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Maternal and Child Survival Program

Focused Review of Successful Quality Improvement Initiatives Aimed at Compliance With Evidence-Based Practice Guidelines for Child Illness Care

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The Maternal and Child Survival Program (MCSP) is a global, United States Agency for International Development (USAID) Cooperative Agreement to introduce and support high-impact health interventions with a focus on 24 high-priority countries with the ultimate goal of ending preventable child and maternal deaths within a generation. The Program is focused on ensuring that all women, newborns and children most in need have equitable access to quality health care services to save lives. MCSP supports programming in maternal, newborn and child health, immunization, family planning and reproductive health, nutrition, health systems strengthening, water/sanitation/hygiene, malaria, prevention of mother-to-child transmission of HIV, and pediatric HIV care and treatment. Visit www.mcsprogram.org to learn more.

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Abbreviations

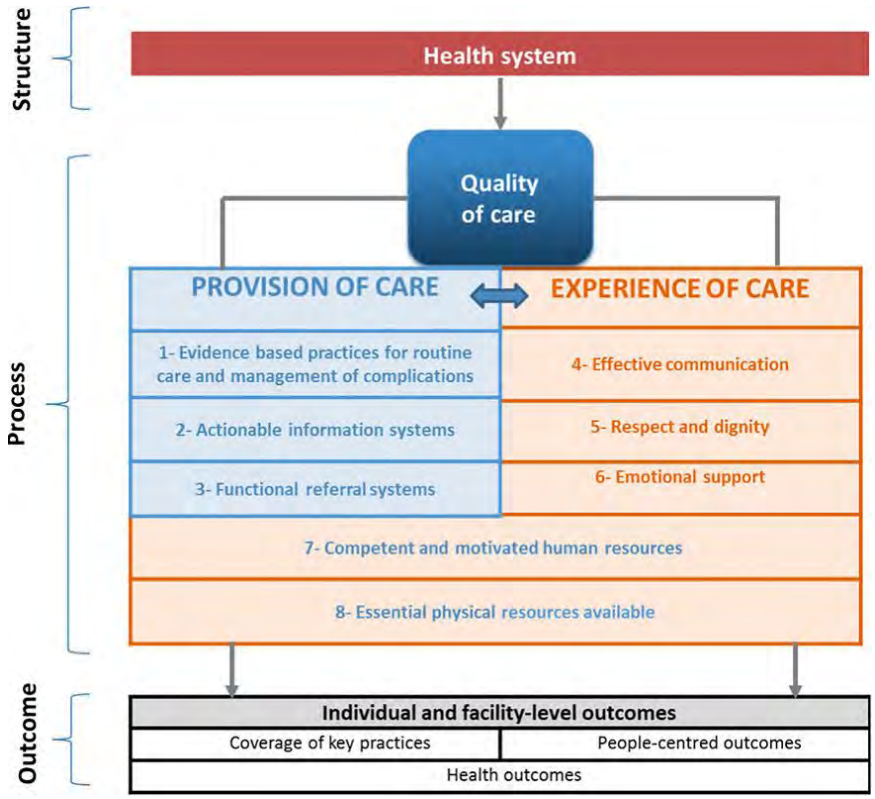
ACT	artemisinin-based combination therapies
AL	artemether-lumefantrine
BPHS	Basic Package of Health Services
CC	cell coordinator
CCM	community case management
CHW	community health worker
COPE	Client-Oriented, Provider-Efficient services
DAZT	Diarrhea Alleviation through Zinc and ORS Therapy
eIMCI	Electronic Integrated Management of Childhood Illness
HMIS	health management information system
iCCM	integrated community case management
IHI	Institute for Healthcare Improvement
IMCI	Integrated Management of Childhood Illness
JHSPH	Johns Hopkins Bloomberg School of Public Health
JSI	John Snow, Inc.
KEMRI	Kenya Medical Research Institute
MCSP	Maternal and Child Survival Program
MI	Micronutrient Initiative
MOH	ministry of health
NGO	nongovernmental organization
NPAT	National Product Availability Team
ORS	oral rehydration salts
PDA	personal digital assistant
PDSA	Plan Do Study Act
PHCU	primary health care unit
QI	quality improvement
QOC	quality of care
SC4CCM	Supply Chain for Community Case Management
WHO	World Health Organization

Summary

This review of peer-reviewed and grey literature focuses on health worker compliance with evidence-based protocols, one of the eight domains of the Quality of Care (QOC) framework developed by the World Health Organization (WHO) (Tuncalp et al. 2015). Apart from a focus on the provision of care, the WHO framework, presented in Figure 1, also includes the dimension of experience of care, which is not addressed in this review. Despite the adoption of Integrated Management of Childhood Illness (IMCI) in 100 countries and the rapid uptake of integrated community case management (iCCM), there is little evidence about ways to improve health worker compliance with practice guidelines. This paper is an effort to identify themes from the literature and generate recommendations for support of this aspect of quality improvement (QI) for the Maternal and Child Survival Program (MCSP) Child Health Team.

Twelve papers describing interventions that have measurably improved health worker compliance with evidence-based protocols for care of the acutely ill child were identified and explored in depth. Although there is a wide range in the comprehensiveness of the services covered, the length of follow-up and the scale at which the interventions were implemented, the review made clear that a multimethod approach has the potential to raise compliance with clinical standards to over 80%, particularly at smaller scale. Critical elements for such an approach include frequent and sustained repetition of the guidelines; monitoring and feedback of performance data to providers, managers, and decision-makers; provision of simplified decision-support tools that can also be used to record patient data; and team-based problem-solving. These elements may largely compensate for a widespread inability in cascade training systems to ensure that all health workers have sufficient in-service training. However, these elements seem to not compensate for inadequate health system inputs such as financing, equipment, and supplies (domain 8 in the WHO QOC framework). Adequate resources for supervision (fuel, transport) were also an essential element in the cases examined. Harmonization of donors, high-level leadership support, and local champions are critical. Financial incentives for performance do not seem to be necessary to motivate health workers when there is support from colleagues and supervisors.

Figure 1. WHO Quality-of-Care Framework (Tunçalp et al. 2015)



Background

The WHO guidelines for malaria, diarrhea, and pneumonia care and treatment, Integrated Management of Childhood Illness (IMCI), and integrated community case management (iCCM), are all clinical protocols that were designed to improve quality of care (QOC). The literature is clear that simple introduction and training of clinical staff on the protocols results in significant, clinically meaningful improvement in providers' adherence to evidence-based standards. A multicountry evaluation of IMCI by Bryce et al. (2004) supported this assumption. It was confirmed in a meta-analysis by Nguyen et al. (2013), which found that (excluding the Bangladesh study to be discussed below), health workers trained on IMCI protocols were 84% more likely than untrained workers to classify presenting children correctly according to the protocol, and 77% more likely to prescribe appropriate medications.

However, protocol introduction and initial training alone are not sufficient to achieve reliable and sustained compliance to guidelines. Nguyen et al. found that in 13 of 21 studies reviewed that reported on prescribing, one-third or more of the patients received inappropriate medications. Steinhardt et al., who have studied the problem of improving performance in child health in great depth, write, "despite significant improvements in quality of care after IMCI training, important performance gaps remain" (Steinhardt et al. 2015). In addition, it is generally not possible to have every provider who is required to implement the guidelines complete the corresponding full initial training course. This is infeasible due to frequent staff turnover and rotation, absenteeism due to illness and participation in other training courses, and the inefficiency and inability of all relevant staff at a site to attend an off-site in-service training course.

