Supplemental Table 2

Description of included studies

References	Country	Study design	Methods	Levels	Modes	Participants & size	Providers	CBP Approaches	Duration	Reported outcomes
Kanlisi et al., 1991 (70)	Ghana		Qualitative	Organisational	Face-to-face	District Health Management (DHMT) Team members of Ejisu: the size of DHMT was not described	Regional (Provincial) Management team	Problem solving approach: a series of 3-day workshops aiming at identifying and analyzing management problems, developing strategies and action plans to solve them, and review achievements every three months.	Six months	-Improved financial management; -Improved teamwork; -Improved transport strategy; -Improved community involvement in health
Barnett & Ndeki, 1992 (74)	Tanzania		Qualitative	Organisational	Face-to-face	DHMT members of Same: A total of 17 district staff participated in the complete process	Centre for Educational Development in Health (CEDHA) and regional staff	Problem solving approach: It involved five stages: Identifying & selecting problems, understanding the causes of selected problems, suggesting solutions, implementing solutions, evaluating the impact of the solutions.	Fifty months	-At the Same team level: DHMT confidence to act, weekly meetings to discuss and tackle problems at the district headquarters, improved supervisory meetings. - Following the encouraging results in Same, the Ministry of Health endorsed the strategy, and secured funds to implement it on a wider scale. A further eight districts were introduced to the process, but the important follow-up work necessary from regional level failed to take place in time.
Conn et al., 1996 (71)	Gambia		Qualitative	Organisational	Face-to-face	DHMT members of two out of three health regions (health	No described	The problem-solving, 'learning by doing' approach: a six-month planning cycle was introduced. This	Eighteen months	-The teamwork facilitated more coordinated supervision and training

						district) of Gambia: the size of each DHMT was not described		identified health priorities and health service problems. It defined ways to address these priorities and problems within the available resources and in an efficient and integrated way. Teams then made realistic work plans based on this analysis.		support to regional health staff; -Regular RHT meetings with a new action-oriented format including distribution of regional health data; -Monthly analyse of data on health service delivery for local use; -Improved problem analysis skills; -Improved management of resources; -Team attitude and staff motivation were improved
De Brouwere and Van Balen, 1996 (72)	DRC (Zaïre)		Qualitative	Individual	Face-to-face	Doctors: 18 doctors trained.	Resident doctors working as DHMT members and having a secondary-level clinical function	Learning by seeing and doing (observation and practice at different levels of district health system (referral outpatient clinic, urban health centre, rural health centre, hospital department, district management team).	Twelve weeks per training	-Most of trainees acquired the requisite skills and know-how for health district management.
Omaswa et al., 1997 (73)	Uganda		Mixed method	Organisational	Face-to-face	DHMT members, district's administrative and political leader from three health districts (Jinja, Arua, and Masaka): the exact number of participants was not stated.	Facilitators from the national quality assurance committee	Problem solving approach: selection of clinical or administrative problems from districts to be addressed by means of QI methods, developing work plans, applying solutions, and measuring the resulting changes, identifying further round of problems to be tackled, general meeting at the end of first year for district health teams to share the lessons they had learnt.	Eighteen months	-Improved collaboration between DHT and local administrators and political leaders; -Integration of curative and preventive activities; -Improved the functioning of referral system; -Improvement of service delivery results (decreased maternal mortality, decrease of reported measles cases, reduced outpatient waiting times and

										increased utilization of outpatient services).
Uys et al., 2005 (75)	South Africa		Quantitative methods: checklists, questionnaire	Individual	Face-to-face	Head nurses of clinics and hospital units, primary health care coordinators, programme managers. Three hospital and six clinics were selected in each district.	No described	In District A, supervisors from both hospitals and clinics were trained in the modified matrix model. In District B, only supervisors from clinics were trained in the CHESS (centre for health and social studies) model. District C was the control region, where no intervention was to take place.	Three months	The general result is that none of the interventions made a significant difference to the quality of care (nursing records or management of chronic conditions) or the job satisfaction of nurses.
Byleveld et al., 2008 (79)	South Africa	Cross-sectional study	Mixed methods: document review, FGD, competency rating scale, interview	Organisational		DHMT members	Various provider including universities, provincial HRD, etc.			
Bradley et al., 2008 (80)	Ethiopia	Pre–post study	Quantitative method: checklist, questionnaire	Organisational	Face-to-face	14 Hospital management team (HMT) members. The average number of beds was240 per hospital, although the number ranged substantially from 74 beds in one hospital to >500 beds in another hospital.	Senior Yale – Clinton Foundation and Post-Graduate Fellows	The EHMI employs a partnership–mentoring model, which incorporates the principles and tools of quality improvement including participatory approaches to organizational change. The Yale University team recruited 24 Senior Yale–Clinton Foundation Fellows and Post-Graduate with experience in hospital administration and/or management to serve for 1 year as management mentors for the medical director and hospital	First year of EHMI project	-The management skills of the medical directors as perceived by the Yale–Clinton Foundation Fellows improved from August 2006 to May 2007 in several management domains, although their level of confidence in their management skills did not increase generally. -About 60% (45 of the 75) of the management indicators surveyed showed some improvement in the domains of human resources, medical

