post-partum FP	FY11	2 of 7 districts in Kayes Region; 41 facilities	41
	Anemia prevention and control	FY12-13	1 of 7 districts (Bougouni) in 1 of 8 regions (Sikasso); 25 facilities	25
	Injection safety	FY13-14	2 of 8 regions (Sikasso, Bamako); 25 facilities	25
Niger	Pre-eclampsia/eclampsia case management (EONC Phase II)	FY08	6 of 7 regions; 32 facilities	32
	Human resources management	FY09-12	All 8 districts in 1 of 7 regions; 15 facilities	26 (11 regional and district management teams, 15 facility teams)

Country	Demonstration collaborative topic	Time Period	Scale	Numbers of improvement teams
Senegal	Community case management of childhood illness	FY11-12	2 of 45 districts; 29 health huts	29
Tanzania	ART/PMTCT (AIDS Relief, implementing partner)	FY08-12	1 of 24 mainland regions (Tanga); 8 facilities	8
	ART/PMTCT (FHI, implementing partner)	FY09-12	1 of 24 mainland regions (Morogoro); 11 facilities	11
	ART/PMTCT (Clinton Foundation and EGPAF, implementing partners)	FY09-12	1 of 24 mainland regions (Mtwara) 9 facilities	9
	Infant feeding (EngenderHealth, Clinton Foundation, and EGPAF, implementing partners)	FY10-12	1 of 24 mainland regions (Iringa); 6 facilities	6
	Most vulnerable children	FY11-12	1 of 169 districts (Bagamoyo, Pwani Region); 25 communities in 3 of Bagamoyo's 22 wards	25
	Human resources management	FY12	1 of 169 districts (Tandahimba, Mtwara Region); 12 facilities	12
	District health management	FY12-14	1 of 28 mainland regions (Lindi), Regional and all 6 Council Health Management Teams	7
Uganda	District health management	FY09-10	39 of 111 districts; 39 District Health Teams (supporting 183 facilities)	39
	Coverage	FY10	14 facilities	14
	Retention	FY10	14 facilities in 8 out of 80 districts	14
	Clinical outcomes	FY10	10 facilities in 7 out of 80 districts	10
	Laboratory	FY10	14 facilities in 12 out of 80 districts	14
	Data management	FY10	17 facilities in central-east Uganda	17
	Nutrition integration in HIV care	FY09-10	32 sites in 29 out of 80 districts	32
	Private sector	FY10	13 private sector facilities	13
	Facility maternal-newborn care	FY11-12	2 of 111 districts (Luwero and Masaka); 34 facilities	34
	Community maternal-newborn care	FY12	2 of 111 districts (Luwero and Masaka); 24 villages	24
	Palliative care	FY10-11	2 of 111 districts (Mayuge and Namutumba); 13 facilities	13
	Chronic care	FY11-12	1 of 111 districts (Buikwe); 15 of 32 health facilities in Buikwe	15
	Integrate FP with ART services	FY12-13	1 of 111 districts (Masaka); 4 sites	4

Country	Demonstration collaborative topic	Time Period	Scale	Numbers of improvement teams
Uganda continued	Strengthen the performance of pharmaceutical human resources	FY12	3 of 111 districts; 14 facilities	14
	Community support to CHWs	FY12-13	1 of 111 districts (Buikwe) with 10 out of 475 villages in the catchment area of Buikwe Hospital	10
ASIA				
Afghanistan	Facility maternal and newborn health	FY09-13	2 of 24 provinces (Balkh and Kunduz); 25 facilities	25
	Community maternal and newborn health	FY10-13	5 of 24 provinces (Balkh, Kunduz, Herat, Parwan, Bamyan); CHWs reporting to 275 health posts in the catchment areas of 17 health centers	17
	Maternity hospital	FY10-13	National and provincial hospitals in Kabul, Parwan, Bamyan, Logar, Wardak and Herat	15
	Post-partum FP	FY11-13	Kabul; 5 hospitals	5
Vietnam	TB case management and TB-HIV improvement collaborative	FY08-09	1 of 58 provinces (Thai Binh); all 8 districts; 1 provincial and 13 district hospitals	14
EUROPE AND EURASIA				
Georgia	Non-communicable diseases	FY12-14	1 of 9 regions (Imereti); 3 hospitals and 17 polyclinics and village practices	20
Russia	Social services for families affected by HIV	FY08-09	9 of 18 rayons of St. Petersburg	9
	Prevention of newborn hypothermia and respiratory disorder	FY09-11	3 of 46 oblasts (Tambov, Yaroslavl, Kostroma); 16 hospitals	16
	Breastfeeding promotion	FY09-11	3 of 46 oblasts (Tambov, Yaroslavl, Kostroma); 12 facilities	12
	Optimizing labor management using the partograph	FY09-11	3 of 46 oblasts (Tambov, Yaroslavl, Kostroma); 13 hospitals	13
	Prevention of unwanted pregnancies and STDs among teenagers	FY09-11	3 of 46 oblasts (Tambov, Yaroslavl, Kostroma); 9 facilities	9
	Primary neonatal resuscitation	FY09-11	3 of 46 oblasts (Tambov, Yaroslavl, Kostroma); 18 facilities	18

