

Article

# The Ethiopia healthcare quality initiative: design and initial lessons learned

HEMA MAGGE<sup>1,2,3</sup>, ABIYOU KIFLIE<sup>1</sup>, KOJO NIMAKO<sup>4</sup>,  
KATHRYN BROOKS<sup>4</sup>, SODZI SODZI-TETTEY<sup>4</sup>,  
NNEKA MOBISSON-ETUK<sup>4,5</sup>, ZEWDIE MULISSA<sup>1</sup>,  
BEFIKADU BITEWULIGN<sup>1</sup>, MEHIRET ABATE<sup>1</sup>, ABERA BIADGO<sup>1</sup>,  
HAREGWENI ALEMU<sup>1</sup>, YAKOB SEMAN<sup>6</sup>, MUNIR KASSA<sup>6</sup>,  
PIERRE BARKER<sup>4,7</sup>, and DANIEL GEBREMICHAEL BURRSA<sup>6</sup>

<sup>1</sup>Institute for Healthcare Improvement, Addis Ababa, Ethiopia, <sup>2</sup>Division of Global Health Equity, Brigham and Women's Hospital, Boston, MA, USA, <sup>3</sup>Division of General Pediatrics, Boston Children's Hospital, Boston, MA, USA, <sup>4</sup>Institute for Healthcare Improvement, Boston, MA, USA, <sup>5</sup>Mdoc, Lagos, Nigeria, <sup>6</sup>Ethiopia Federal Ministry of Health, Addis Ababa, Ethiopia, and <sup>7</sup>University of North Carolina at Chapel Hill, Chapel Hill, NC, USA

Address reprint requests to: Hema Magge, Institute for Healthcare Improvement, Executive Director, Ethiopia, Division of Global Health Equity, Brigham and Women's Hospital, Division of General Pediatrics, Boston Children's Hospital. E-mail: hmagge@ihi.org

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## Abstract

**Objective:** To describe the development, implementation and initial outcomes of a national quality improvement (QI) intervention in Ethiopia.

**Design:** Retrospective descriptive study of initial prototype phase implementation outcomes.

**Setting:** All public facilities in one selected prototype district in each of four agrarian regions.

**Participants:** Facility QI teams composed of managers, healthcare workers and health extension workers.

**Interventions:** The Ethiopian Federal Ministry of Health (FMOH) and the Institute for Healthcare Improvement co-designed a three-pronged approach to accelerate health system improvement nationally, which included developing a national healthcare quality strategy (NHQS); building QI capability at all health system levels and introducing scalable district MNH QI collaboratives across four regions, involving healthcare providers and managers.

**Outcome measures:** Implementation outcomes including fidelity, acceptability, adoption and program effectiveness.

**Results:** The NHQS was launched in 2016 and governance structures were established at the federal, regional and sub-regional levels to oversee implementation. A total of 212 federal, regional and woreda managers have been trained in context-specific QI methods, and a national FMOH-owned in-service curriculum has been developed. Four prototype improvement collaboratives have been completed with high fidelity and acceptability. About 102 MNH change ideas were tested and a change package was developed with 83 successfully tested ideas.

**Conclusion:** The initial successes observed are attributable to the FMOH's commitment in implementing the initiative, the active engagement of all stakeholders and the district-wide approach utilized. Challenges included weak data systems and security concerns. The second phase—in 26 district-level collaboratives—is now underway.

**Key words:** quality improvement, health systems strengthening, large-scale improvement, maternal and newborn health

## Background

Despite great strides in reducing maternal and child mortality, there remains a high burden of deaths related to the quality of care mothers and newborns receive in low- and middle-income countries (LMICs) (1). Access improvement has not been accompanied by increase in quality; poor quality care is responsible for about 60 000 maternal and 660 000 neonatal deaths yearly in LMICs (2).

While effective interventions exist to treat the main causes of maternal and neonatal deaths in LMICs, effective implementation at scale remains a challenge (3–5). Common barriers cited include inadequate funding, lack of political will, insufficient human resources and poor community engagement (6,7). To address these barriers, a systems approach has been advocated, led by governments and engaging all levels of the health system, including patients (1).