Ensuring that key health systems supports are in place to maintain health worker use of the guidelines and training is an important component of IMCI, according to WHO recommendations. These key health

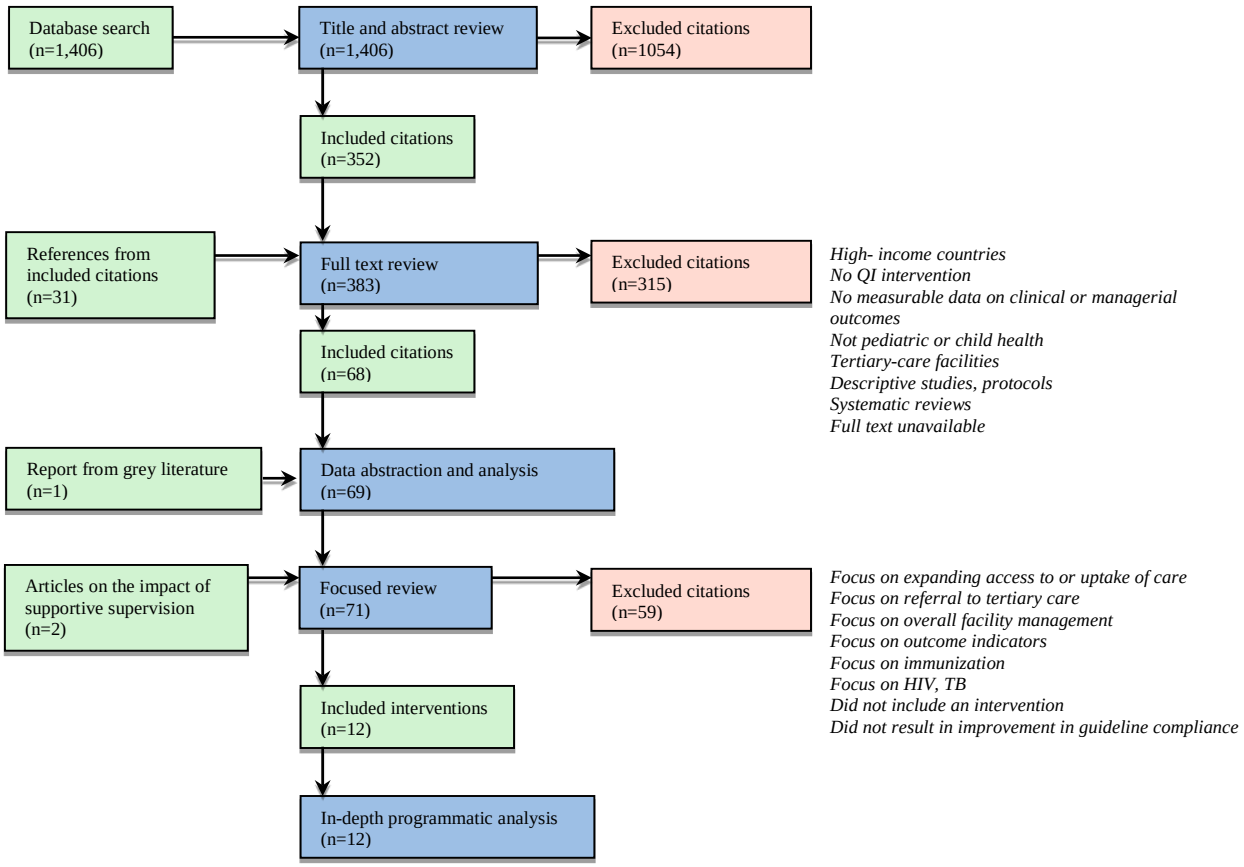
system supports and activities have never been clearly defined and have generally received less attention than the IMCI and iCCM algorithms themselves. The efforts to ensure the provision of these elements in a consistent and sustainable manner may be viewed as the key activity of quality improvement (QI) for service provision (i.e., compliance with evidence-based practice guidelines).

Methods

Initial Systematic Review

A systematic review of published, peer-reviewed reports and grey literature identified interventions to improve the quality of health care services for children under age five. Articles were included if: 1) they provided details on a QI strategy or intervention; 2) the strategies or interventions were for children under five; 3) the strategies or interventions were carried out in a primary health care or ambulatory care setting; 4) they were implemented in low- or middle-income countries; and 5) they included measurable data on either clinical, managerial, and/or financial outcomes. The systematic review covered a 10-year period from 2005 to 2015 and identified 69 relevant documents (68 published articles and one report from the grey literature). The key elements identified were the use of multipronged intervention strategies that included focused, regular supervision and/or clinical mentoring strategies. The selection process is illustrated in Figure 2.

Figure 2. Stages and filters used during the review process



In-Depth Exploration of Promising Approaches

To identify critical design elements for QI initiatives in MCSP's focus countries, the MCSP Child Health Team conducted a focused review building on the systematic review described above. Since fidelity or compliance with evidence-based standards is one important dimension of quality under MCSP, the objective of this review was:

- To identify interventions that had measurably improved compliance
  - with established, evidence-based clinical and management protocols,
  - for single-episode, sick-child care visits to primary care providers;
- To conduct a complete review of the peer-reviewed and grey literature on these interventions, and
- From this, to elucidate the critical elements for replication and identify key areas for future learning under MCSP.

The initial step in the focused review was to identify which of the 68 articles and one report met these more restrictive criteria. This resulted in excluding articles that focused on expanding access to or uptake of care, referral to tertiary care, overall facility management, outcome indicators, immunization, or disease-specific QI activities related to care for illnesses such as HIV and tuberculosis. Also excluded were articles that not describe an intervention and did not result in improvement in guideline compliance. Twelve articles met the inclusion criteria.

A targeted literature search was conducted to identify overall evidence reviews and global recommendations related to best practices on implementation of IMCI and iCCM. Since supportive supervision was found to be a key element of strategies for improvement, review articles on the impact of supportive supervision on primary health care were sought and a focused review was conducted to identify assessments of interventions examining the impact of supportive supervision on child health. Through this, two additional QI efforts were identified for inclusion.

Results

The 12 practice improvement articles that fit the criteria focused on four packages of interventions: IMCI; iCCM of pneumonia, malaria, diarrhea, and malnutrition; malaria case management only; and diarrhea case management only. These 12 QI efforts are detailed in Table 1:

1. Mentoring and Enhanced Supervision at Health Centers *(IMCI)* —Rwanda
2. Multicountry evaluation of IMCI effectiveness, cost, and impact *(IMCI)* —Bangladesh
3. Enhanced support to IMCI-trained health workers *(IMCI)* —Benin
4. Electronic decision support tool: eIMCI *(IMCI)* —Tanzania
5. Supply chain for community case management (SC4CCM) *(iCCM)* —Ethiopia, Malawi, Rwanda
6. Project Fives Alive! *(Malaria case management)* —Ghana
7. Malaria case management: Mobile phone text reminders *(Malaria case management)* —Kenya
8. Malaria case management: Test, treat, and track *(Malaria case management)* —Kenya

9. Client Oriented, Provider Efficient (COPE) services for IMCI *(IMCI)* —Guinea, Kenya
10. Malaria case management: Supportive supervision *(Malaria case management)* —Nigeria
11. Diarrhea alleviation through zinc and ORS therapy *(Diarrhea case management)* —India
12. Health service performance assessment/balanced scorecard *(IMCI)* —Afghanistan

The studies describe interventions carried out in nine countries in Africa and three countries in Asia. They range from small pilot studies on eHealth methods lasting a few months (Interventions 4 and 7) to complex national scale-up efforts lasting several years (Interventions 5, 6, 8, and 12). The degree of rigor in the description and evaluation ranges from a two-sentence description of intervention and impact (Intervention 6) to a complex, multicountry quasi-experimental implementation research project detailed in several hundred pages of reports (Intervention 5).

