This annex defines and presents further information and research on a selection of improvement interventions.

1. **Licensing of health care providers** is a key determinant of a well performing health system. However, emerging work looking at performance differences between licensed and unlicensed practitioners suggests that licensing alone is not enough to assure quality care. For example, a World Bank study on a rural area of India – where there are 15 times as many unqualified providers as those with a medical degree – found that formal training is not a guarantor of high quality. The study observed minor differences between trained and untrained doctors in adherence to safety checklists and no differences in the likelihood of providers giving the diagnosis or providing the correct treatment (1). These findings suggest that formally trained doctors may know what they should be doing clinically but that further interventions are needed to ensure compliance with higher-quality standards of care (2). Systematic monitoring of quality and individual feedback to providers, as well as patient education on provider competence, are other methods for improving quality of care (3).

2. **Accreditation** is the public recognition, by an external body, of an organization's level of performance against a set of prespecified standards (4). Accreditation can be granted by public sector, non-profit and for-profit bodies. Historically, metrics used to assess accreditation have been structural and process oriented, such as the presence of adequate medical equipment, staffing ratios and adherence to programmatic standards. Minimal research has been conducted on the relationship between accreditation and clinical outcomes. In one study in Egypt, mean patient satisfaction scores were significantly higher for accredited nongovernmental health units across a few domains: cleanliness, waiting area, waiting time, unit staff and overall satisfaction (5). At least theoretically, accreditation offers some benefits, such as increased public trust and confidence, self-regulating behaviour on the part of health care institutions, and a basis for incentives and sanctions for performance management. Maintenance of an effective accreditation programme may be challenging, for several reasons: the need for additional resources to address structural and performance deficiencies of facilities in preparation for accreditation, continual adaptation to ensure standards are up to date with the evidence, and sustained funding for national or international accreditation (6, 7). In many circumstances, a period of targeted technical assistance will be necessary prior to the implementation of an accreditation programme (6).

3. **Clinical governance** includes the systematic promotion of activities such as clinical audit; clinical risk management; patient or service user involvement; professional education and development; clinical effectiveness research and development; use of information systems; and institutional clinical governance committees (8). Clinical governance is a concept used to improve management, accountability and the provision of quality care. The National Health Service in the United Kingdom has pioneered large-scale implementation of clinical governance activities (9). Although literature from low- and middle-income countries remains limited, a case study from Indonesia showed that clinical governance was used to improve maternal and newborn health in 22 hospitals (10). The most acceptable mechanisms to drive clinical governance are...
those that recognize professional leadership and are perceived as being locally relevant and allowing reflection on personal professional practice (11).

4. **Public reporting** is a strategy used to increase transparency and accountability on issues of quality and cost in the health care system by providing consumers, payers, health care organizations and providers with comparative information on performance. It includes a broad range of approaches, such as report cards on hospital performance, comparative prices and costs in a community, and benchmarking on clinical indicators for providers. Public reporting has been implemented in several high-income countries, including Canada, the United Kingdom and the United States, where evidence shows that it catalyses improvement. In low-resource countries less has been published, but several cases are illustrative of potential impact. In Afghanistan, the Ministry of Public Health produced and released publicly a balanced scorecard (12), using household survey and annual hospital survey data, which showed progressive improvement in the national scores between 2004 and 2008 in all six domains, including patient and community satisfaction, capacity for service provision, overall quality of services, and reduction of user fees (13).

5. **Performance-based financing** is a broad term for remuneration provided to health care providers based on performance measures. Often the amount contingent on performance is a subcomponent of the full payment, which may be based on fee for service, capitation or other calculations. Payment can be allocated at the individual level or group level (for example hospital, department or care team). Evidence shows mixed success, depending on factors such as substantial buy-in from stakeholders, institutional capabilities, and the competency of the financing scheme or fund holder (14–17). A field experiment from Rwanda suggests that performance-based financing may be feasible (and preferable to input-based financing) in sub-Saharan Africa (15). The study found improvement across a number of access and knowledge indicators, for example 62% reduction in out-of-pocket costs, 144% increase in deliveries by skilled persons, and 23% increase in knowledge of HIV transmission risks through skin-piercing objects, but found no impact on clinical outcomes (15). Similarly, results from a pilot in Nigeria found an increase in antenatal care visits, and the use of skilled delivery (17).