Country	Demonstration collaborative topic	Time Period	Scale	Numbers of improvement teams
Russia continued	Regionalization of perinatal care	FY09-11	3 of 46 oblasts (Kostroma, Tambov, Tver), 20 facilities (6 hospitals formed one team)	15
	Tuberculosis	FY12	3 districts in Saratov Oblast and 3 districts in Bryansk Oblast; 49 facilities	49
Ukraine	Implementation of brief physician intervention to reduce alcohol consumption and smoking among pregnant women	FY13-14	1 oblast (Poltava); 10 facilities	10
LATIN AMERICA				
Guatemala	Community EONC (ProCONE)	FY10	All 22 districts of San Marcos Health Area	22
	Complications EONC (ProCONE)	FY10-11	8 health areas; 16 hospitals reduced to 8 hospitals in June 2010	8
Honduras	Pneumonia and diarrheal disease case management	FY09-10	1 of 20 health regions (La Paz); 25 facilities	25
	Obstetric referrals	FY09-11	1 of 20 health regions (Comayagua); 6 facilities	6
Nicaragua	HIV screening among high risk groups and those with sexually transmitted infections	FY08-09	5 of 17 regions; 20 facilities	20
	Post-obstetric event family planning	FY09	7 of 17 regions; 23 facilities	23
	ART	FY09-10	5 of 17 regions; 5 facilities	5
TOTAL	59			1065

Table C2. Spread improvement collaboratives supported by HCI (T01 and T03)

Country	Spread collaborative topic	Time Period	Demonstration teams		Spread teams	
			Scale	No. of teams	Scale	No. of teams
AFRICA						
Cote d'Ivoire	ART/PMTCT	FY10-13	27 of 83 districts; 41 sites	41	40 of 83 districts; 80 facilities	80
Tanzania	ART-PMTCT (Clinton Foundation and EGPAF, implementing partners)	FY09-12	9 facilities (Mtwara Region)	10	Lindi Region; 10 facilities	10
	PMTCT (EGPAF, implementing partner)	FY09-12	9 facilities (Mtwara Region)	8 facilities	Kilimanjaro Region; 11 facilities	11
Uganda	First wave spread collaborative in HIV/AIDS Quality of Care Initiative	FY08	(Under QAP)	57 facilities	32 facilities	32
	Second wave spread collaborative in the HIV/AIDS Quality of Care Initiative	FY08	(Under QAP)	57 facilities	31 facilities	31
	ART coverage, retention and outcomes	FY11-12	(Separate FY10 collaboratives)	10-14 facilities per collaborative	49 districts; 96 facilities	96
ASIA						
Afghanistan	Facility maternal and newborn health	FY10-13	29 facilities (Balkh and Kunduz provinces)	29	Parwan, Bamiyan, Herat provinces; 27 facilities	27
	Facility maternal and newborn health	FY11-13	29 facilities (Balkh and Kunduz provinces)	29	Saripul, Samangan, Wardak, and Logar provinces; 28 facilities	28
EUROPE AND EURASIA						
Russia	HIV/AIDS treatment, care and support and TB-HIV co-infection case management	FY09-10	4 districts of St. Petersburg and the City AIDS Center (QAP)	5	All 18 municipal districts of St. Petersburg City	18
	Social services for families affected by HIV	FY09-10	9 districts of St. Petersburg	9	All 18 municipal districts of St. Petersburg City	18
	Prevention of hypothermia and respiratory disorders among newborns	FY11-12	16 sites in Kostroma, Tambov, and Yaroslavl oblasts	16	25 hospitals (Kostroma, Yaroslavl, Ivanovo, Tambov, Tula, and Tver oblasts)	25