Not all the articles included here have comparison groups or even pre/post measures that tease out the effects of the individual program elements contributing to improvement. For the single intervention (6, IHI/Ghana) that demonstrated impact at scale, the change package related to child health remains only minimally described. However, it is possible to elucidate some general themes, conclusions, and options that could be applied in country programs.

Conclusions

The findings are organized according to the seven principles developed by MCSP to guide QI:

1. A measurable, clear aim focused on important health outcomes for which evidence-based interventions exist
2. The inclusion of the needs, values, and desires of patients/clients
3. The engagement of the hearts and minds of health care workers to continuously improve services
4. A team process, which includes representatives of all key system functions working together
5. The explicit use of a change management strategy
6. Routine real-time use of data to measure whether care is improving and to guide change
7. A focus on processes of care or service delivery as well as local systems that support that care

Principle #1: Measurable, clear aim focused on important health outcomes for which evidence-based interventions exist

IMCI, iCCM, standard malaria and diarrhea case management are interventions that have been consistently proven and are universally recognized to reduce under-five mortality. The approaches examined were related to the aspect of quality concerned with compliance to these kinds of evidence-based standards (domain 1 in the QOC framework). Although this does not cover all aspects of quality in the new WHO QOC framework (Figure 1), this limitation did provide a clear focus which was likely a factor in the success of the approaches. At the core of many of the interventions were user-friendly decision-support tools to facilitate consistent compliance with complex algorithms. In general, these tools needed to undergo several cycles of testing and simplification to ensure that they are easily understood, usable, and result in reproducible outcomes. Ideally, these tools will also incorporate data recording to support reporting, monitoring, and feedback. Examples

include the simplified IMCI documentation tools used in Interventions 2 and 3, the eIMCI tool tested in Intervention 4, and the supply-chain management tools introduced in Intervention 5.

Reminders or continuing training, routine monitoring and feedback, decision-support tools and team-based problem-solving can largely compensate for the inability to provide complete in-service training on IMCI or case management to all relevant health workers. Although it is helpful if every facility has at least one health worker trained on the gold-standard curricula, the excessive cost of trainings coupled with their burden on staff time make this objective difficult to achieve in most settings. In addition to less comprehensive training, creative alternatives focused on important health outcomes have shown promising results, including on-site mentoring (described in Intervention 1), establishment of local QI teams (Intervention 5), mobile phone text reminders (Intervention 7), and simplified tools used during supervision (Interventions 8, and 10).

Principle #2: Inclusion of the needs, values, and desires of patients/clients

This principle is in line with the WHO QOC guidance on the experience of care as a key component of quality. Since the selection criteria were focused on providers' compliance to guidelines, the review could not gather further evidence from the perspectives of sick children and their caregivers about their needs, values, and desires; this principle was not as salient in the interventions examined. Probably the best example of this is Intervention 9, which used the Client-Oriented, Provider-Efficient services (COPE) method.
Since caregivers who seek care for their children often have multiple needs, unified partner and government-agency support for an integrated approach is critical. Countervailing pressures to implement IMCI-specific vs. integrated supportive supervision decreased the effectiveness of Interventions 3 and 8. In a similar way, the prioritization of malaria medication supplies to districts where malaria is endemic undermined Rwanda's effort to ensure each community health worker (CHW) in all districts had at least one dose of community case management (CCM) medication in stock, as described in Intervention 5.

Principle #3: Engagement of the hearts and minds of health care workers to continuously improve services

Performance incentives (Interventions 5 [Rwanda] and 12) are a useful but non-essential way of ensuring health worker motivation. Health workers can also be motivated by positive feedback, recognition, and communication during supervision or mentoring (Interventions 1 and 5), team meetings and opportunities for exchange with other teams or facilities (Interventions 5, 6, and 9), comparative "scorecard" data (Intervention 12) or positive feedback from patients (Intervention 9).

Principle #4: Team process, which includes representatives of all key system functions working together

Team-based problem-solving (Interventions 1, 5, 6, and 9) can greatly enhance the ability of health workers and facilities to adhere to guidelines, although the success of Intervention 2 shows that it is not absolutely essential. This is the core of the traditional QI approach using Plan-Do-Study-Act (PDSA) methodology. Under this method, a team of all providers, managers and service providers (such as pharmacists) who routinely contribute to provision of the child health service meet regularly (usually monthly) to review data on compliance with the protocol, identify gaps and weaknesses (including those related to facility readiness and supply chain), and jointly generate ideas to solve the problem. The ideas are then tested and their implementation monitored to see if the problem is addressed. Some key points:

- The composition of the team will generally dictate which problems can be solved and which will be deemed "outside" of the team's competence. In Intervention 5 (Ethiopia and Rwanda), QI teams composed of health center and CHW representatives were able to resolve supply-chain issues at the community level but were unable to resolve problems caused by national- or regional-level shortages.
- Links between local QI teams and higher-level decision-makers may facilitate solving identified problems related to finances, expenditures, staffing, or supplies (Interventions 5 [Malawi] and 6).
- To be effective without leadership from partners, QI teams require training and support on PDSA methods, data collection, holding effective yet concise meetings, as well as the substantive issue in question (Interventions 5 and 9).
- Incorporating team-based problem-solving into the mission of an existing team or regularly scheduled meeting (Intervention 5 [Ethiopia]), rather than creating an additional QI team (Intervention 5 [Rwanda]) greatly increases the feasibility of QI and the likelihood that meetings will be held on a regular basis.
- Making QI a routine management method (Intervention 6) and incorporating it into the regular job description and evaluation criteria for health workers (Interventions 1 and 5 [Malawi]) appear to increase the likelihood of participation in the team process and the sustainability of the QI method.
- The COPE methodology (Intervention 9) is a feasible method for introducing QI at small health facilities, which has been demonstrated to be effective for outpatient care such as family planning and IMCI. However, its scalability has yet to be tested.

Principle #5: Explicit use of a change management strategy designed with the understanding that organizations are complex and change is iterative and may involve multiple components and levels working together.

Frequent, sustained repetition of treatment guidelines through a variety of media, presentation methods, and time points is an essential element in raising compliance. The mechanisms for repetition can vary, and may include clinical mentoring (Intervention 1), supportive supervision (Interventions 2, 3, 5 [Rwanda], 8, 10, 11, and 12), computerized decision support (Intervention 4), refresher training (Intervention 5 [Ethiopia]), team meetings focused on the issue (Intervention 5), mobile phone text reminders (Intervention 7), or job-aid wall charts (Intervention 8).

It is often the case that traditional training cascades did not roll out successfully. There are other techniques to amplify the effectiveness of traditional training or to mitigate its imperfect rollout; however, they are unlikely to be successful if every facility does not have at least one trained health worker. These techniques include giving repeated and ongoing feedback and mentoring, providing reminders, holding short, on-the-job trainings, and providing decision-support tools and opportunities for team-based problem-solving (Interventions 1, 5, 7, 8, and 10). The fact that these techniques seemed to contribute to success is in line with behavior change theory (Glanz and Rimer 1997).