6. **Training and supervision** of health workers are among the most common interventions to improve the quality of health care in low- and middle-income countries. Despite extensive investments from donors, evaluations of the long-term effect of these two interventions are scarce. One study found that training and supervision did not meaningfully improve quality of care for pregnant women or sick children in sub-Saharan Africa (18). Another study from Benin found that workers who had received integrated management of childhood illness training plus study supports provided better care than those with training plus usual supports, and both groups performed better than untrained workers (19). In a related project in Benin to strengthen supervision of health workers, after some initial success, many obstacles were encountered at multiple levels of the health system that led to a breakdown in supervision, including poor coordination, inadequate management skills, ineffective management teams, lack of motivation, decentralization, health worker resistance, less priority given to programme-specific supervision, supervision workload, non-supervision activities, incomplete implementation of project interventions, and loss of leadership and effective supervisors (20). The study concluded that support from leaders is crucial, and that donors and politicians thus need to make supervision a priority (20).

7. **Medicines regulation** improves the quality of medicines, both produced and available. While between 5% and 15% of WHO Member States report cases of
counterfeit medicines, this is probably a considerable underestimate. Globally, medicine regulation capacity is limited; WHO estimates that 30% of countries have no medicine regulation or a regulatory entity that does not function properly (21). A study in Uganda assessed the effectiveness of national standard treatment guidelines on rational medicine prescribing and found significant improvement in the treatment of general cases, malaria and diarrhoea (22). Due to the extent to which medicine regulatory authorities are both financially and human resource intensive, it can be challenging to ensure that guidelines are followed. This is noted to be the case especially in poorer countries (21). It has been argued that resource-constrained countries should rely on the assessment of major medicine regulatory authorities, such as those in the United States and Europe, when assessing certain categories of medicines (23). This does not solve the problem of enforcement, and high-income country guidelines may not align with the attributes other countries identify as most important. Best-practice prescribing strategies that have had proven success in both developing and industrialized countries include standard treatment guidelines, essential medicine lists, pharmacy and therapeutic committees, professional training, and targeted in-service education (24).

8. Inspection of institutions for minimum safety standards can be used as a mechanism to ensure there is baseline capacity and resources to maintain a safe clinical environment. Although there is little formal literature on the inspection of institutions for minimum safety standards at the hospital or health centre level (25), inspection factors known to improve safety practices include consistency between standards, approval of standards by a country’s ministry, and proper supervision to communicate standards and help practitioners use them in everyday practice (26). At the minimum, inspection standards can identify structural elements that are foundational for quality: a clean water source, reliable power and backup capacity, adequate coverage by skilled health care workers, clear management responsibility, complete medical records and accountability.

9. Safety protocols, such as those for hand hygiene, address many of the avoidable risks that threaten the well-being of patients and cause suffering and harm (27). Health care-associated infections are the most frequent adverse event in health care delivery worldwide (28), the most common being infections of surgical wounds, the bloodstream, the urinary tract and the lower respiratory tract (29). Yet, hand hygiene is a worldwide problem, with compliance rates averaging less than 40% (30). Hand hygiene studies have shown an impact on hand hygiene rates ranging from 10% to almost 50% (31, 32). Twenty hospital-based studies published between 1977 and 2008 showed an association between improved hand hygiene practices and reduced infection (33). Additionally, hand hygiene programmes can be cost-effective: one study in Vietnam calculated that for every health care-associated infection averted, the hospital saved US$ 1000 (32). Behaviour change requires multifaceted approaches focusing on system change, administrative support, motivation, availability of alcohol-based hand sanitizers and soap, training and intensive education of health care workers, and reminders in the workplace (30, 34, 35). Compliance is a pervasive problem dependent on many structural factors, including professional position (doctor, nursing assistant, physiotherapist technician), department or type of care delivered, staffing ratios, and the presence of relevant safety equipment such as gloves (33). Moreover, programmes need to be context sensitive (for example, alcohol-based sanitizers should be used where clean water is not reliably available) (31, 35).

10. Safety checklists, such as surgical safety checklists, can have a positive impact on reducing both clinical complications and mortality. In one study performed in eight diverse hospitals in a mixture of high- and low-income settings, postoperative
complication rates fell on average by 36% and death rates fell by a similar amount following increased adherence to six core safety processes covered by a provided checklist (36). Moreover, if during the first year of instituting a checklist major complications are prevented, a hospital will realize a return on its investment (37). However, evidence suggests that the successful uptake of checklists requires education of clinical staff, material resources, and integration into broader institutional efforts and clinical context (38–40). These factors have been shown to be particularly relevant in low- and middle-income countries (38). Poor checklist implementation in low-income settings might not only fail to reduce patient safety risks, but may also introduce new risks such as gaming, disengagement and other behaviours harmful to patient care (38). Implementation of surgical checklists is more likely to be optimized in established, multifaceted patient safety programmes (38).