Ethiopia has demonstrated strong commitment to improving maternal and child health and reducing maternal and under-5 mortality by 70% between 1990 and 2015 (8,9). However, maternal and neonatal mortality remain high at 412 deaths per 100 000 live births and 29 deaths per 1000 live births, respectively (8). These deficits are due to both utilization and quality issues; for example, only 32% of pregnant women complete at least four antenatal care (ANC) visits and less than half of mothers receive any clinical check-up after delivery (1,8). To address these needs, the Ethiopian Federal Ministry of Health (FMOH) declared quality and equity as a core pillar in its 2015 Health Sector Transformation Plan (HSTP) (10), to achieve improved health outcomes at scale.

The Ethiopian FMOH partnered with the Institute for Healthcare Improvement (IHI) to identify opportunities for improvement of healthcare quality in the country. Through this landscape analysis, bottlenecks to improving healthcare quality in Ethiopia were found to include inadequacies in access to care, data generation and use, excessive focus on quality assurance, oversight of quality improvement (QI) initiatives, communication across the levels of care, monitoring and evaluation, healthcare personnel skills development and poor coordination across initiatives (11). The FMOH and IHI thus co-designed the Ethiopia Health Care Quality Initiative (EHCQI) as an approach to accelerate health system improvement across the country.

## Methods

We designed a three-pronged, multi-level approach for the EHCQI (Fig. 1) that, anchored in the Juran Trilogy of quality planning, QI and quality control (12), was intended to ensure large-scale implementation and sustainability of effective QI efforts. The components of the initiative were as follows:

1. Development of a National Healthcare Quality Strategy (NHQS) to establish the vision and governance structures required to achieve a quality health system;
2. Building of QI capability at all levels of the health system (federal, regional, zonal, woreda/district, and health facility levels) to activate the newly developed quality governance structures and help institutionalize a culture of continuous QI in Ethiopia and
3. Design and implementation of maternal and newborn health (MNH) QI collaboratives to demonstrate the translation of the quality governance structures and capability-building efforts into improvements in quality in a priority focus area of the FMOH.

The MNH collaboratives were designed to improve the quality of routine antenatal, delivery and postnatal care; improve

management of leading causes of maternal and neonatal mortality and improve service utilization through stronger community engagement and referral networks. The collaborative design—an adaptation of IHI's Breakthrough Series model (13) and the Model for Improvement framework (14)—helps to generate ideas during collaborative learning sessions (intermittent face-to-face meeting of facility teams and leaders to learn QI methods, share results and experiences and plan implementation), some of which are subsequently tested and ultimately implemented in health facilities. We hypothesized that these improvements would reduce facility-based maternal and neonatal mortality by at least 30% over the 3-year implementation period.

With full national scale in mind from the outset, the FMOH chose the woreda (district) as the 'scalable unit' (a representative sub-unit of the health system targeted for full scale-up) (15) for the collaboratives. This unit includes a primary hospital, linked to referring nurse-led health centers and linked to Health Extension Worker (HEW)-staffed health posts, which serve as the front lines with communities.

## Phased design for scale

The approach was implemented in two phases—a 'prototype' phase and a 'test-of-scale (TOS)' phase—aligned with the Ethiopian health-care tier system and grounded in IHI's framework for large-scale change (15). A third phase (full scale) is being planned by the FMOH.