Principle #6: Routine real-time use of data to measure whether care is improving and to guide change with attention to the quality of that measurement

Monitoring and feedback of data about performance to decision-makers, national, regional, district, and facility managers is a critical element in improving performance and the elements that contribute to successful performance. Once high levels of guideline compliance have been achieved, continued monitoring and feedback are necessary for quality control and to maintain high compliance. Methods for carrying out monitoring and feedback include:

- Supportive supervision using a supervisory checklist; providing immediate feedback to the supervised workers (Interventions 1, 2, 3, and 10).
- Compiling information from supervision visits and providing combined or comparative feedback at regular (usually monthly) team meetings (Interventions 1, 5, and 11).
- Requiring health workers to complete health management information system (HMIS) or project-specific reporting formats, the results of which are compiled and fed back to team meetings and which also facilitate reporting to higher levels of the health system (Interventions 5 [Ethiopia and Malawi], 6, and 11).
- Conducting monitoring surveys of a representative sample of facilities or geographic areas, the results of which are compiled and fed down the health care system from the national to the local level (Interventions 8 and 12).
- Using tools for self-assessment, including client interviews, client flow analysis, and IMCI record review, the results of which are fed back to team meetings (Intervention 9).

Principle #7: Focus on processes of care or service delivery as well as local systems that support that care, with root cause analysis of the critical process of care and system bottlenecks

Training, reminders, supervision, and QI efforts are not sufficient to completely correct for inadequate supplies, equipment, and budgetary resources at upper levels of the health system (Interventions 1, 5, and 9).

Leadership support for the intervention at higher levels of the health system and champions at the local level are critical for success. Interventions 5 (Malawi and Ethiopia), 8, and 12 provide positive examples of this; Interventions 3 and 5 (Rwanda) show what can happen in the absence of such support. The collaborative approach (Interventions 5 [Rwanda] and 6),in which a large number of similar facilities join to address a common problem, can be a useful method for developing, testing, and rolling out change packages to improve compliance. However, the learning sessions are resource intensive, and the collaboratives are usually time limited, with 18 months being an optimal length.

Although supportive supervision/clinical mentoring has been shown to be an effective way to combine several of the elements above, the frequency of supervision by the ministry of health (MOH) (as opposed to partners) is often limited by budgetary shortfalls, transport problems, and fuel shortages (Interventions 3). In Intervention 5 (Rwanda), these limitations may also have led to the interruption of QI-specific team meetings, which happens in many program settings. If these strategies are selected, it is critical to ensure that budgetary resources are allocated to support them. Alternatively, more cost-effective mechanisms (Interventions 4 and 7) can be investigated. Problems linked to external financial support (Interventions 3 and 5 [Rwanda]) and lack of health system responsiveness to good health worker performance (as was found

in Intervention 5 [Rwanda] when health centers failed to fill CHWs' resupply requests) can be severely demotivating and result in rapid declines in guideline adherence.

There were examples of ignoring harmonization with the health system, and this seemed to decrease effectiveness. Pressure to implement IMCI-specific versus integrated supportive supervision decreased the effectiveness of Interventions 3 and 8. Prioritization of malaria medication supplies to districts where malaria is endemic undermined Rwanda's effort (Intervention 5) to ensure that each CHW in all districts had at least one dose of CCM medication in stock.

Overall Conclusions

This review focused on adherence to evidence-based standards, only one of the components of quality in the WHO QOC framework. A variety of models incorporating multifactorial approaches was successful in approving adherence. These approaches have the potential to raise health worker adherence to treatment guidelines to over 80%. This level of compliance was demonstrated by Intervention 1 in Rwanda, Intervention 2 in Bangladesh, Intervention 5 in Malawi, and Intervention 6 in Ghana (although the details of the Ghana intervention and evidence for its success have yet to be published). It is critical that the mix of methods selected for QI be adapted to the specific context and country strategies. To date, none of the interventions described has demonstrated long-term sustainability in the absence of continued outside inputs (partner involvement). Almost all of the initiatives were donor/partner led as opposed to government-led. The cost of implementing these approaches was not part of the review, and our ability to judge how they could be modified or adapted is thus limited. It is clear that intensive interventions requiring substantial financial investment and laborious human efforts are less likely to be sustainable at scale.

Some creative solutions were described across the 12 QI interventions, and meaningful conclusions were drawn with regard to almost all seven principles underlying the process of QI for MCSP country programs (with the exception of client's needs, values, and desires).

As with all interventions in the field of international health, it is critical that the mix of methods selected for a QI intervention be adapted to the specific country context and its government's goals and strategies.

Table 1. Interventions that have demonstrated success in improving compliance with evidence-based practice guidelines for ambulatory care of the acutely ill child

#	Lead Author/organization/funding	Guideline	Name of program/Intervention tested	Years carried out	Countries
1	Anatole/Partners in Health/ Doris Duke Charitable Foundation	IMCI	Mentoring and Enhanced Supervision at Health Centers	2010–2012	Rwanda
	Description: Nurses were recruited to serve as clinical mentors (specifically for IMCI) in two districts in Rwanda with 21 health centers. Separate mentors were provided for women's health and HIV care. Clinical mentors were required to have several years of experience in IMCI and were selected based on their performance on a written examination in the clinical area and demonstrated technical skills, mentoring experience, competency, and interpersonal skills. They received an initial 2-day training in the clinical area and attended a 2-day workshop in clinical mentoring based on the I-TECH Clinical Mentoring Curriculum (2008); attended monthly program meetings where they received continuing training in mentoring and systems-based QI; and also received on-site mentoring from technical advisors at least once every 2 months. Nurses were MOH employees and were integrated into the supervision team at the district hospital, where they were responsible for providing clinical care once monthly. At least two nurses at each of the 21 health centers were also provided direct clinical training in IMCI to ensure baseline knowledge. Mentors provided 2- to 3-day visits to each health center once every 4 to 6 weeks. Each visit included side-by-side mentoring, observing care using a checklist based on MOH guidelines, and immediate feedback. An average of 51.6 cases were observed per month. The mentors assist with complex cases, physical exam skills, and complex reasoning. The visits also included group teaching sessions with clinical presentations, case discussions, demonstrations of skills, and review of documentation practices. Mentors were also responsible for leading QI activities at each health center using team-based PDSA problem-solving methods, providing feedback on each visit to the health center director, and sharing updates at monthly district meetings to facilitate district-level QI. **Results:** The quality of assessment, as measured by performance on the IMCI integrated assessment index, increased from 0.64 at baseline to 0.96 in 12 months for children ages 2 to 4, and from 0.61 at baseline to 0.92 at follow-up for children under age 2. Correct classification improved from 59% to 99%, and correct treatment improved from 78% to 98%. In follow-up interviews, it was noted that although mentors' QI efforts could assist facilities in improving systems of organizing care at the facility level (such as clinic scheduling), they were not able to address drug and equipment shortages and facility infrastructure issues. The ongoing training and skill-building provided by the mentor program was able to partially compensate for lack of full training of site staff and rapid staff turnover.				
2	Hoque/ICDDR,B WHO Bill & Melinda Gates Foundation USAID	IMCI	Training and monthly supportive supervision including case observation	2002–2005	Bangladesh
	Description: As part of this five-country evaluation of the effectiveness of the IMCI strategy, the Bangladeshi research team randomly chose 10 primary care facilities in Matlab district to provide best possible IMCI implementation, and 10 to provide standard government care. "Best possible" implementation included a standard course of IMCI training, adaptation of forms used to document sick child management, structured formats for monthly reports, provision of job aids, introduction of drug-tracking and management systems and monthly supportive supervision (rigorously maintained in practice) by external project staff using a supervisory checklist. Monthly supervision visits were rarely missed; they lasted about 2.5 hours and included review of the register, attendance records, drug availability, and availability of required equipment and job aids. The supervisors observed care of at least one child and gave the provider immediate feedback. **Results:** In 2000, intervention- and comparison-arm providers conducted 18%–25% of required assessment tasks. In 2005, intervention arm providers conducted 85% of required -assessment tasks compared with 11% in the comparison arm. Intervention-arm providers classified 64% of children correctly in 2005, compared with less than 10% in the comparison arm and less than 30% in both arms in 2000. Also, intervention-arm providers treated 71%–82% of pneumonia and malaria cases correctly in 2005, compared with <5% in the comparison arm in 2005 and <20% in both arms in 2000. Workers with only 18 months of pre-service training performed as well as those with 4 years of pre-service training. Nguyen et al. (2013) excluded this study from some of the analyses in their meta-analysis because the intervention-arm Bangladeshi health workers performed so much better than IMCI-trained health workers in the other 25 studies reviewed.				