11. **Adverse event reporting** documents an adverse or unwanted medical occurrence resulting from specific health services or during a patient encounter (41). Reporting of adverse events is a strategy to raise awareness, increase transparency and foster accountability regarding unsafe care. Adverse events due to medical care represent a major source of morbidity and mortality globally. A study looking at the global burden of unsafe medical care estimated that there are 421 million hospitalizations in the world annually, with approximately 42.7 million adverse events occurring resulting in 23 million disability-adjusted life-years (DALYs) lost per year (42). Approximately two thirds of all adverse events occurred in low- and middle-income countries. Unsafe medical care may lead patients, especially in low-income countries, to opt out of using the formal health care system, thereby making unsafe care a significant barrier to access for many of the world's poor. Consumption of resources due to prolonged stay and extra care, as well as loss of wages and productivity, is a further consequence of unsafe care.

12. **Clinical decision support** (CDS) is the provision of knowledge and patient-specific information presented at appropriate times to enhance front-line health care delivery. CDS encompasses a variety of tools to enhance decision-making, such as clinical guidelines, condition-specific order sets, computerized alerts and reminders, documentation templates, and diagnostic support. CDS can be automated (embedded within electronic health records or mobile devices) or paper based. Although electronic CDS has many advantages, it does require ongoing technical assistance and may be subject to challenges of poor infrastructure, such as limited access to the Internet or unreliable power supply (43). A number of studies have examined the feasibility of implementing CDS in low- and middle-income countries, but there is only minimal evidence on its impact on health so far (43, 44). Studies note the need to balance CDS prompts that are in place to standardize care for better quality with the physician's autonomy to make decisions based on context, clinical expertise, and unique patient needs (43–45).

13. **Clinical standards, pathways and protocols** are tools to guide evidence-based health care that have been implemented internationally since the 1980s (46). In high-income settings, clinical pathways have been used to improve care for diverse conditions, including acute myocardial infarction and stroke. For example, a study from Australia showed that after introduction of a clinical pathway programme with checklists and reminders, an additional 48% of acute myocardial infarction patients received beta blockers within 24 hours of admission (47). Similarly, following introduction of a clinical pathway programme, an additional 55% of ischaemic stroke patients received aspirin or clopidogrel within 24 hours of admission (47). Another study from the United States incorporated “best of care” clinical protocols into clinician’s workflow via care provider order entry and showed that the decision support tool significantly increased the number of patients receiving aspirin for acute myocardial infarction (48).
Clinical pathways and protocols are also used in low- and middle-income settings, where national guidelines are published periodically and serve as an important source of reference for clinicians and public health officials, particularly for vertical disease-focused programmes such as tuberculosis and HIV/AIDS (49, 50).

14. **Clinical audit and feedback** is a strategy to improve patient care through tracking adherence to explicit standards and guidelines coupled with provision of actionable feedback. A common usage worldwide is to foster implementation of clinical practice guidelines, whereby audit and feedback is used to identify unjustified variation and increase guideline adherence. Audit at both individual and hospital levels is a key part of the Catalonian Cancer Strategy (Spain) for promoting equity (51). Even in rural, resource-limited settings, for example in the United Republic of Tanzania, clinical audit has been associated with a decrease in maternal mortality and morbidity (52). Research in higher-income countries has demonstrated that higher-performing facilities tend to deliver more timely, individualized and non-punitive feedback to providers than lower-performing facilities (53). While most studies do not quantify the extent to which audit and feedback concretely impacts adherence to standards, they do highlight the frequency of medical errors and provide a descriptive account of care quality in a given setting, helping clinical staff to identify and address areas for needed improvement. Noted challenges to successful implementation include resource availability, provider buy-in and leadership support for the process, consistency in understanding and implementation of guidelines, the accuracy of information in clinical records, and the effectiveness of continuing feedback mechanisms (51, 54).