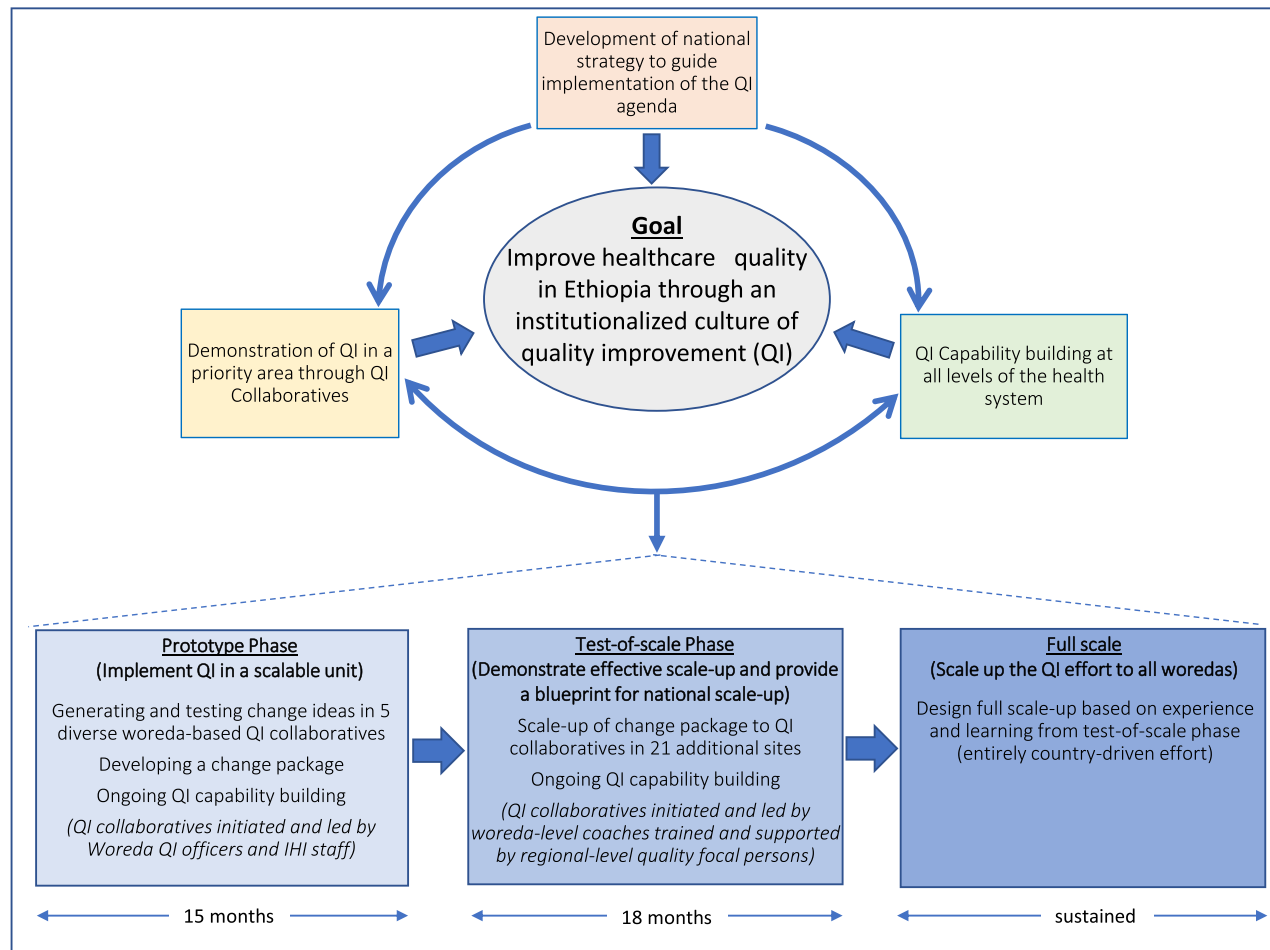
The objectives of the prototype phase were to understand the most successful implementation ideas for change and the health system attributes that influence the performance of the system. The output of the prototype phase was the development of a change package—a set of locally developed change ideas with measurable impact for improvement of MNH. There were five prototype collaboratives, selected in consultation with the FMOH and Regional Health Bureaus (RHBs), with one in each of four agrarian regions (Amhara; Oromia; Southern Nations, Nationalities and Peoples Region [SNNPR] and Tigray) and one in the pastoralist region of Afar. During the prototype phase, IHI Senior Project Officers, in partnership with the woreda health office, led the learning sessions and facility coaching visits. These officers were nurses or nurse midwives trained in QI and coaching techniques as part of their onboarding.

After refining the intervention approach during prototype and building will across the region, the project transitioned to the TOS phase, which aims to assess the effectiveness of the change package developed during the prototype phase in a much larger and more diverse set of woredas and to test the feasibility of the approach within the existing system. In this phase, learning sessions are integrated into woreda review meetings, facilitation and coaching are led by woreda-based coaching teams and QI capability building is led by RHB quality unit trainers.

Learnings from the prototype and TOS phases will inform the planned national scale-up, which will be entirely country-led.

## Woreda improvement collaborative design

**Collaborative structure and measures.** Prior to introduction, MNH—a priority area designated in the NHQS—was selected by the FMOH as the content focus, and representative collaborative core indicators were selected jointly by the program leadership (IHI and FMOH) based on evidence review, national priorities and available data, to be the focus of improvement activities (Table 1). 'Clinical bundles' (a small set of evidence-based interventions that have greater



**Figure 1** EHCQI design framework.

impact when implemented together (16,17)) of key evidence-based interventions around the time of delivery were introduced as quality measures to catalyze system improvement. At the direction of the FMOH, bundles were co-developed based on standard Ethiopian protocols and WHO Safe Childbirth Checklist (18), which was introduced as a tool during the collaboratives.