#	Lead Author/organization/funding	Guideline	Name of program/Intervention tested	Years carried out	Countries
3	**Rowe/CDC/CDC**	**IMCI**	**Health worker performance and IMCI**	**1999–2004**	**Benin**
	Description: This cluster-randomized trial provided enhanced supports to IMCI-trained health workers at public and private primary health facilities in two intervention areas and compared their performance to that of workers in two comparison areas with usual supports. The enhanced supports included: training supervisors and local health officials in supportive supervision; supporting two supportive supervision visits every 3 months, one at the health worker's clinic and one in a hospital setting; supervision of the supervisors by an experienced pediatrician; provision of a counseling guide and a simplified IMCI register that served as both a decision-support tool and a source for study data; and training of health workers on use of these job aids. Supervisors used a checklist to observe consultations, provided feedback to the health workers, and assisted with problem-solving. **Results:** In a pre-post analysis, the percentage of children receiving IMCI-recommended care improved from 16% in 1999 to 40% in 2004, but there was no significant difference between study arms. In a per-protocol analysis, workers actually receiving IMCI plus study supports provided IMCI-recommended treatment 62% of the time, compared with 40% of the time for workers receiving IMCI training with usual supports, and 17% for workers who were not IMCI trained. Even among IMCI-trained health workers who received study supports, there was great variability in performance, with the number of children receiving recommended treatment ranging from 15% to 88%. The authors attributed the variability in performance between the intention-to-treat and per-protocol results to delays in national implementation of the IMCI program and the fact that only 29% of planned supervision visits actually occurred. There was a strong dose-response relationship between the number of supervision visits that a health worker received during a 6-month period prior to the assessment and the probability of providing IMCI-recommended care. The study did not provide financial support for conducting supervisory visits. Focus groups and interviews conducted after the trial identified the departure of key leaders, dysfunctional management teams, poor coordination, planning of multiple activities at the same time, difficulty of coordinators accessing project funds, and an insufficient number of supervisors. IMCI-specific supervision was also given lower priority than integrated supervision in the project area.				
4	**Mitchell/D-Tree International, Harvard School of Public Health, Ifakara Health Institute Rockefeller Foundation**	**IMCI**	**eIMCI**	**2008–2009**	**Tanzania**
	Description: Tanzanian health workers have a paper booklet designed to help them follow the IMCI protocol. The investigators designed an electronic decision support tool (eIMCI) that was programmed into a Personal Digital Assistant (PDA) and that guided the health workers through the assessment, classification, and treatment as well as communication of instructions to the parents. Ten of the 15 assessment items were included in the eIMCI; the remainders were assessed in the same manner as prior to introduction of the tool. Assessment results were recorded directly on the PDA. Additional training was limited to instructions on how to use the eIMCI tool and the PDA. **Results:** Completeness of assessment of all 10 assessment items included in eIMCI was 71% under the post-intervention electronic system and 21% under the pre-intervention paper system. There were no significant differences in completeness of assessments of the other five items. Correct classification was 83% under the paper system compared with 91% under eIMCI. Correctness of prescribing was not reported. Performance was more consistent between sites under the electronic system. Average visit times were very similar; 9 minutes per child under both electronic and paper systems.				

#	Lead Author/organization/funding	Guideline	Name of program/Intervention tested	Years carried out	Countries
5	**JSI Research & Training Institute Bill & Melinda Gates Foundation**	**iCCM**	**Supply Chain for Community Case Management (SC4CCM)**	**2010–2014**	**Rwanda Malawi Ethiopia**

Overall Description: SC4CCM was an implementation research project to test methods to improve the last stage of the supply chain to support community case management—the link from primary health care facilities to rural community health workers. The project was implemented in two phases in each country: the initial phase in each country included three arms designed to identify the best model for achievement of supply chain goals; and phase two was to begin the nationwide scale-up process. JSI developed an intervention model that included improvements in: 1) product flow—inventory management, distribution, and storage; 2) data flow—ways of capturing and transmitting data on supply chain; and 3) effective people—setting up management processes and skills through training, standard operating procedures and clear delineation of roles and responsibilities, establishing QI teams that crossed levels of the health system for group problem-solving, and providing motivation and recognition of CHWs for their achievements in improving the local supply chain. The project assumed that other supply-chain processes would ensure the supply of iCCM commodities at the health center level. This description focuses on the "effective people" component.

Ethiopia Description: The SC4CCM intervention was conducted to test training approaches for CHWs on new procedures and tools developed for a nationwide transition from a supply-based to a demand-based supply chain for health posts. In phase one (6 months), three strategies were tested in four zones each. Arm (a) tested a five-module training program and QI-type problem-solving methods + supportive supervision and support for primary health care unit (PHCU) meetings; Arm (b) tested the modular training program and QI; and Arm (c) tested on-the-job training. In each arm, health center pharmacy managers and CHW supervisors attended a 3-day training-of-trainers workshop. QI problem-solving was integrated into the monthly PHCU meetings. Phase two was targeted at two of the Arm (a) zones: West Gojam zone in Amhara region and Hadiya zone in Southern Nations, Nationalities, and Peoples region. iCCM products were introduced into the demand-based supply system. Project and *woreda* (district) staff jointly conducted supportive supervision of health centers and selected health posts, their data were presented at three review meetings, and a refresher training for CHWs was conducted.