								management teams in the 14 hospitals.		records, nursing standards and practice, infection prevention and control, quality management and financial management.
Hartwig et al., 2008 (81)	Ethiopia	Case study	Mixed methods: checklist, document review	Organisational	Face-to-face	HMT members	Senior Yale – Clinton Foundation and Post-Graduate Fellows	The model included needs assessment and baseline evaluation using a hospital management indicator checklist, deployment of 24 Fellows (US and international hospital administrators) for 1 year to work as mentors with hospital management teams in 14 Ethiopian hospitals, continuing didactic and practical training in quality improvement methods for hospital management teams, and 24 management improvement projects to be completed during the year with plans for replication more broadly as appropriate.	First year of EHMI project	-On average, hospitals had 53.2% (SD 16.6) of the 63 key hospital management indicators in place, although there was variation across hospitals and across management domains. -Overall, the presence of key hospital management indicators was lowest in the domains of infection control and quality management and highest in the domains of financial management and nursing standards and practice.
Kokku, 2009 (82)	Tanzania	Case study	Qualitative methods: document review, group discussion, feed-back sessions	Organisational	Face-to-face	DHMT members and facility staff	Health Trainers with variety of skills	A mixture of different approaches was used during the project to achieve the planned outcomes including placing the experts (health trainers) within DHMT. Existing tools for supportive supervision and HMIS system were adopted to suit the local needs and equipment were provided to facilities. The health trainers supported DHMT in day-to-day activities through a process of mentoring and	Six years (2001-2007)	-Better systems for supportive supervision, planning, indent and outreach. -Improved leadership and management skills: regular meetings with agendas and records minutes, better delegation of tasks among DHMTs members. -The establishment and training of 21 village health committees to improve the ownership

								provided technical advice while participating in all planning meetings. The health trainers were part of the supportive supervision team and provided on the job training for the facility staff. In short, apart from classroom trainings the project used approaches like mentoring, coaching and on job training to build the DHMT capacity.		and laid foundation for launching community health fund. -Improved immunization coverage of all antigens from 58 to 85%. [2] Improved Antenatal coverage from 30% to 78%.
Adjei et al., 2010 (83)	Ghana	Case study	Mixed methods: IDI, questionnaires	Organisational		District health workers, with a focus on the DHMT members.	The Government of Ghana and its health sector work with a wide range of development partners (DPs).	Several capacity efforts took place in the districts. The four key efforts identified were: training, provision of technical assistance, infrastructural improvements and knowledge management.		
Gill et Bailey, 2010 (76)	Kenya	Case study	Mixed methods	Organisational	Face-to-face	Regional team members, DHMT members, facility teams.	National quality assurance core team	The intervention described consists of a multidisciplinary core team at the national level, trained as trainers, that provides oversight of regional and district quality assurance teams whose purview is to improve the quality of care and operational functions. Quality assurance teams continuously identify and address systemic barriers to the timely delivery of quality services. In parallel, the process involves improving the management capabilities of facility directors and administrators through the		-Improved work climate, -Better management, -Higher quality of services, -Greater financial transparency and security, -Substantially increased utilization of services, -Decreased response time and -Raised staff morale and commitment.

								use of quality improvement activities that identify and resolve local management and clinical care problems.		
Kebede et al., 2010 (77)	Ethiopia		Qualitative	Individual	Face-to-face	Hospital Managers (CEOs): The program has enrolled two cohorts of hospital leaders (a total of 55 CEOs) and is working in more than half of the government hospitals in Ethiopia.	Faculty from Yale and Jimma University Schools of Public Health	The MHA is split 15% in the classroom and 85% in executive practice at the hospital. Didactic classes (3 weeks of intensive classroom time every 4 months at Jima University campus): classes include formal lectures (pertaining to conceptual principles and technical tools), case applications (in which students work in groups to define and address case-based problems) and expert panel discussions (involving local experts in the topic). Executive practice (between classroom times): comprises the systematic application of classroom tools to specific management projects to improve the functioning and quality of the hospital and is evaluated through monthly reporting and periodic site visits by faculty.	Two years	Several hospital improvements were documented in terms of improved hospital sanitation procedures, improved medical record accuracy, reduced wait times for admissions and outpatient visits and improved human resource monitoring
Rowe et al., 2010 (78)	Liberia		Quantitative methods: self-administered questionnaire	Individual	Face-to-face	Representative from DHMTs, Government hospitals, international NGOs: a total of 97 participants, representing all 15 counties in	Instructors from Yale University and Mother Patern College	-Classroom-based health system management course for health facility and CHT managers was developed and taught by Yale University, Mother Patern College, and CHAI; Follow-up and mentoring for course participants was	Five months by cohort	-In the area of self-assessed personal management skill development, significantly higher proportions of respondents rated their management skills upon completing the course as “strong” or “very strong”