Each collaborative included 6–11 multidisciplinary teams from all facilities in a woreda, bringing together the referral system for a catchment population. Each team had 4–7 members, comprising facility managers, physicians, nurses, midwives, health data officers and HEWs.

**Launch activities.** At the initiation of each collaborative, woreda health officers and facility-level leadership were trained in QI processes, after which they conducted a baseline facility assessment to identify the gaps in MNH care delivery. From this assessment, action plans were developed with health facility managers to address core input gaps, including provision of clinical trainings in emergency obstetric and neonatal care. IHI also supported facilities to mobilize resources to close structural gaps such as water and electricity, mainly through data-based advocacy. Targeted financial support was provided by IHI when local resources were exhausted.

**Learning sessions and coaching.** Each prototype collaborative was about 15 months, with four 2- to 3-day learning sessions separated by three action periods (Fig. 2). Learning session participants

received financial support at local rates to cover transportation, accommodation and meals. In the first learning session, participants were trained in QI methodologies and the collaborative model. After identifying the key health system drivers of better performance using driver diagrams, and defining the core improvement collaborative indicators that would be the target of improvement, participants used their own facility baseline data to identify key MNH quality gaps. From this, aim statements were constructed and change ideas developed to achieve those aims. These ideas were tested and refined during action periods using Plan-Do-Study-Act (PDSA) cycles (14), with support provided by IHI project officers and woreda-level coaches during QI coaching visits. Change ideas that were determined to be effective, based on run chart rules (19) and qualitative feedback from QI teams, were included in a final change package (supplemental file).

Successes and challenges in implementing change ideas and clinical bundles were shared across teams during learning sessions. Patient-centered care, including respectful maternity care, defined as care that is ‘humane and dignified, and delivered with respect for women’s fundamental rights’ (20), was a core emphasis of learning sessions and QI projects. After building will for community engagement among healthcare workers, community members also attended the last learning session in the prototype phase, providing feedback on their priorities and experience of care, and the proposed change package. We combined clinical mentorship with QI coaching during action periods; coaches observed clinical processes and supported

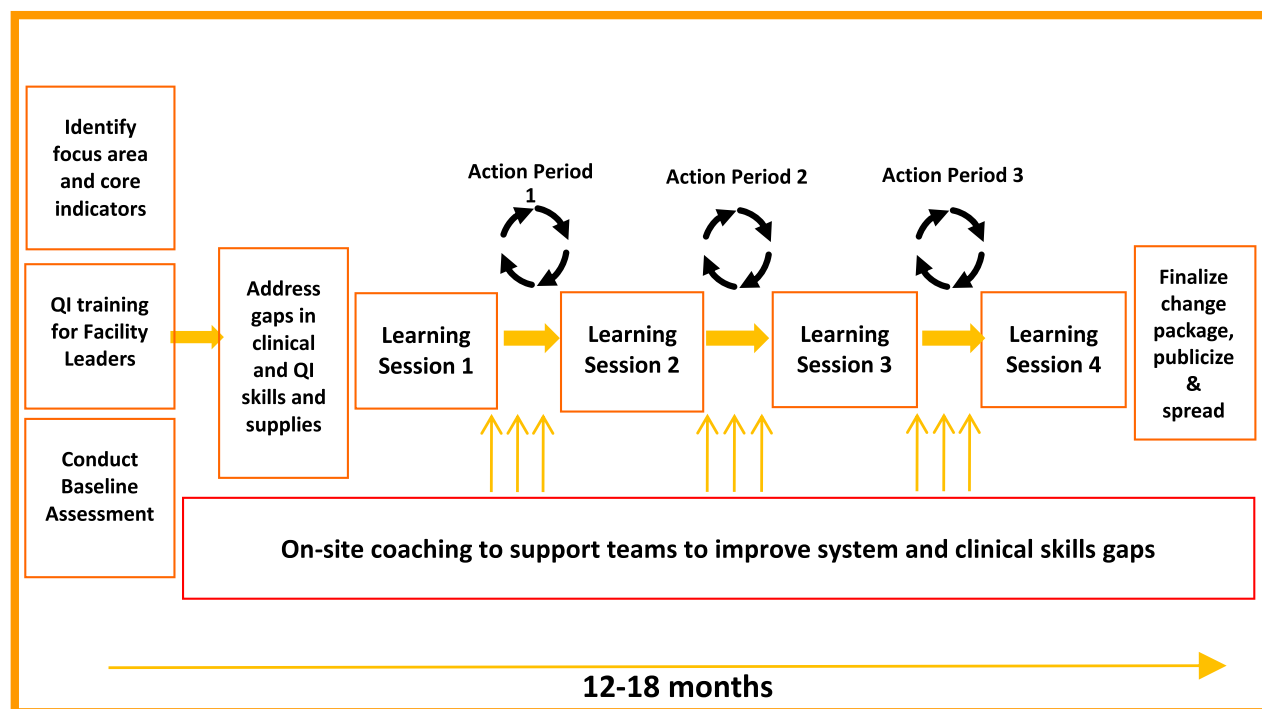
**Table 1.** Maternal and newborn health improvement collaborative core indicators