Ethiopia Results: The percentage of CHWs who had a bin card for every product of the 9–12 they managed increased from 4% in West Gojam and 8% in Hadiya to 27% and 36%. The percentage of bin cards that were grossly inaccurate fell from 45% to 29% in West Gojam and from 29% to 24% in Hadiya. The percentage submitting the last monthly report rose from 59% to 89% in West Gojam and from 28% to 77% in Hadiya. Over 90% of CHWs reported ever having received supervision; the percentage of CHWs reporting having problem-solving sessions during PHCU meetings rose from 70% to 99%. The results on the primary outcome indicator of availability of all four iCCM products (cotrimoxazole, ORS, zinc and any form of ACT) at health posts fell in West Gojam from 77% at baseline to 61% at endline and rose in Hadiya from 58% to 71%. Reasons of failure is mainly insufficient attention to logistics procedures at higher levels despite functional system at health posts and health center levels

Malawi Description: Malawi incorporated a mobile Health (mHealth) intervention for data flow. Phase one of the project compared the following three study arms, each with about 25 health centers and about 80 CHWs: Arm (a): "effective people" + product flow + data flow + training on product flow and data flow in three districts; Arm (b): product flow + data flow + training on product flow and data flow in three districts; and Arm (c): no intervention in four districts. Methods for training on product flow and data flow were not described; however, 94% of CHWs were reported to have been trained in both intervention arms. Supervisors and health center drug store managers were also trained. Quarterly supportive supervision visits were standard in the project area but did not always include supply-chain issues. The "effective people" component was carried out through creation of QI teams including district managers, health center staff, and CHWs. Teams were trained on developing a joint supply-chain vision, setting performance targets and indicators, using reports to monitor targets, creating a management diary, developing plans to recognize high-performing facilities and CHWs, and conducting effective meetings. Health center QI team meetings were to be held monthly and district-level QI team meetings to be held quarterly. Attendance at QI teams was expected of CHWs and included in their performance review. In phase two, the Arm (a) intervention was scaled up to 24 of Malawi's 29 districts, with scale-up in process in the remaining five districts. The cluster supervisor was added to the membership of the district and facility QI teams to serve as a link between the two. District malaria and family planning coordinators were also added, since their supplies were included in the intervention, and District Health Management Teams were oriented to the supply-chain QI process. A National Product Availability Team (NPAT) was added in Nov. 2013 with representatives of logistic officers and logistics management information system officers from across the MOH and partner representatives.

#	Lead Author/organization/funding	Guideline	Name of program/Intervention tested	Years carried out	Countries
	Malawi Results: In phase one, there was no significant difference between in-stock rates for all four iCCM products (Cotrimoxazole, ORS and two forms of ACT) assessed between study arms: 64% for Arm (a), 59% for Arm (b) and 63% for Arm (c). However, rates of CHW use of correct inventory management procedures were over 90% in both intervention arms compared with 48% in Arm (c). Average time from resupply request to receipt was 12.8 days in Arm (a) vs. 26.4 days in Arm (b). Monthly reporting rates were 94% and complete reporting rates 85% in Arm (a) vs. 79% and 65% in Arm (b). In phase two, Zinc was added to the list of ICCM products. National monthly reporting rates on stock were over 85% by Jan.–May 2014; complete reports were available from over 70% of CHWs nationally and over 90% of CHWs in two selected phase one districts. The average time from request to receipt of resupply declined from 8 days in Jan. 2012 to four days by May 2014. However, health facilities frequently under-filled CHWs' requests due to limited stock at the facility level. Nationally, about 65% of CHWs reported that all five CCM products were in stock each month by early 2014; in two sampled phase one districts, those levels were 88% and 95%. Some phase one facilities saw a slight decline in in-stock rates in 2014. Seven out of eight facilities surveyed held QI team meetings approximately monthly in early 2014. Two of four districts sampled had held QI team meetings in early 2014; the other two districts relied on partner-funded cluster- or district-level review meetings. The NPAT had met three times by the end of 2014. Institutionalization is partial as there is no formal process for training new staff on the product flow, data flow, or QI team processes introduced. **Rwanda Description:** All product management and data tools were manual; unlike in Malawi, iCCM supply-chain information was not linked to the national electronic Logistics Management Information System. In phase one, the three study arms (each with about 30 health centers and 100 CHWs) were: Arm (a): resupply procedures + QI teams in three districts; Arm (b): resupply procedures + performance-based incentives in three districts; and Arm (c): no intervention in four districts. In the two intervention arms, one CHW was designated the "senior CHW" in charge of mentoring his peers, commonly called the "cell coordinator" (CC), and responsible for managing a demand-based resupply system by collecting data from the 10 CHWs in the cell and resupplying them. CCs conducted a supervisory home visit to other CHWs (at least quarterly) using a supervision checklist; CCs received transport allowances from JSI for these activities. In Arm (a), health center QI teams were established, composed of 7–10 CCs, health center CHW supervisors, pharmacy store managers and data managers and tasked with using a PDSA process to improve re-supply performance. QI teams had a 5-day initial training and were provided data collection and monitoring and evaluation tools and a guide on how to hold an effective meeting. Partner and district staff intended to attend monthly QI team meetings; district coaches received allowances to attend; however district coaching actually occurred less frequently; joint districtwide learning sessions were held quarterly and a final three-district learning session held at the end of 12 months. In Arm (b), supply-chain indicators were added to the existing community performance-based financing system and monetary incentives were provided quarterly to CHW cooperatives based on their indicator scores. In phase 2, Arm (a) interventions were scaled up to 10 districts and in process in four more. Indicators on stock-card accuracy, CC supervision visits, and QI team meetings are being added to the national performance-based financing. District coaches rather than project staff were expected to help new health centers establish new QI teams and learning sessions, and allowances for CCs and district coaches were eliminated. **Rwanda Results:** In phase one, over 90% of CHWs in Arms (a) and (b) and 85% of CHWs in Arm (c) reported receiving CCM products regularly. Reporting completion and timeliness was high and nearly identical for CHWs in Arms (a) and (b). 36% of CHWs in Arm (a), 33% in Arm (b) and 18% in Arm (c) had accurate stock cards completed for all five iCCM medications (cotrimoxazole, ORS, zinc and two forms of ACT) plus rapid diagnostic tests. Although procedural compliance was nearly identical in Arms (a) and (b), rates of having all five medications in stock on the day of the survey were not: 63% in Arm (a) compared with 45% in Arm (b) and 38% in Arm (c). At the endline survey after phase two, stock-card use and accuracy matched midline survey levels. However, rates of having all five medications in stock in Arm (a) had declined to 33% (below the pre-intervention level of 35%). This appeared to reflect product stock-outs at the district and health center level combined with the interruption of QI team meetings after the midline survey—scale-up districts reported starting QI teams, but Arm (a) districts did not restart them. CCs said they had decreased use of standard resupply worksheets since their requests were not being filled by the health centers. Stock-outs may reflect National Malaria Program prioritization of supply to endemic districts.				