15. **Morbidity and mortality reviews** provide a collaborative learning mechanism and transparent review process for clinicians to examine their practice and identify areas of improvement, such as patient outcomes and adverse events, without fear of blame (55). Morbidity and mortality reviews are used to bring together clinical staff to review, for learning purposes, what contributed to complications or a patient’s death (55). As such, they promote active recognition of mistakes or errors, and are an opportunity to learn as well as to identify needed process improvements. They have been shown to improve collaboration and communication, aid team-based learning, and result in changes in record keeping and governance relevant to patient safety (55–57). Historically they have been popular in higher-resourced contexts, but studies are emerging that demonstrate potential in low- and middle-income countries. Descriptive work from Nepal suggests that they are feasible in rural, low-resource contexts (56). Research across geographical and economic contexts points to the importance of senior administrative participation, engagement of both clinical and non-clinical staff, clear identification of goals, selection of cases based on their potential for improvement and coordinated follow-up for improvement activities as key success factors (55–57).

16. **Collaborative and team-based improvement cycles** are a formalized method that brings together multiple teams from hospitals or clinics to work together on improvement around a focused topic area over a defined period of time. Several of the common features of collaboratives are the sharing of ideas for improvement, iterative testing of actions leading to improvement, and mutual learning across multiple health care organizations. Studies from high-income settings, such as the National Surgical Infection Prevention Collaborative or the collaborative to decrease caesarean delivery rates, have shown that collaboratives can be very effective, reducing infection rates from 27% to 1.7% and caesarean section rates by 30% in a matter of months (58–60). Collaboratives have also been used in low-income settings. For example, the Ethiopian Hospital Alliance for Quality was a national collaborative sponsored by Ethiopia’s Federal Ministry of Health. It included 68 hospitals, of which 44 showed a 10% improvement in a 10-point measure of patient satisfaction from the beginning to the end of the study period (61).
USAID funded 54 collaboratives in 14 low- and middle-income countries during the period 1998–2008. A meta-analysis of 27 of these collaboratives in 12 low- and middle-income countries showed that high-level performance was maintained for an average of 13 months and the average time to reach 80% performance was 9.2 months, while the average time to reach 90% performance was 14.4 months (62).

17. **Formalized community engagement and empowerment** refers to the active and intentional contribution of community members to the health of a community’s population and the performance of the health delivery system. Community involvement in health has many forms and approaches, including the adoption of behaviours to prevent and treat diseases; effective participation in disease control activities; contribution to the design, implementation and monitoring of health programmes; and provision of resources for health. Participation and input to health systems can occur through various means, such as needs analysis, high-level priority setting or participation on governing boards. Many case examples can be found; for example, in Eritrea and Senegal, strengthened community participation in malaria control led to a decrease in severe malaria cases (63), and preliminary analysis of the Ebola outbreak indicates that more formalized community participation efforts resulted in a significant impact on the identification and tracing of cases and broader trust in local Ebola treatment units (64). Health system reform processes have increasingly recognized the essential contribution of communities; in Kenya, feasibility was tested in district-level annual health sector planning where community participation did influence target and priority setting. Challenges of formalized community involvement include building capacity to empower communities, providing tools and products to support community involvement, and appropriate follow-up and supervision by health professionals.

18. **Health literacy** is the capacity to obtain and understand basic health information required to make appropriate health decisions on the part of patients, families and wider communities (65). Poor health literacy is a challenge for health care quality; for example, patients with low literacy have difficulty following medical instructions, interacting with the health care system, and reading or complying with medicine prescriptions (65). Additionally, patients with low disease-specific knowledge report lower quality of life and have poorer health-related outcomes (65). Studies show educational interventions can have an impact on both knowledge improvement and clinical care seeking. For example, an intervention in Malawi led to a significant improvement in knowledge pertaining to mental health literacy (66), and a study in India found a positive association between health literacy programming and child vaccination rates (67). However, literacy gains lessen with time, so follow-up programming is key. Research suggests targeting influencers, such as teachers, to extend programmatic reach and ensure long-term impact (66, 67). Other considerations include the integration of health literacy curricula into required schooling, which is especially common with sexual health education (68).

19. **Shared decision-making** between providers and patients is often employed to tailor care to the patient’s needs and preferences, with the goal of achieving better patient outcomes. There is considerable evidence that patients want more information and greater involvement (69), but few studies have evaluated the impact on clinical outcomes, particularly in low- and middle-income countries. Inadequate communication between providers can result in missed services (70). Barriers to patient activation, however, exist in many public health sector settings, such as in clinics, which are often congested and overstretched (71). One study on adherence to antiretroviral therapy and shared decision-making or “patient activation” found that after diagnosis, patients actually preferred provider-led decision-making, but as they gained comfort with their HIV diagnosis, they were more open to a shared decision-making approach
to HIV treatment (71). There is no evidence that shared decision-making negatively impacts clinical care, though there may be limitations to what can be addressed in a single clinical visit, given such factors as local concepts of illness or historically grounded distrust of “Western” medicine, which may motivate patients to seek traditional medicines (70).