Process	Measure	Data source
Antenatal care (coverage)	ANC coverage—four visits	HMIS
Antenatal care (quality)	Percentage of pregnant women attending ANC clinics tested for syphilis	HMIS
Delivery management (coverage)	Proportion of births attended by skilled health personnel	HMIS
Delivery management (quality) <sup>1</sup>	Proportion of deliveries with 100% compliance to MNH labor ‘on admission’ clinical bundle	Chart review with checklist
Delivery management (quality) <sup>2</sup>	Proportion of deliveries with 100% compliance to MNH labor ‘before pushing’ clinical bundle	Chart review with checklist
Delivery management (quality) <sup>3</sup>	Proportion of deliveries with 100% compliance to MNH labor ‘just after birth’ clinical bundle	Chart review with checklist
Delivery management (quality-sick newborns)	Proportion of neonates treated for birth asphyxia	HMIS or Delivery register
Postnatal care (coverage)	Percentage of women who attended postnatal care 48 hours after delivery	HMIS
Postnatal care (quality-sick newborns)	Proportion of neonates treated for sepsis	HMIS or Delivery register
Postnatal care (quality-preterm/LBW)	Percentage of preterm or low birthweight infants put on KMC (facility)	Delivery register
	<b>Clinical outcome/impact</b>	
	Maternal mortality (facility-based)	HMIS
	Proportion of stillbirths of total births attended	HMIS
	Early neonatal mortality (facility-based)	HMIS

<sup>1</sup>Elements: Danger sign assessment, partograph initiated when cervical dilation at least 4 cm, availability of soap and water/alcohol hand rub and gloves, birth companion encouraged to be present during labor and at birth, mother’s privacy maintained during labor and delivery.

<sup>2</sup>Elements: Availability of gloves; soap/antiseptic and clean water; preparation of 10 IU IV/IM oxytocin in syringe; availability of two clean, dry, warm towels and suction device; availability of bag and mask (size 0 and 1); helper/assistant identified and informed for resuscitation.

<sup>3</sup>Elements: Newborn assessment, immediate skin-to-skin contact and initiate breastfeeding within the first hour, baby weighed and recorded, administer Vitamin K1, administer tetracycline eye ointment.

**Figure 2** Collaborative design.

patient care as needed and provided QI project coaching with data review. This integrated approach provided real-time clinical support and helped QI coaches understand facility-level systems better. By

reviewing data together and comparing reported data to source registers, coaches also addressed data quality through the coaching process.

## Measurement plan

Program delivery, facility QI activities, clinical processes targeted by QI and clinical outcomes were monitored and analyzed routinely through chart reviews and with data from the Health Management Information System (HMIS) (Table 1).

To verify the accuracy and completeness of HMIS data, project officers reviewed HMIS indicators against paper source registers, and the most valid data available were used to assess improvement. Clinical bundle measurements were validated through direct observation.

These indicators were analyzed at the facility and woreda levels and tracked over time on run charts and statistical process control charts. We describe the current state of program implementation, drawing on the implementation outcomes framework developed by Proctor and colleagues (21) for the MNH collaborative component, the confluence point of the quality strategy and capability-building efforts. Effectiveness was defined as achieving measurable impact in the targeted MNH outcome, represented by change ideas meeting criteria for inclusion in the MNH change package. All other outcomes were assessed qualitatively based on implementation experience.