Country	Spread collaborative topic	Time Period	Demonstration teams		Spread teams	
			Scale	No. of teams	Scale	No. of teams
Russia continued	Breastfeeding	FY11-12	12 hospitals in Kostroma, Tambov, and Yaroslavl	12	17 hospitals in Ivanovo, Tula, Tambov, Ivanovo, and Kostroma oblasts	17
	Optimizing labor management through use of the partograph	FY11-12	13 facilities Tambov, Yaroslavl, Kostroma	13	19 facilities (Kostroma, Yaroslavl, Ivanovo, Tambov, and Tula oblasts)	19
	Prevention of unwanted pregnancies, abortions, and sexually transmitted diseases among teenagers	FY11-12	9 facilities Tambov, Yaroslavl, Kostroma	9	10 facilities in Kostroma, Tambov, Ivanovo, and Tula oblasts	10
	Primary neonatal resuscitation	FY11-12	18 sites in Tambov, Yaroslavl and Kostroma oblasts	18	19 facilities in Ivanovo, Tver, Tula, Tambov, Yaroslavl, and Kostroma oblasts	19
	Regionalization of perinatal care	FY11-12	20 facilities in Kostroma, Tambov, and Tver oblasts	15	20 facilities in Ivanovo, Tver, Tula, Tambov, Yaroslavl, and Kostroma oblasts	15 (one team encompassed 6 facilities)
LATIN AMERICA						
Bolivia	Tuberculosis	FY09-12	39 facilities in 16 municipalities of 3 departments (QAP)		47 facilities (El Alto, La Paz Department)	47
	Tuberculosis	FY11-12	47 facilities in El Alto, La Paz Department		38 facilities (Cochabamba City)	38
Guatemala	Basic EONC (ProCONE)	FY09-11	11 districts of San Marcos Health Area (Calidad en Salud Project), 25 facilities	25	16 priority districts in 8 health areas, 143 facilities	143
	Community EONC (ProCONE)	FY10-FY12	22 districts of San Marcos Health Area	22	16 priority districts in 8 health areas, 120 prioritized communities	16
Nicaragua	Nicaragua maternal and newborn complications spread collaborative	FY09-FY10	17 national and regional hospitals (QAP)	17	9 hospitals and 29 health centers in 9 regions	38
	Post-obstetric event family planning collaborative	FY10	23 facilities in 7 regions	23	108 facilities in all 18 regions	108
TOTAL	22					846

Appendix D.

HCI research and evaluation studies

Country	Study
Institutionalization of modern QI approaches	
Ecuador	The Process of Institutionalizing Quality Improvement in the Public Health System in Ecuador: An Anecdotal Qualitative Assessment
Global	Institutionalization of Improvement in 15 HCI-supported Countries
	Qualitative study of institutionalization in 17 HCI-supported countries
Guatemala	Improving the Quality of Guatemala's Public Health System: A View to Institutionalization
Honduras	Institutionalization of better care practices and QI in demonstration and replication regions in Honduras
Nicaragua	Process and Level of Institutionalization Achieved in AMOCSA, a Private Health Care Entity in Chinandega, Nicaragua
Niger	How do quality improvement teams function after an improvement intervention ends? A description of team performance after the end of an obstetric and newborn QI initiative in Niger
	Sustaining Better Maternal and Newborn Care and Quality Improvement in Niger: Challenges and Successes
	Institutionalizing quality in 3 regions in Niger
Russia	Institutionalization of Quality Improvement Approaches and Results in Former USAID-assisted Regions in Russia
Design and implementation of improvement collaboratives	
Afghanistan	Qualitative Assessment of Community-based Services for Essential Obstetric and Newborn Care in Kunduz Province, Afghanistan
	Qualitative Assessment of Community-based Services for Essential Obstetric and Newborn Care in Balkh Province, Afghanistan
Benin	Task-shifting in MNC Counseling: Evaluation of the Quality and Impact of Counseling by Skilled and Unskilled Health Care Workers in Zou/Collines, Benin
Cote d'Ivoire	Assessing QI team performance in the HIV/AIDS service improvement collaborative in Cote d'Ivoire
	Assessment of HIV Quality of Care in Cote d'Ivoire
	Effects of participating in collaborative improvement on the quality of HIV/AIDS care in facilities in Cote d'Ivoire: a comparison of intervention and control sites
Ecuador	Humanization and Cultural Competence of Delivery Services in Ecuador
	Sustainable scale-up of active management of the third stage of labor for prevention of postpartum hemorrhage in Ecuador