20. **Peer support and expert patient groups** link people living with similar clinical conditions in order to share knowledge and experiences. The approach complements and enhances other health care services by creating the emotional, social and practical support necessary for managing health problems and staying as healthy as possible. The extensive literature supporting the effectiveness of peer support and patient groups in HIV-infected adults provides insight into what is both feasible and achievable as a strategy for improving quality of care. A systematic review of the impact of support groups on people living with HIV showed that support groups were associated with reduced mortality and morbidity, increased retention in care and improved quality of life (72). Group visits have shown promise in providing individual patients with a peer support network to maximize adherence, improve patient retention, provide patient education, monitor side effects, and achieve therapeutic gains (73). In a South African support group, participants were significantly more likely to have an undetectable viral load and a CD4 cell count greater than 200 cells/mL at 12 months than those who did not participate in a support group (72). Given the severe human resource challenges worldwide, specifically the shortage of trained health care providers, support groups can play a larger role in improving the effectiveness of models of care (72).

21. **Patient feedback and experience of care** as a strategy to better understand and improve health service quality has risen dramatically, primarily in high-income countries. In these contexts there is a growing body of evidence that self-reported experience correlates with other, more objective, measures of clinical quality (74). Patient-reported measures are associated with better patient experience, adherence to treatment, greater engagement with their care, and better outcomes (75, 76). A few studies in low- and middle-income countries have shown that patients can adequately judge certain aspects of their care. For example, a study based in the United Republic of Tanzania found that patients proactively sought care based on their clinical needs, as judged by the type and severity of symptoms, as well as the perceived value of previously received care (77). Audit-based evidence from primary care settings in India found that patients have a good idea of what they both want and need from doctors and are willing to pay for it (78). Some critics are concerned that the main determinants of patient experience may be driven by factors such as the attractiveness of the environment or amicability of staff; however, it has been shown that patients are able to differentiate superficial comforts from more meaningful engagement.

22. **Patient self-management tools** are technologies and techniques used by patients and families to manage their health issues outside formal medical institutions. They are increasingly studied as quality improvement tools in the context of growing empowerment of patients worldwide. Given the increasing prevalence of chronic disease globally, diabetes self-management serves as a good example. Diabetic patients involved with self-management education programmes demonstrated significant reductions in glycosylated haemoglobin levels; in Uganda, patient outcomes included decreases in HbA1c percentage and diastolic blood pressure, and in Honduras, reports of self-care demonstrated improvements in over 50% of patients in blood sugar levels, diet and medication adherence (79). One economic analysis of interventions for diabetes found that diabetes self-management training reduces medical costs in developing countries in the short term (80). Because mobile phones are widely available, mHealth interventions for self-management can be a cost-effective tool (79).
Challenges to widespread implementation include both geographical and financial access to such self-management programmes, trained human resources at central and peripheral levels, and access to education (81).

23. **Health technology assessment** (HTA) is conducted to find out how health care technologies help maintain and improve health. HTA is used to inform policy and clinical decision-making related to both the introduction and diffusion of a wide spectrum of health technologies (82, 83). Assessing whether HTA affects quality involves looking at the long-term pay-off of policies that have been implemented and demonstrated success. HTA has many different applications, such as policy-making for influenza vaccination of children, informing the development of reimbursement schemes in Sweden (which resulted in decreased annual costs), influencing characteristics of health benefit packages in Thailand or Chile (84–86), or defining the role of specific laparoscopic surgery techniques in Kazakhstan (87). Cohesion amongst and between stakeholders is necessary for the successful implementation of HTA with participation from health care professionals, patient advocacy groups, and the industry, such as medical technology or pharmaceutical firms (88). Transparency in analytics, costs and outcomes (real-life patient data) is key for HTA assessment to be successful (83). Because timely and appropriate access to health care products, procedures and medicines can often impact patient outcomes, HTA represents an important mechanism for improving quality of care for both individuals and populations.
Annex references

1. Das J, Holla A, Das V, Mohanan M, Tabak D, Chan B. In urban and rural India, a standardized patient study showed low levels of provider training and huge quality gaps. Health Affairs (Millwood). 2012;31(12):2774–84.