A formal evaluation is being performed by an independent collaborator to rigorously evaluate the impact of the approach on the patient, provider/team and system levels, and results will be published separately.

## Results

### National healthcare quality strategy

The NHQS was developed by the FMOH with support from IHI at the beginning of the initiative, in March 2016. The NHQS identified four strategic focus areas: (i) developing an integrated approach to quality management, (ii) igniting consumer demand for quality, (iii) linking UHC strategy with the quality agenda and (iv) strengthening data systems and feedback (22). Implementation of the NHQS is underway with the leadership of the FMOH, including creating quality governance structures at all levels, building QI capability and convening annual QI summits to support a QI ‘movement’.

### Building QI capability

QI capability is being built through targeted trainings in essential QI methods and leadership for different cadres of healthcare providers and administrators across the multiple levels of the health system. To date, two intensive 10-month Improvement Advisor professional development programs have been held to provide high-level theoretical and practical training in QI for 33 FMOH and regional-level staff who will be leading QI management in Ethiopia after the project. In addition, the IHI QI Leadership and Management program was used more broadly to train 212 woreda, regional and national managers to lead and manage the QI work that was unfolding in the woredas. As champions—individuals who showed leadership and commitment to continuous QI—were developed, IHI worked together with the FMOH and partners to develop context-relevant and nationally owned QI trainer and participant manuals for Trainer-of-Trainers (TOT) and basic-level QI courses. IHI supported the first TOT with the FMOH in January 2018, which produced 24 federal- and RHB-level trainers. These trainers subsequently led the launch of the TOS collaboratives and provided basic QI training to 848 participants from TOS collaborative health facilities.

## MNH QI collaboratives

**Fidelity to implementation design.** Between October 2016 and September 2018, four prototype collaboratives were completed in Oromia, Tigray, SNNP and Amhara. A fifth has been underway in Afar region since March 2018. Overall, the program was implemented as designed, with a few adaptations. First, woreda selection for prototype collaboratives was initially intended to include three geographically distinct woredas (urban, agrarian and pastoralist) in one region. However, a recognition of contextual differences across regions caused us to change the approach to include one prototype collaborative per region across five regions.

Second, we expected to find a primary hospital and its referring facilities within one woreda. However, in two regions, the selected catchment area had a semi-urban woreda with its referral hospital situated within a separately administered woreda. We remained consistent with the design principle of structuring collaboratives along the referral system and worked with two woreda health offices in these cases.

Third, activities in Amhara region had to be delayed for 8 months due to regional security concerns. The prototype collaborative in the pastoralist Afar region was deliberately delayed until enough project experience had been gained in the agrarian communities.

**Adoption and effectiveness.** Participating facilities have been actively engaged in the collaboratives, with all facilities represented in every learning session. Thirty-five QI teams have, on average, met once per month and received 1.6 coaching visits each month, leading to the generation of 102 change ideas that were refined over the action periods using 826 PDSA cycles (Tables 2 and 3); 83 of these ideas were included in the final change package (supplemental file).

**Acceptability.** The FMOH’s leadership of the EHCQI design and implementation process, the leadership of the FMOH in developing QI training materials and the high levels of adoption of the quality planning approach and QI activities noted in Tables 2 and 3 demonstrate acceptability of the approach. Also, acceptability was demonstrated through the willingness of the FMOH to dedicate full-time employees to the improvement initiative. Acceptability will be more deeply assessed during the TOS, as the entirety of the execution of the QI activities is dependent upon the approach being acceptable to health system actors.

## Discussion

The design of the EHCQI built upon existing assets and initiatives in Ethiopia to create robust national and regional quality planning that guides district-level system improvement and strengthens quality control.

A critical factor in the successful implementation of the prototype phase has been the FMOH’s leadership of the design and implementation at all levels. The impetus for program design came from the FMOH in alignment with the Quality and Equity transformation agenda laid out in Ethiopia’s HSTP (10). Such high-level investment provides the ideal environment for program implementation as has been advocated since the early days of large-scale QI efforts (23).