						Liberia, were trained.		provided by Mother Patern faculty, on-site Yale-Clinton Foundation Fellows, and CHAI staff who assisted participants in managing projects and reinforcing course concepts.		in comparison to the beginning of the course in all three cohorts (P-value < 0.001). -In general, at least two thirds of the respondents indicated the course met each objective "extremely well". -In the area of faculty responsiveness, most respondents reported that faculty "definitely" responded effectively to questions and "definitely" related theory to real-life by using workplace problems. -Finally, nearly all respondents reported they would "definitely" recommend the course to colleagues. -There was no significant difference in participants' rating of the course in any areas (all P-values > 0.10), suggesting that the transition from Yale to Liberian faculty was effective.
Kahindo et al., 2011 (84)	DR Congo	Case study	Mixed methods: data from HMIS, document review, semi-structured interviews	Organisational	Face-to-face	DHMT members	Provincial Health Administration staff	Support practices for the development of health districts have two aims: (i) strengthening the skills of the health workforce (provincial health administration staff with broad skills and capable of tackling the problems posed at the health district level	Nine years (2000 à 2008)	-Improved health system governance at the provincial level (internal team building, linking the main actors in the health system around harmonised objectives, optimising the allocation of resources to the health districts)

								comprehensively), (ii) strengthening the working environment.		-Better support for the development of the health districts in the province (increasing the number of supervisions, preparing supervisions based on data analysis, and feedback to the DHMT members). -Improved health outcomes: improved health coverage, improved essential drug supply, improved health information management, improved emergency preparedness, improved use of curative and preventive care exceeding the national averages since 2001: curative service utilisation increasing from 0.36 new cases/inhab/yr in 2001 to 0.50 NC/inhab/yr in 2008. Obstetric coverage reached 87% in 2007 compared to the national average of 54.7%. The vaccination rate for DTP3 is 92.6% compared to a national average of 84.7% in 2007.
Blanchard et Carpenter, 2012 (85)	South Africa	Cross-sectional study	Qualitative methods: FGD	Individual	Face-to-face	17 participants comprising DH Manager and 2 HRMs, six hospitals' CEOs & HRMs, one community	Researchers from the Centre for Rural Health (CRH)	Action learning groups were established. An initial one-day workshop was held where researchers from the CRH introduced participants to the methodology of action learning, and participants were divided into three	Eleven months	The major benefits reported by participants were enhanced teamwork and collaboration, and providing participants with the skills to apply action learning principles

						health center's CEO & HRM		groups. The three groups consisted of four, six and seven participants, respectively, and each comprised members from different institutions. Each group was assigned a facilitator from CRH. The three groups (each with a facilitator) met regularly (approximately monthly) for 4–6 hours over a period of 11 months. In the first meeting with each group, participants had the opportunity to introduce themselves to the group by answering a set of four questions about themselves. Thereafter, individual group members took turns to present a real issue or problem relating to their work in their respective organisations. Generally, each meeting allowed time for one new presentation, as well as feedback on the issues presented at the previous meetings.		to other challenges in their working lives.
Kebede et al., 2012 (86)	Ethiopia	Pre–post study	Quantitative methods: checklist	Individual	Face-to-face	24 Hospital CEOs (16 urban and 8 rural)	Yale and Jimma University faculties	Courses are taught in three 3-week blocks and CEOs work in their hospitals in executive practice between the didactic blocks, resulting in 85% of time in executive practice and 15% of time in the classroom. Supportive supervision was also provided on-site by the teaching staff for evaluation	Two years	-Adherence to hospital performance standards increased significantly during the one-year follow-up (27% compared with 51% of standards met at baseline and follow-up, respectively; p-value < 0.001). -Significant improvement in adherence to

								purposes. In addition, the CEOs who were enrolled in the MHA were provided some on-site technical assistance such as software installation for master patient index or pharmacy inventory control functions, as they implemented hospital improvements.		management standards in 7 of the 12 management domains (p-values < 0.01). -Improvement was more apparent in most domains for which there were detailed implementation guidelines and specific training through the MHA in addition to performance standards. -No statistically significant difference between urban and rural hospitals.
Seims et al., 2012 (87)	Kenya	Quasi-experimental	Mixed methods: interviews, data from HMIS	Organisational	Face-to-face	67 intervention teams of health managers, doctors and nurses were included in the study.	Mentors or coaches	LDP uses a team-based approach to develop leadership and management skills among health workers. The intervention centres around a "Challenge Model" whereby participants select a problem or challenge faced and develop a shared vision and action plan to help address the challenge as a team. Additional components include: stakeholder alignment meetings at the national and subnational levels to generate commitment to and ownership of the LDP among decision makers; four LDP workshops that train participants in various leadership practices including scanning, focusing, aligning and mobilizing, and inspiring. On-the-job team meetings where teams work on action plans to address	Six months	Results showed significant increases in health-service coverage at the district level (p = <0.05) in the intervention teams compared to the comparison teams. Similarly, there were significant increases in the number of client visits at the facility level in the intervention group versus comparison facilities (P < 0.05).