#	Lead Author/organization/funding	Guideline	Name of program/Intervention tested	Years carried out	Countries
6	**Sodzi-Tettey/Institute for Healthcare Improvement (IHI) Bill & Melinda Gates Foundation**	**Malaria care**	**Project Fives Alive!**	**2008–2015**	**Ghana**
	Description: The project was an ambitious 7-year initiative in collaboration with the Ghana Health Service and the National Catholic Health Service. It used a phased QI collaborative model to tackle under-five mortality in a comprehensive manner through improving the reliability of implementation of the national maternal, newborn, and child health program. IHI sought to scale up the model to a regional and national level through development of deep local capacity in QI, including QI teams at all hospitals, and by reporting QOC indicators through the national HMIS, enhanced by a QI improvement collaborative for data quality. In addition to indicators of the QOC for each clinical package supported, IHI monitored indicators of the strength of each collaborative network, the number of ideas tested, and local ownership and sustainability. Ideas that were tested and resulted in improvement in initial groups of facilities were documented and consolidated into "change packages" that were rolled out to facilities in later phases. This is one of the few initiatives to have demonstrated impact at scale. Provider compliance with child health protocols is a small component of a much larger initiative, and it was implemented late in the initiative. The child health intervention targeted was malaria protocols. However, little detail about the malaria care change package has so far been published. **Results:** Adherence to malaria protocols has been raised to 85%, and malaria case fatality rates have decreased 36%.				
7	**Zurovac/Kenya Medical Research Institute (KEMRI), Oxford University, The Wellcome Trust**	**Malaria case management**	**Mobile phone text reminders**	**2009–2010**	**Kenya**
	Description: In this cluster-randomized controlled trial at 107 health facilities, mobile phone text reminders were shown to improve compliance to malaria treatment guidelines. One of 10 text message reminders about pediatric malaria case management was sent to the personal mobile phones of 110 workers in the intervention arm twice daily on each work day. Each text message was accompanied by a motivational quote or reminder, for example: Quote: "Persistent work triumphs." Reminder: "Check ALL sick children <5 yrs for any severe signs! Also check for fever, cough, diarrhea, pallor & any other problem." The intervention lasted 6 months. The analysis was limited to facilities where drugs were in stock. **Results:** The primary outcome was performance on a composite index of treatment management including correct prescribing, dosing, dispensing, and parent communication. At baseline, correct management was observed in 11% of cases in the control arm and 20.5% of cases in the intervention arm. At 6 months, correct management was observed in 16.5% of cases in the control arm and 49.6% in the intervention arm in an intention-to-treat analysis. The effect persisted 6 months after the intervention had ceased; at that time point, correct management was observed in 18% of patients in the control arm and 51% in the intervention arm. ($p<.01$). The cost of the text messages themselves was estimated at US$2.60 per health worker, not including the costs of managing the text message system.				

#	Lead Author/organization/funding	Guideline	Name of program/Intervention tested	Years carried out	Countries
8	**Zurovac/KEMRI, Oxford University Global Fund to Fight AIDS, Tuberculosis and Malaria President's Malaria Initiative (PMI)/USAID**	**Malaria case management**	**Test, Treat and Track**	**2010-2013**	**Kenya**
	Description: This is an evaluation of Kenya's "Test, Treat and Track" malaria case management policy launched in 2009. This policy was designed to implement the WHO's 2010 malaria treatment guidelines, which called for universal parasitological testing of all febrile patients in all parts of the countries with either microscopy or rapid diagnostic tests. Under the implementation, the supply chain for antimalarial medications was strengthened, including procurement and distribution based on artemether-lumefantrine (AL) consumption (a "pull" system), training health workers on logistics and management information systems, 3-day training of health workers under a cascade model, distribution of job-aid wall charts showing the new algorithm, introducing routine supportive supervision with observation supported by supervisory manuals, and improvement of microscopy through training of microscopists and quality assurance of microscopy (through partners). National, cross-sectional surveys were conducted to monitor implementation of the policy and facilitate improvement; survey findings were widely disseminated to national and subnational managers and health workers during in-service trainings and supervision. **Results:** Testing improved from 34% of febrile patients in 2010 to 58% at all facilities, and to 63% at facilities with available diagnostics in 2013. AL treatment rates for test-positive patients increased from 83% to 90%. AL treatment rates for test-negative patients decreased from 52% at baseline to 16.6% in 2013. Partially as a result of this decline in inappropriate drug use, stock-outs of AL decreased from 27.2% in 2010 to 7% in 2013; these improvements occurred despite the fact that roll-out of the health system supports was not yet complete by 2013: just 50% of health workers were trained, 58.1% had new guidelines, and 28% had wall charts. The percentage of facilities having had any supervisory visit in the 3 months prior to the survey increased from 42% in 2010 to 69% in 2013, those having malaria case-management supervision increased from 18% to 31%, and those where supervision included observation of patient care rose from 7% to 13%. The authors noted that integration of supervisory activities across diseases was being promoted during the malaria roll-out, and this may have resulted in less focus on malaria case management during supervision.				

#	Lead Author/organization/funding	Guideline	Name of program/Intervention tested	Years carried out	Countries
9.	**Bradley/EngenderHealth UNICEF, USAID**	**IMCI**	**COPE**	**2000–2001**	**Guinea, Kenya**
	Description: COPE is a QI process designed for smaller health facilities. It was developed for reproductive health services and adapted for child health. COPE focuses on teaching facility staff decision-making and problem-solving skills. Each facility is asked to conduct a 2- to 3-day self-assessment in which staff from all areas, including administrative and support staff and service providers, participate. The process is conducted for several hours each day during a time period when fewer clients are usually seeking services. The assessment is guided by a self-administered written guide with trigger questions focusing on clients' rights to information, access to services, counseling and informed choice, safe and effective care, privacy, confidentiality and expression of opinion, dignity and comfort, and continuity of care. The guide also addressed staff needs for good management and facilitative supervision, information, training, and development, and supplies, equipment, and infrastructure. Facilities are instructed to conduct baseline data collection including at least 10 client interviews, a client-flow/staff-utilization analysis, and a review of about 20 IMCI patient records. On the basis of this data, the facility team creates an action plan. This study was conducted in eight intervention health centers (four in Guinea and four in Kenya) and in eight comparison facilities (four in each country). Each health center selected was rural or periurban and had about 10 staff, none of whom had received IMCI training. To begin the study, partners oriented district supervisors and intervention site managers to COPE concepts. District supervisors also received training in facilitative supervision. The self-assessment, action planning, and improvement process was implemented through four exercises at each facility spaced over 15 months. Outside facilitators led the first two exercises, site staff led the third with guidance, and site staff managed the fourth independently. District supervisors attended most COPE exercises. Partners also provided short, on-site training requested by facility staff, including facilitative supervision, quality management, immunization, infection prevention, counseling, and information, education, and communication. **Results:** At endline, intervention sites performed significantly better ($p<.05$) than comparison facilities on four of eight indicators of proper history-taking, five of eight indicators of proper physician examination, and 10 of 10 measures of information given to the provider by the patient. Appropriate malaria prescriptions were provided to 62% of children at intervention sites compared with 51% of children at comparison sites ($p=.06$), and correct antibiotic prescriptions were given to 78.8% of children at intervention sites compared with 46% of children at comparison sites ($p<.001$). 70% of clients said they were very satisfied with the visit at intervention sites compared with 48% at comparison sites, and 80% of clients at intervention sites said services had improved in the past year compared with 27% of those at comparison sites. 83% of 76 staff surveyed at intervention sites reported that staff morale was high, compared with 36% of 81 staff at comparison sites and, asked about outside supervision, 61% of staff at intervention sites vs. 23% at comparison sites agreed that "We truly benefit from supervision." However, supply-chain issues were not able to be resolved by the intervention.				