We have also found that aligning collaborative design with the district-wide system from the start, as was done in a similar large-scale improvement initiative in Ghana (24), has been instrumental to the integration of the learning system into existing administrative structures. This not only brings facilities within a referral system



**Table 2.** Implementation results at the end of four prototype collaboratives

Measure	Result				
	Aggregate	Oromia	SNNPR	Amhara	Tigray
Facility support					
Monthly average number of coaching/mentoring visits received per QI team	1.6	1.2	1.8	1.3	2.1
Average duration of coaching visits per QI team per month (non-travel)	9 hours	8.39 hours	9 hours	5 hours	13.2 hours
Number of health providers trained in NICU	19	5	5	4	5
Number of health providers trained in helping babies survive	85	24	15	30	16
Number of health providers trained in B-EMONC	32	0 <sup>1</sup>	6	11	15
Capability building					
Number of managers trained in QI	50	18	8	17	7
Number of healthcare providers trained in QI	94	15	27	33	19
Average number of professionals per learning session	74	81	68	76	70
QI activities					
Average number of documented QI team meetings per QI team per month	1	1	1.2	0.84	0.83
Average number of active PDSAs per QI team per month	2.4	1.6	2.3	2.2	3.4
Total number of PDSA cycles over the prototype period	826	152	167	264	243
Total number of change ideas tested	102	30	21	32	19

<sup>1</sup>No staff trained as baseline assessment demonstrated no gaps in availability of trained clinical staff.

**Table 3.** Change ideas tested in the prototype phase

Antenatal care	ANC coverage – four visits	23	21
	Percentage of pregnant women tested for syphilis during ANC1	7	7
Delivery management	Proportion of births attended by skilled health personnel	16	6
	Proportion of deliveries with 100% compliance to ‘on admission’ bundle	12	12
	Proportion of deliveries with 100% compliance to ‘before pushing’ bundle	3	3
Postnatal care	Proportion of deliveries with 100% compliance to ‘soon after birth’ bundle	7	7
	Percentage of women who attended postnatal care 48 hours after delivery	11	8
	Percentage of preterm or low birth weight infants put on Kangaroo Mother Care (KMC)	16	14
	Percentage of neonates treated for sepsis	7	5
	<b>Total</b>	<b>102</b>	<b>83</b>

together to share ideas but also promotes local ownership and provides the best lens through which to analyze population health. For example, by using the woreda lens, it became clear early on that care for sick and small newborns was not accessible in many woredas. This has made establishing basic neonatal care services at primary hospitals a key technical focus for most woredas.

Finally, we found learning sessions to be an effective way to link health system actors directly with community members to advance patient-centered care. During the last prototype learning sessions, community members vetted the change package and helped set priorities for future improvement activities. Subsequently, in the TOS phase, community members were engaged in collaboratives from the first learning session. This involvement of the community in learning sessions is an extension of community engagement efforts that have taken place in previous similar large-scale QI initiatives (25).

We also learned from challenges. The program was introduced during a time of political change in Ethiopia, which slowed the implementation process. However, the health sector strategy remained

stable and enabled the work to largely proceed as designed. The deep engagement of the FMoH and incorporation of the QI strategy into central policy and planning were major guarantors of survival of the program during periods of instability and change. This could be relevant learning for countries or contexts undergoing frequent leadership transitions or staff turnover.

Data quality presented significant challenges for the initiative, a problem that has been experienced in similar large-scale QI initiatives (26,27). At baseline, the HMIS indicators designated to be used to benchmark improvement were found to be of poor quality, inflated or nonexistent. Once the extent was realized, we worked closely with woreda leadership to reframe the culture around data to one that values honest reporting for improvement and patient accountability. We have also begun working closely with federal officials overseeing HMIS to address data collection and reporting designs that affect data quality throughout the system. Data QI coinciding with real improvement would bias toward the null; therefore, effective ideas could be excluded from the change package.

Finally, we found that many facilities, while highly engaged in the QI process and activities, lacked basic infrastructure and supplies necessary for quality care, a common problem in resource-limited settings (28). However, the structure of the collaboratives, with open sharing of ideas during learning sessions, encouraged health workers to use data effectively to advocate for solutions. This strategy, which promotes a culture of data-based self-advocacy, provides an alternative to strategies used to bridge structural gaps in similar settings, which have included organizing resources through partner organizations<sup>27</sup> or designing the QI initiative within the constraints of the resources available (24).

In conclusion, our implementation experience has been promising, with a high degree of engagement in the QI process at all health system levels. The combination of a national strategy, expanded QI capability across the system and successful demonstration of QI method implementation holds promise for scale-up and sustainability of this comprehensive approach to improve outcomes across the Ethiopian healthcare system.

## Supplementary data

Supplementary data mentioned in the text are available to subscribers in *INTQHC* online.

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