								the selected challenge and plans for monitoring progress in achieving measurable results; and meetings with mentors/coaches where teams review and reinforce LDP content and receive technical assistance for monitoring and evaluating progress on their action plans.		
Aikins et al., 2013 (88)	Ghana	Cross-sectional study	Quantitative methods: checklist	Organisational	Face-to-face	DHMT members, Sub-District Health Team (SDHMT) members, Community Health Officers (CHOs)	Regional Management Team for DHMTs, DHMT for SDHTs, SDHT for CHOs	Facilitative supervision is a system of management whereby supervisors at all levels in an institution focus on the needs of the staff they oversee. The most important part of the facilitative supervisor's role is to enable staff to manage the quality improvement process, to meet the needs of their clients, and to implement institutional goals. This approach emphasizes monitoring, joint problem solving, and two-way communication between the supervisor and those being supervised. Adoption of a facilitative approach leads to a shift from inspection and fault-finding to assessment and collective problem solving to continuously improve the quality of care.	Four years	-The 9 districts differ markedly with respect to their performance on the various items assessed. -Using the overall scores, three DHMTs (i.e., 43% of DHMTs) were graded as good (≥ 80%). All the remaining six DHMTs were adjudged as fair (≥ 79 - 60%). -Using the overall scores, none of the SDHTs were grade as good (= ≥ 80%). Four of the nine districts SDHTs were, however graded fair (≥ 79 - 60%). -Using the overall scores none of the CHOs were grade as good (= ≥ 80%). Seven of the nine districts CHOs were graded as fair (≥ 79 - 60%). The remaining two district CHOs were adjudged as poor (≤ 59%).

Ledikwe et al., 2013 (89)	Botswana		Mixed methods: questionnaire, interviews, FGD	Individual	Face-to-face	Monitoring & Evaluation officers	Facilitators from the International Training and Education Center for Health (I-TECH) in Botswana	Trainings were conducted two to three times a year and included skill-building workshops and didactic sessions. On-site mentoring visits lasted 1 to 2 days with the purpose of reinforcing knowledge and skills gained during trainings as well as troubleshooting other work-related challenges. Mentoring was tailored to the individual needs of the District M&E Officers.	Two years	Knowledge scores significantly increased ($p < 0.05$) during the three trainings in which pre/post tests were administered. Over 1 year, there were significant improvements ($p < 0.05$) in self-rated skills related to computer literacy, checking data validity, implementing data quality procedures, using data to support program planning, proposing indicators, and writing M&E reports.
Mpofu et al., 2014 (90)	Botswana		Qualitative methods: IDI, FGD	Individual	Face-to-face	51 M&E officers: university graduates in the field of social sciences with no prior health information exposure	Facilitators from I-TECH in Botswana	M&E officers were provided with on-the-job training and mentoring to equip them with the knowledge and skills necessary to carry out M&E responsibilities in health districts across the country.	Two years	Data from the in-depth interviews and focus group discussions demonstrate several achievements from the establishment of the district M&E officer cadre. These include improved health worker capacity to monitor and evaluate programs within the districts; improved data quality, management, and reporting; increased use of health data for disease surveillance and public health services planning purposes; introduction of district-led operational research activities; and increased availability of time for nurses and other health workers to

										concentrate on core clinical duties.
Kwamie et al., 2014 (5)	Ghana	Case study	Qualitative methods: Document review, Observation, Semi-structured interviews	Organisational	Face-to-face	Health Managers and staff	Regional health administration members, and one external consultant	The LDP is designed for teams to apply 'leading and managing' practices to service delivery problems (referred to as 'challenges' in the LDP). This is realized through teamwork, defining root causes, action planning, monitoring, and evaluation, and repeating the cycle. The LDP consists of a six-month cycle of root challenge identification, action planning, and monitoring and evaluation. Two-day, face-to-face workshops were held in the capital city Accra three times bi-monthly. Workshops were interspersed with monthly coaching visits, with the facilitation team attending teams and their wider staff in their facilities to ensure organization wide diffusion of LDP teachings.	Six months	The LDP was a valuable experience for district managers and teams were able to attain short-term outcomes because the novel approach supported teamwork, initiative-building, and improved prioritisation. However, the LDP was not institutionalised in district teams and did not lead to increased systems thinking. This was related to the context of high uncertainty within the district, and hierarchical authority of the system, which triggered the LDP's underlying goal of organisational control.
Edwards et al., 2015 (91)	Mozambique	Case study	Quantitative methods: checklist	Organisational	Face-to-face	DHMT members in 10 District Health Directorates	Regional teams of three persons	Mentoring support was provided through three regional teams. Each team was responsible for oversight of three or four districts. By spending time with the managers in their own work environments and assisting them throughout day-to-day challenges, this site-based mentorship approach	The first year of HMM programme	-Of the four domains, district performance in the accounting domain exhibited the strongest and most sustained improvements. -District HR management saw improvements in its ability to pay salaries on time, initiate procedures for health worker career

								provided contextualized guidance and avoided sending staff to costly, off-site workshops, which cause significant disruptions in local service provision.		development, and plan and budget for new personnel. -The M&E capacity domain demonstrated weak progress across year-one. -The one indicator analysed for transportation management suggested progress.
Balinda et al., 2015 (103)	Uganda	Case study	Qualitative methods: review document, authors' experiences of the GLM training	Individual	Face-to-face	All health care staffs with management tasks included DHTM members, regional hospital managers	Senior Ugandan health care managers (national trainers)	The original course comprised 10 modules and took 10 days. However, it was executed in two sessions of five days, with each session covering five modules. The period between the two training sessions was used for participants to work on a Community Health Improvement Project (CHIP). The training consisted of a mixture of adult learning methodologies, including short lectures, questions and answers, small group discussions, plenary presentations, video shows and role plays. Participants from the same district developed their own CHIP together, which was presented to the class and discussed.	Ten days	Practical application skills were observed in the class. There were immediate changes in the behaviour of the participants during the course of the training, as noticed in their team-building processes in group assignments and time management. Other intended competencies which are now being practised include systems thinking, stewardship, change management, performance management, service organization, support supervision and monitoring. This was ascertained through support supervision of the participants. Their increase in knowledge was demonstrated by their post-training test results, which all of the participants passed.