Country	Study
Global	Evaluating Health Care Collaboratives: The Experience of the Quality Assurance Project
	Results of Collaborative Improvement: Effects on Health Outcomes and Compliance with Evidence-based Standards in 27 Applications in 12 Countries
	Field Testing of Learning System Tools: The Standard Evaluation System (SES) Team Documentation Journal, Team Synthesis Form, and Excel Results Databases
Guatemala	Quality Improvement Team Performance in Guatemala
Nicaragua	Shared learning among quality improvement teams in Nicaragua: Spread of better care practices in HIV/AIDS, family planning, obstetrics and pediatric care through collaborative learning
Russia	Sharing innovations across teams in an MNCH collaborative – effects of an interactive website in Russia
Tanzania	Partnership for Quality Improvement to Improve PMTCT and ART Services in Tanzania: Assessment of results, capacity and potential for institutionalization
Uganda	Health facility factors associated with improvements in the quality of HIV/AIDS care at health facilities in Uganda
Design and implementation of spread activities	
Afghanistan	Evaluating Spread of an MNCH Improvement Collaborative to Bamiyan, Herat and Parwan Provinces in Afghanistan
Bolivia	Evaluation of methods used to spread learning from the El Alto TB collaborative to new sites in Cochabamba
Cote d'Ivoire	Shared learning in collaborative improvement: spread of changes to improve PMTCT and ART services among QI teams in Cote d'Ivoire
Ecuador	Spreading evidence-based maternal and newborn care practices and continuous quality improvement in Ecuador: A temporal comparison
Global	Synthesis of learning on spread
Guatemala	How Proven Improvements are Adopted by Other Health Centers: A Study on the Spread of Best Practices for Maternal and Newborn Care in Guatemala
	Studying Spread of Best Practices for Maternal and Newborn Care from Health Centers to Health Posts in San Marcos
	The Spread of ProCONE: A Case Study from Guatemala
Mali	Evaluation of the spread of EONC best practices from Niger to Mali
Nicaragua	Expanding the learning: spread of innovations in MNCH to new teams
Tanzania	Evaluation of the Scale-up of the PMTCT Infant Feeding Counseling Training Program in Tanzania
	Spread of PMTCT and ART Better Care Practices through collaborative learning in Tanzania
Uganda	Comparison of Coaching Strategies for Improvement Collaboratives in Ugandan HIV/AIDS Health Centres
	Diffusion and adaptation of innovations to improve care for HIV/AIDS patients in 14 health facilities in Uganda
	Spread of better care practices to improve coverage, retention and outcomes of patients receiving ART care in resource-limited settings