#	Lead Author/organization/funding	Guideline	Name of program/Intervention tested	Years carried out	Countries
10.	**Bello/University of Jos**	**Supportive supervision in the context of malaria case management**		**2013**	**Nigeria**
	Description: This was a quasi-experimental comparison study. Jos North Local Government Area was randomly selected as the intervention area. Supervisors of malaria case management services in five Jos North primary health centers with 55 health workers treating pediatric malaria patients were trained on supportive supervision of malaria case management using the WHO guidelines on supportive supervision, and they were provided with the WHO supervisory checklist for IMCI services and taught how to use it. Supervisors were also provided with a treatment manual for malaria. Supervisors were instructed to visit each facility for 2 hours each month and spend at least 15 minutes with each health worker. Supervisors were provided financial incentives consisting of stipends and transport expenses for the monthly visits. The intervention was carried out for 3 months. Eight health centers with 50 health workers in neighboring Jos South Local Government Area served as the comparison group. Only 22% of the health care workers had been trained on malaria case management or on the new government policy calling for use of artemisinin-based combination therapies (ACTs) in treatment. **Results:** Performance of health workers in proper malaria case management according to the criteria on the supervisory checklist improved dramatically in the intervention group. The guidelines were completely adhered to 33% of the time during the first supervisory visit and 71% during the third supervisory visit. An initial visit carried out in the comparison facilities at the time of the third supervisory visit in the intervention facilities found that the guidelines were completely adhered to just 4% of the time. However, a survey carried out separately from the supervision found that mode of diagnosing malaria (by fever vs. lab test) was not significantly different between the two study arms: 29% of cases at baseline in the intervention arm were diagnosed by fever criteria vs. 16% in the comparison arm; 3 months later both arms had changed practices, with 59% of children in the intervention arm and 55% in the comparison arm being diagnosed by lab test. There was no significant change during the period in use of ACT vs. chloroquine for treatment in either study arm.				

#	Lead Author/organization/funding	Guideline	Name of program/Intervention tested	Years carried out	Countries
11.	**Kumar/Micronutrient Initiative (MI) (public sector)/FHI 360 (private sector)/ Lamberti/JHSPH/Society for Applied Studies (evaluation)/ U.S. Fund for UNICEF, Bill & Melinda Gates Foundation, Children's Investment Fund Foundation; UNICEF**	**Diarrhea case management**	**Diarrhea Alleviation through Zinc and ORS Therapy (DAZT), Reducing Deaths from Diarrhea in the Indian State of Bihar**	**2010–2015**	**India**
	Description: DAZT was an effort to scale up use of oral rehydration salts (ORS) and zinc for diarrhea treatment through public- and private-sector providers in six districts of Gujarat and 12 districts of Uttar Pradesh through MI activities with the public sector and FHI 360 drug detailing in the private sector. MI extended this effort to 15 districts of Bihar, India. Previous MIs in these states had focused on building an enabling environment with leadership support for evidence-based diarrhea management and on improving the supply chain. For the public sector, a training package was developed focusing on both technical knowledge of zinc, ORS, diarrhea case management and potential complications, and skills for communicating with caregivers. The package included video and flip chart aids for the trainers. Nongovernmental organizations (NGOs) were responsible for training; in 2011–2012 they trained 140,000 health personnel medical officers, auxiliary nurse-midwives, child development program officers, supervisors, and two types of CHWs: anganwadi workers (community health workers responsible for newborn and child health services) and accredited social health activists. ORS and zinc supplies started off with 3 million combination packs procured by the MI; subsequent years' supplies were procured by the state governments with MI assistance in forecasting and budgeting. NGOs in Uttar Pradesh and Gujarat provided supportive supervision to CHWs from May 2013 to September 2014, and government block community mobilizers provided supportive supervision in Bihar from December 2011 to September 2014. Each supervisory visit included one-on-one work with CHWs assessing caregivers' compliance with ORS. Supervisors could not reach all CHWs each month, so poorly performing CHWs were prioritized (52,000 received supervision). Supervisors held monthly meetings with CHWs, which included feedback from the supervision visits. A project monitoring and evaluation system was developed that built on the national HMIS and included pictorial reporting formats for CHWs. In the private sector effort, FHI 360 worked with local partners, including pharmaceutical companies and NGOs, to visit rural medical practitioners and drugstores and promote zinc and ORS treatment. Short videos were developed to assist with this behavior change effort. ORS and zinc sales were monitored through daily text messages and a quarterly provider tracking survey. Monthly coordination meetings were held with local partners. **Results:** In the public sector, the intervention resulted in a sharp increase in the number of cases of diarrhea reported to the national HMIS, particularly after CHW reporting was integrated into the HMIS. In the 15 intervention districts in Bihar, the number of monthly diarrhea cases reported increased from 2,978 in February 2011 to 47,422 in February 2014. However, health workers appeared to report only cases for which they wanted to prescribe ORS and zinc, including cases for which they were unable to prescribe the antidiarrheals due to a stock-out; therefore, it was impossible to calculate provider adherence to treatment guidelines from program data. The total number of public sector diarrhea patients reported to have received any treatment during the project periods was 593,030 in Gujarat, 99% of which were reported to have received both zinc and ORS; 907,295 in Uttar Pradesh, 86% of whom received both zinc and ORS; and 1,796,563 in Bihar, 77% of whom received both zinc and ORS. In a household survey, 21% of children in Gujarat who had had diarrhea in the past 2 weeks and sought care in the public sector were reported to have received either zinc or ORS or both at endline, up from 8% at baseline. 33% of those who sought care in the private sector reported receiving one or both antidiarrheal at endline, compared with 9% at baseline. In Uttar Pradesh, 49% of those seeking care in the public sector and 44% of those seeking care in the private sector received at least one antidiarrheal at endline, compared with 4% and 2% at baseline.				

#	Lead Author/organization/funding	Guideline	Name of program/Intervention tested	Years carried out	Countries
12	Edward/JHSPH Afghanistan Ministry of Public Health	IMCI	Health Service Performance Assessment/ Balanced Scorecard	2004–2008	Afghanistan
	Description: This study is an evaluation of the Basic Package of Health Services (BPHS), introduced in Afghanistan in 2004. The corresponding Essential Package of Hospital Services was introduced in 2005. These two packages defined the function, catchment area size, health services offered and equipment and drugs required by each level of health facility in the country. IMCI and essential drug supply were core elements of the BPHS. The role of CHWs, supervised by community councils, was seen as central. Through a results-based financing mechanism, the Ministry of Public Health contracted with NGOs to deliver the BPHS in a given province. Contracting was competitive and performance incentives were built into the contracts. USAID, the European Commission, and the World Bank divided responsibility for financing provincial health systems. The HMIS was revised to provide routine service statistics. Annual surveys were conducted to provide monitoring and evaluation data based on 29 performance indicators, combined in a balanced scorecard, including measures of service quality. The total number of active BPHS facilities increased from 1,075 in 2004 to 1,829 in 2011. The average number of rural population per active BPHS facility decreased from 15,175 to 10,849. The number of health posts staffed by CHWs increased from 631 to 12,213. The absolute number of patient visits in the BPHS system increased from 2.0 million to 44.8 million per year. **Results:** About 600 facilities, including basic health centers, comprehensive health centers, and district hospitals, were surveyed in each year's National Health Service Performance Assessment. The percentage of facilities with at least one provider trained in IMCI rose from 50% in 2005 to 65% in 2008; however, the percentage of providers trained in IMCI declined from 31% to 25% as the number of providers interviewed grew from 1,438 to 2,233. Average scores on an IMCI index designed to assess the quality of patient assessment, examination, and counseling improved from 43.5 in 2005 to 56.1. In a multivariate analysis, factors affecting the IMCI index scores included provider training (doctors and assistant doctors scored better than nurses or others), type of facility (comprehensive health centers and district health centers scored similarly and better than basic health centers), spending 10 or more minutes to conduct a consultation, provider satisfaction and level of IMCI knowledge, having had IMCI training, availability of IMCI clinical guidelines, having had six or more supervision visits in the past 6 months, facilities managed by a contracting-in mechanism, and functional community councils.				

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