Katahoire et al., 2015 (92)	Uganda		Qualitative methods: IDI, observation, documents review	Organisational	Face-to-face	DHMT members and Communities in 5 health districts	Child Fund International (CFI), Liverpool School of Tropical Medicine (LSTM), and Advocates Coalition for Development and Environment (ACODE)	CODES combines UNICEF tools designed to systematize priority setting, allocation of resources and problem solving with the Community. These tools include LQAS ((using Tanahashi model), Bottleneck analysis, Causal analysis, Continuous Quality Improvement (using the Plan, Do, Study, and Act cycles), Community Dialogues based on Citizen Report Cards and U reports.	The first two years of the project	All five districts health teams with support from the implementing partners were able to adopt the UNICEF tools and to develop district health operational work plans that were evidence-based. Members of the DHTs described the approach introduced by the CODES project as a more systematic planning process and very much appreciated it. Districts were also able to implement some of the priority activities included in their work plans but limited financial resources and fiscal decision space constrained the implementation of some activities that were prioritized.
Odaga et al., 2016 (93)	Uganda		Quantitative methods: questionnaire	Organisational	Face-to-face	DHMT members and Communities in 5 health districts	CFI, LSTM, and ACODE	The CODES project combines tools designed to systematize identification of gaps, priority setting, allocation of resources, and problem-solving. The project also empowers and engages communities in monitoring health service provision and to demand quality services through community dialogues based on Citizen Report Cards (CRC) and U reports as a feedback mechanism. The tools include LQAS, Bottleneck	Five years	All five districts were trained and participated in LQAS surveys and readily adopted the tools for priority setting and resource allocation. All districts developed health operational work plans, which were based on the evidence and each of the districts implemented more than three of the priority activities which were included in their work plans. In the five districts, the CODES

								analysis using the Tanahashi model, Causal analysis, and Continuous Quality Improvement, which are the supply-side tools; and community dialogues based on CRC and U reports, which are the demand-side tools. Learning and using of tools is promoted through training, participation, and learning networks (peer-to-peer learning) and through mentoring.		project demonstrated that DHTs can adopt and integrate these tools in the planning process by systematically identifying gaps and setting priority interventions for child survival.
Tetui et al., 2016 (21)	Uganda		Mix-methods: IDI	Organisational	Face-to-face	District Health managers	Makerere University School of Public Health researchers		Three years (2013–2015)	An interative, dynamic and complex model with three sub-process of building a competent health manager was developed. A competent manager was understood as one who knew his/her roles, was well informed and was empowered to execute management functions. Professionalizing health managers which was viewed as the foundation, the use of engaging learning approaches as the inside contents and having a supportive work environment the frame of the model were the sub-processes involved in the model. The sub-processes were interconnected although the respondents agreed that having a supportive work

										environment was more time and effort intensive relative to the other two sub-processes.
Mutale et al., 2017 (19)	Zambia	Cross-sectional	Mix-methods: questionnaire, IDI	Individual	Face-to-face	444 Health workers at different levels of the health system	Ministry of Health (MoH), Ministry of Community Development, Mother and Child Health (MCDMCH), Broad Reach Institute for Training and Education (BRITE)	The course had both theoretical and practical sessions which were supported by mentorship both during and after training. It has been packaged in line with a recent study that recommended experimentation with action learning approaches, including a mix of formal training, on-the-job training, mentoring and support.	Six to twelve months by phase	-On average, knowledge levels increased by 38% after each workshop. -The calculated before and after percentage change for work environment themes ranged from 5.8% to 13.4%. Majority of respondents perceived improvements in the workplace environment, especially in handling human resource management matters. -The smallest improvement was noted in ethics and accountability. -Qualitative interviews showed improvements in the meeting culture and a greater appreciation for the importance of meetings. Shared vision, teamwork and coordination seemed to have improved more in work places where the overall manager had received ZMLA training.
Tetui et al., 2017a (94)	Uganda	Case study	Data collection: IDI, document review, observation	Organisational	Face-to-face	District Health managers	Makerere University School of Public Health researchers	The Participatory Action Research (PAR) approach has five main phases depicted in a cycle – problem identification, deduction of possible solutions, taking	Three years (2013–2015)	The findings indicate that the participatory action research approach enhanced health managers' capacity to collaborate with others,