Country	Study
Cost-effectiveness of QI (including studies on efficiency)	
Afghanistan	Cost-effectiveness analysis of improving the quality of care in maternity hospitals in Kabul, Afghanistan
	Kunduz household surveys 2010 – 2012
	Balkh household surveys 2010 – 2012
	How Accurate are Medical Record Data in Afghanistan's Maternal Health Facilities?
Cote d'Ivoire	Factors Associated with Loss to Follow-up Status among ART Patients in Cote d'Ivoire
	Impact and cost of an HIV/AIDS improvement intervention in Cote d'Ivoire
Ecuador	Effectiveness and economic analysis of improving maternal and newborn care in conditional cash transfer settings in Ecuador
	Cost implications of spread strategy
	Validity of quality performance indicator self-evaluation for maternal and newborn health in Ecuador
Georgia	Effectiveness and cost-effectiveness of improving hospital and ambulatory care for chronic diseases in Imereti Region, Georgia
Global	The 'how' and 'why' of cost-effectiveness analysis for care pathways
Guatemala	Evaluation of a Collaborative Approach and of ISO Certification to Improve Quality of Maternal-Neonatal Health Care Services in Guatemala: A Comparative Cost Analysis
	Analysis of Effectiveness and Cost-Effectiveness of Adding Quality Improvement Collaborative to a Conditional Cash Transfer Program in Guatemala
Kenya	Implementation of standards of service for orphans and vulnerable children in Kenya: A prospective evaluation of performance, costs, and equity
Mali	An evaluation and cost-effectiveness analysis of an improvement collaborative for eclampsia /pre-eclampsia services in Mali
Nicaragua	Cost-Effectiveness of a Pediatric Care Improvement Intervention in Nicaragua
	Cost-Effectiveness of a program to improve clinical quality and retention of HIV patients in three MINSA Hospitals
	Cost-Effectiveness of Implementing Kangaroo Care in Bertha Calderon Hospital, Managua
	Economic Analysis of a Pediatric Ventilator-Associated Pneumonia Prevention Initiative in Nicaragua
Niger	Cost-Effectiveness of Collaborative Improvement for Essential Obstetric and Newborn Care in Niger
	Validity of Quality Improvement Team Self-Assessment in Monitoring Maternal and Newborn Indicators in Niger—Comparison of data from external record review, observation and case-simulation
Tanzania	Baseline Assessment of HIV Service Provider Productivity and Efficiency in Tanzania
	Investigation of the Sequential Validity of QI Team Self-Assessments in a Health Facility HIV Improvement Collaborative in Tanzania
Uganda	An evaluation and cost-effectiveness analysis of an improvement collaborative for maternal and newborn care services.
	Cost-effectiveness analysis of the coverage collaborative
	Increasing efficiency in Ugandan HIV clinics through improved data management: an evaluation of a quality improvement intervention

Country	Study
Uganda	Validity of Self-Assessment Data
Other QI methodologies distinct from collaborative improvement	
Albania, Armenia, Georgia, and Russia	Assessment of selected maternal newborn care practices in women of reproductive age in the Europe and Eurasia Region
	Assessment of the non-communicable disease screening and care practices in women of reproductive age in the Europe and Eurasia Region
Guatemala	Documentation of the ISO 9001:2008 certification for administrative, financial, and clinical services in Guatemala: A Case Study
	Qualitative Study on ISO Certification in San Marcos
Kenya	Case Study on Piloting Standards in Kenya
Madagascar	Application of the Community Health Worker Assessment and Improvement Matrix (CHW AIM) in Madagascar
Malawi	HIV/AIDS quality of care assessment
Nicaragua	Impact of SBA competency improvement efforts on maternal mortality and management of obstetrical complications
	Post Partum Family Planning Intervention for At-Risk Women in Masay and Rivas, Nicaragua
Russia	Cost-effectiveness of an interactive website for sharing innovations across team in an MNCH collaborative in Russia
Tanzania	Effectiveness of PMTCT counselor training program in Tanzania
	Evaluation of the relationship between engagement, performance, and retention of health workers delivering HIV/AIDS services
	Evaluation of the effectiveness of QI training in implementation of MVC service standards
Uganda	A Rapid Evaluation of the Uganda MoH Training Program on the Use of HIV Patient Monitoring Tools
	Evaluation of a Ministry of Health ART Training Workshop in Uganda
	Assessment of quality of HIV/AIDS care in private-for-profit facilities in Uganda
	Experiences in Use of the Expert Patient in HIV/AIDS Services
	Task Shifting in HIV/AIDS Service Delivery: An Exploratory Study of Expert Patients in Uganda
Zambia	CHW Program Functionality Improvement, Performance and Engagement: Operations Research Results from Zambia
Other studies	
Namibia	Qualitative research on male circumcision in Namibia
Russia	Accessibility of ART in St. Petersburg and Orenburg City, Russia
	Perceptions of task-shifting related to care of HIV-positive patients in St. Petersburg, Russia
Tanzania	Cross-sectional examination of home-based care service delivery in Tanzania
Vietnam	Expanding TB-HIV integrated services in Thai Binh Province in Vietnam

Appendix E.

HCI peer-reviewed articles and technical and research reports

Articles Published in Peer-reviewed Journals

- Altaf A, Vaid S. 2013. The Sindh Disposable Syringe Act: Putting the act together. *J Pakistan Med Assoc* 63(11):1425-26.
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- Broughton EI, Gomez I, Nuñez O, Wong J. 2011. Cost-effectiveness of a pediatric care improvement intervention in Nicaragua. *Rev Panam Salud Publica* 30(5):453-60.
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