								action, reflecting on the consequences of the actions and specifying learning.		be creative, attain goals and review progress. The enablers included expanded interaction spaces, encouragement of flexibility, empowerment of local managers, and the promotion of reflection and accountability.
Tetui et al., 2017b (95)	Uganda	Case study	Qualitative methods: Semi-structured interviews, FGD	Organisational	Face-to-face	Community stakeholders, Sub- County level stakeholders, District level stakeholders	Makerere University School of Public Health researchers	MANIFEST was implemented following Gerald Susman's PAR cycle. According to Susman, the PAR cycle has five phases: problem diagnosis, action planning, taking action, evaluation and specifying learning achieved. The cycle repeats itself with a refinement of the problem or a new one. At the centre of the PAR cycle are principles that build and strengthen communities and systems through the inclusive nature of dialogue and actions made at various levels (reflexive critique, critical dialog, collaborative resource, risk, plural structure, theory, practice and transformation).	Three years (2013–2015)	'Being awakened' emerged as an overarching category capturing stakeholder experiences of using PAR. This was described in four interrelated and sequential categories, which included: stakeholder involvement, being invigorated, the risk of wide stakeholder engagement and balancing the risk of wide stakeholder engagement. In terms of involvement, the stakeholders felt engaged, a sense of ownership, felt valued and responsible during the implementation of the project. Being invigorated meant being awakened, inspired and supported. On the other hand, risks such as conflict, stress and uncertainty were reported, and finally these risks were balanced through tolerance, risk-

										awareness and collaboration.
Uduma et al., 2017 (96)	Tanzania	Quasi-experimental	Quantitative methods: questionnaire	Organisational	Face-to-face	DHMT members, facility managers, health workers	No described	The intervention components were (a) workshop with district health management teams and facility managers on human resource management, (b) intensive training in supervisory and support skills for managers directly engaged in supervision, aimed at strengthening the capacity of these in-charges at a facility level or (c) action learning sets for staff engaged in supervision at the district and facility level which followed on from the training and continued for a period of 12 months.	Twenty months	The results indicated an improvement in the intervention a + b and a + b + c districts. In both intervention groups, the end-line samples have generally higher scores than the corresponding baseline samples for both supervisors and health workers. However, the difference is more marked in intervention a + b for the supervisors and in intervention a + b + c for health workers. This provides evidence of the positive impact of the intervention on supervisors' behaviours in the intervention groups, compared with the control group and demonstrates that supervisors are making procedural changes within their facilities which will in turn have a positive impact on staff.

Cleary et al., 2018a (97)	Mozambique	Case study	Qualitative methods: IDI, FGD, observation, document review	Organisational		DHMT members	Sofala Provincial Directorate of Health, African Health Initiative, Eduardo Mondlane University's School of Medicine		Six years (2010 to 2015)	Key features of the HSS implementation practice, which were mainly geared towards generating ownership of the intervention by the public health system and strengthening existing routine practices and procedures: 1) integration of the HSS intervention into the health system—and working with the system (the intervention's activities were integrated/ aligned with the priorities of the health system, physically, financially and operationally integrated into the health system), 2) Flexibility, adaptation, responsiveness, and 3) Relational trust-building (integrity: transparent rules, consistent procedures, and fair and impartial decision making ; benevolence : inclusive procedures; competence : sanctions for rule breaking and being seen to achieve fair results).
Cleary et al., 2018b (9)	South Africa	Case study	Qualitative methods: observation, interview, document review	Organisational	Face-to-face	SDHT members, facility managers	Research team: organizational psychologist, health policy and systems researchers.	The overall project approach was one of collaborative action learning. The emergent LD interventions included FM group coaching (seven 2-h long sessions aimed at creating a community of practice), FM short course training in	Five years (2012 - 2016)	- Despite this broader governance context, the SDMT and FMs began to report changes in their understanding of the benefits of relational leadership. These shifts in understanding enabled a larger space for FMs to

								health management (5-day short course), FM peer support (monthly half-day meetings of FMs), Facility supervision (day-long supervision visits to each facility run by SDMT every six months), Relational leadership skills (Day-long workshop on how to enable a Thinking Environment in the workplace), SDMT group coaching (Eight 2-h long sessions aimed at creating a community of practice), Facility strategic workshops (Day-long strategic planning workshops in each facility). Within this emergent design, we drew structure from the Thinking Environment as a methodology that is appropriate for enabling a distributed relational leadership.		exercise discretion. They were positive about their exposure to the set of LD processes and reported benefits from their use of the leadership skills. FMs also mentioned that the sub-district team has really improved in terms of support and feedback. From the perspective of the SDMT, the health system gains attributed to the LD interventions included greater trust and cohesion within the SDMT and in the relationship with FMs and staff.
Doherty et al., 2018 (102)	South Africa		Mixed methods: document review, questionnaire, 18 semi-structured interviews	Individual	Face-to-face	Health managers including district health managers	School of Public Health and Family Medicine, University of Cape Town, University's Graduate School of Business	The Oliver Tambo Fellowship Programme is a health leadership training programme with a post-graduate Diploma at its core, supplemented by management seminars, mentorship and alumni networking. The four residential modules (three of 8 days and one of 5 days) were run over a year. Students completed a range of assignments between each module, always	Eighteen months	- Alumni were retained in the public health sector; they felt empowered and motivated by the program to implement management transformation, demonstrated characteristics of transformational leadership, and received recognition from colleagues and line managers for their improved leadership.

								entailing personal reflection, critical thinking skills and diagnosing and addressing challenges specific to their own workplaces. A final management project that was larger in scope and implemented over the 4 months following the last module, required considerable reflection, planning, implementation and adjustment over time, of a set of small-scale interventions designed to suit the specific context of their workplaces.		-Health organisation's management practices changed through the transformational leadership provided by alumni; health services improved as a result of intervention by alumni; Alumni build health management and leadership capacity within their own institutions (including training and mentoring young managers). Changes reported from district and hospital levels included improving district and sub-district health information system, improving the support given to sub-district and health facility managers, improving supply chain in a district, improving the patient transport system in a district, improving waiting times in a district hospital, improving staff satisfaction at a hospital, getting facilities accredited, etc.
Martineau et al., 2018 (98)	Ghana, Tanzania, Uganda	Action-research	Qualitative methods: document review, IDI, FGD	Organisational	Face-to-face	DHMT members	Country research teams members of the PERFORM project consortium	The intervention was based on the action research (AR) cycle entailing four stages: plan, act, observe and reflect. AR is manifested by the DHMTs in the following process: identify and plan strategies to address problems identified;	Two years	-DHMT members improved management competencies for problem analysis, prioritisation and integrated HRM and health systems strategy development. They learnt how to refine plans as

								implement strategies; observe and record the effects of the strategies and reflect on the processes and effects. Multiple and reinforcing methods used for developing these competencies: situational analysis with support from the CRT, two national workshops, follow-on activities (reflective diaries, CRT visits and interdistrict meetings to review progress and share experiences).		more information became available and the importance of monitoring implementation. - The MSI produced changes in team behaviours and confidence. There were positive results regarding workforce performance or service delivery; these would increase with repetition of the MSI.
Chuy et al., 2020 (99)	DRC	Case study	Mixed methods: IDI, FGD, observation, questionnaire	Organisational	Face-to-face	DHMT members	Provincial Health Administration Staff			The members of the management teams in the health districts generally report that the provincial health administration support is mainly administrative and technical. They raise the problem of its need for a conceptual model, regularity, structuring and systematisation. They also point to constraining factors of this support, such as corruption, irrelevant visits and influence peddling.
Chelagat et al., 2020 (100)	Kenya	Quasi-experimental	Quantitative methods: questionnaires, data from HMIS	Organisational	Face-to-face	Senior health managers drawn from different levels and sectors of health service	Strathmore Business School, Management Sciences for Health, Ministry of Health	The program cohort cycle is implemented within a nine-month period and composed of five workshop modules; four team coaching sessions and one cross-learning site visit. Each workshop module is equivalent to four classroom days, and a	Nine months by cycle	Leadership training and coaching built around priority institutional health service improvement projects in the intervention institutions showed: a) skilled birth attendance increased, on average, by

								coaching session takes between 60 to 120 min. The coaching session acts as a link between (a) the classroom learning; (b) the application of the learned knowledge in the workplace; and (c) team support and accountability. The teaching methodology included: case method, experiential learning, and group work. At the end of the program, the participants were expected to present their project implementation progress to their peers and the program facilitators for feedback.		71%; b) full immunization of children, increased by 52%; c) utilization of in and out-patient services, which on average, increased by 90%; d) outpatient turn-around time reduced on average by 65% and; e) quality and customer satisfaction increased by 38.8% (in all the intervention facilities). These improvements were sustained for 60 months after the leadership training. In contrast, there were minimal improvements in service delivery indicators in the comparison institution over the same period of time.
Desta et al., 2020 (101)	Ethiopia	Cross sectional study	Quantitative methods: check list	Organisational	Face-to-face	DHMT members	LMG trainers? Project staff Zonal Health Department staff (equivalent to regional or provincial level)	The Activity uses various approaches including provision of leadership, management and governance trainings at the district level. The training approach is team-based and experiential learning which entails including two to three people from each district and allowing open discussion to share experiences among themselves. The trained people with their counter parts in their facility work together to scan their current situation, design performance improvement	The LMG training was introduced in the year 2017 and data collected from 284 district health offices during the January to December 2019 fiscal year	A total of 284 districts, 94 LMG and 190 non-LMG, were included in the study. Results of the independent samples t-test revealed that LMG districts scored better average performances of 61.8 ± 121.45 standard deviation (SD) compared to non-LMG districts 56.89 ± 110.39 SD, with t (282243) = −3.407317 and $p < 0.001$, two-tailed. The difference of 4.9 percentage unit in the average performance indicated a statistically significant difference

								projects, identify their stakeholders and mobilize resources and jointly conduct monitoring & evaluation. Onsite coaching and technical support are also provided by LMG trainers, project staff, and Zonal Health Department staff using a standard coaching checklist and following OALFA (Observe, Ask, Listen, Feedback, and Agreed) technique. In addition, learning sessions are organized through performance review meetings (PRM) to share challenges, and success and lessons at different levels.		between the LMG and non-LMG districts.
Chelagat et al., 2021 (48)	Kenya	Quasi-experimental	Quantitative methods: semi-structured questionnaires	Organisational	Face-to-face	Over 200 Health care managers and leaders from 19 counties	Strathmore Business School, Management Sciences for Health, Ministry of Health	The curriculum was designed to provide an opportunity for the teams to practice knowledge, skills, and attitude to address real workplace policy and systems challenges to produce measurable results toward improving health performance. A vital aspect of leadership development training was the integration of facility improvement projects and team coaching in the curriculum. The role of the team coach, therefore, was to help teams demonstrate their own leadership skills through practice by clarifying the project's objective, holding	Six years (2010-2016)	The pretest and posttest means for all the six health system (HS) pillar indicators of the treatment group were higher than those of the control group. The regression method to estimate the DID structural model used to calculate the "fact" and "counterfactual" revealed that training had a positive impact on the intended outcome on the service delivery, information, leadership and governance, human resources, finance, and medical products with impact value ≥1 (57.2).

								the teams accountable, monitoring the project's progress, and participating in experience sharing workshop. These workshops were embedded in the five modules and the project's teams were expected to present their progress after every module break.		
Orgill et al., 2021 (53)	South Africa	Case study	Qualitative methods: IDI, literature review	Organisational	Face-to-face	Extended DHMT members	New District Manager	The DM worked with a combination of existing resources to address challenges within the management team meeting. He designed a suite of bottom-up innovations. These innovations included: introducing a new meeting agenda that focused on all the health system building blocks; developing job descriptions for former hospital chief executive officers (CEOs) who were sent to work in the district office 'without a portfolio'; inviting nongovernmental organisation (NGO) partners to the meeting to foster shared vision and accountability; enforcement of the Health Management and Information Systems (HMIS) policy to promote information use by managers; and efforts to focus on solutions in meetings not only problems	Two years	The new district manager drew on systems thinking, tacit and experiential knowledge to design bottom-up innovations. Capacity was triggered through micro-practices of sense-making and sense-giving which included using sticks (positional authority, enforcement of policies, over-coding), intentionally providing justifications for change and setting the scene (a new agenda, distributed leadership).These micro-practices in themselves, and by managers engaging with them, triggered a generative process of buy-in and motivation which influenced managers and partners to participate in new practices within a routine meeting.

Kahindo et al., 2021	DRC	Cross-sectional study	Quantitative methods	Organisational	Face-to-face	DHMT members	Provincial Health Administration Staff	The functions oriented towards the socio-technical support of the health districts refer, in particular, to the supervision and accompaniment of the health district teams. The option of switching from a hierarchical and normative support model to a coaching model aimed at capacity building, empowerment of teams and support for problem-solving has been taken.		-The health district managers generally less well perceived the support process regarding the frequency of visits, availability of supervisors and overlap with visits from the intermediate level to the health districts. On the other hand, for more than 85% of the district managers, the support provided by the intermediate level was perceived positively in terms of the gradient of the supervisor's skills, the adequacy of the support with the needs, the effective reinforcement of the DHMT member' capacities, the effective support for problem-solving faced by the teams and the actual usefulness of the support provided by the supervisors at the provincial level. -The perception of provincial-level support's effects on the health districts' performance was generally satisfactory. Indeed, in more than 90% of cases, the added value of the support and coaching provided by the intermediate level in strengthening the performance of the health

										districts was perceived to be at least good.
Waissa et al., 2021	Uganda	Randomised controlled trial (RCT)	Quantitative methods	Organisationnel	Face-to-face	DHMTs (8 intervention, 8 control)	CFI, LSTM and ACODE under management of UNICEF and Ministry of Health.	The management intervention involved three mutually reinforcing pillars: pillar 1 consisted of collating, analysing and applying programme and survey data (LQAS, bottleneck analysis using a framework adapted from tanahashi model), pillar 2 involved regularly reviewing and, where necessary, supporting the implementation of district work plans and pillar 3 aimed to stimulate demand for services through community engagement.	Five years	-All intervention districts developed work plans that prioritised bottleneck in managing pneumonia, diarrhoea and malaria. -Intervention districts reported significant net increases in the treatment of malaria (+23%), pneumonia (+19%) and diarrhoea (+13%) and improved stool disposal (+10%). -Coverage rates for immunisation and vitamin A consumption saw similar improvements
Bulthuis et al., 2022	Ghana, Malawi and Uganda		Qualitative methods: interviews & group discussions	Organisationnel	Face-to-face	DHMT members	Project country research teams (CRTs)	The MSI uses a participatory action research cycle. Project country research teams (CRTs) facilitate district health management teams (DHMTs) in executing the plan, act, observe and reflect steps of the action research cycle. In addition, reflection is facilitated through district and inter-district meetings.	2017-2021	-Improved management competencies (strengthened problem-solving capacity, strengthened specific management skills that related to the action research cycle such as analysing problems, planning, the use of data and reflection) --> increased work commitment, -Improved health worker performance (reduction in absenteeism, change in staff attitude) -Improved team work (better working together, more frequent

										communication, having a more open environment to share ideas, improved relationships among staff, improved team spirit and better interaction among units), strengthened collaborations with actors outside the DHMTs, such as subdistrict staff and non-governmental organizations. -Improved health indicators focused by action research: antenatal care coverage, yaws and buruli ulcer detection rate, tuberculosis cure rate
Kok et al., 2022	Ghana, Malawi, and Uganda			Organisationnel	Face-to-face	DHMT members	Project country research teams (CRTs)	The intervention included a participatory action research approach, in which DHMTs conducted a plan-act-observe-reflect cycle related to a prioritized health workforce or service delivery problem. As part of the MSI, broader reflection took place through inter-district meetings, during which three districts reflected upon each other's progress.	2017-2021	DHMTs' willingness to participate in the MSI increased over time, partly because of their positive experiences in terms of problem analysis, problem-solving and teamwork.