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Catalog of Approaches to Improve Technical Efficiency in Health Systems

Local Health System Sustainability Project
Task Order 1, USAID Integrated Health Systems IDIQ

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LOCAL HEALTH SYSTEM SUSTAINABILITY PROJECT

The Local Health System Sustainability Project (LHSS) under the USAID Integrated Health Systems IDIQ helps low- and middle-income countries transition to sustainable, self-financed health systems as a means to support access to universal health coverage. The project works with partner countries and local stakeholders to reduce financial barriers to care and treatment, ensure equitable access to essential health services for all people, and improve the quality of health services. Led by Abt Associates, the five-year, $209 million project will build local capacity to sustain strong health system performance, supporting countries on their journey to self-reliance and prosperity.

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ACRONYMS

ART	Antiretroviral Therapy
CAUSE	Confidence, Awareness, Understanding, Satisfaction, and Enactment
CCC	Chittagong City Corporation
CHEW	Community Health Extension Worker
CHW	Community Health Worker
CI	Confidence Interval
CSMBS	Civil Service Medical Benefit Scheme
FP	Family Planning
HFG	Health Finance and Governance Project
HMIS	Health Management Information System
LHSS	Local Health System Sustainability Project
LMIC	Low- and Middle-Income Country
NGO	Non-governmental Organization
OR	Odds Ratio
PPHCC	Provincial Public Health Coordination Committee
TE	Technical Efficiency
UCS	Universal Coverage Scheme
USAID	United States Agency for International Development
WHO	World Health Organization

INTRODUCTION

USAID's *Vision for Health System Strengthening 2030* sets out a framework for high-performing health care that is accountable, affordable, accessible, and reliable (USAID 2021). The framework emphasizes the importance of health system strengthening activities that improve equity, quality, and resource optimization. Within this context, the question of how health systems use financial, human, and other resources to achieve health outcomes takes on increased importance. One way performance is measured is by analyzing the system's efficiency level. Simply defined as the ratio of output to input, efficiency gives insights into how well a health system uses its resources to maximize access, equity, and public trust (Cylus, Papanicolas, and Smith 2016). There are two main frameworks for understanding efficiency: allocative and technical. Allocative efficiency scrutinizes the choice of either inputs (e.g., financial resources, human resources) or outputs (e.g., outpatient care, prevention) in a health system. It looks at a mix of goods and services to decide which combination benefits society the most. Allocative efficiency thus considers if health systems are "doing the right thing" with their resources. Allocative inefficiencies occur when inputs are deployed or outputs are produced that are not aligned with the priorities or needs of a society (Nassar et al. 2020). In contrast, technical efficiency describes the extent to which a system minimizes the use of inputs for desired outputs (Cylus, Papanicolas, and Smith 2016). Put simply, technical efficiency considers if health systems use resources "in the right way" to deliver health goods and services: can the same outputs be produced with fewer inputs? Can the same inputs produce more outputs?

The World Health Organization (WHO) estimates that 20–40 percent of health expenditures are wasted due to inefficiency (WHO 2010). The primary causes of inefficiencies are wasteful clinical care, financial waste, and governance-related waste (Cylus, Papanicolas, and Smith 2016). Inefficiencies can have severe consequences for patients' access to health care, lead to inequitable distribution of funds, and exacerbate mistrust between the health sector and other relevant stakeholders, including both local communities and ministries of finance. Furthermore, governments in low- and middle-income countries (LMICs) face both increased competition for resources and high burdens of health care needs. These pressures necessitate a detailed examination of different ways to combat inefficiency and waste. A key consideration for technical efficiency is the degree to which health systems have duplicative health interventions. The potential for this overlap is especially high in LMICs given the prevalence of donor-funded disease-specific vertical programs. Increasingly, then, governments and stakeholders are taking a system-wide approach to analyzing efficiency. This approach holistically examines health system functions (e.g., service delivery, financing, governance) to improve how resources are mobilized, allocated, and deployed (Sparkes, Durán, and Kutzin 2017).

Defining technical efficiency

Technical efficiency focuses on how resources are used to provide health services – it is a measure of whether inputs are being used in a way that minimizes waste (WHO 2022).

It is typically concerned with minimizing inputs (costs, human resources, etc.) to produce a given set of outputs (health products and services), or maximizing outputs given specific inputs (Cylus, Papanicolas, and Smith et al. 2016).

In 2018, the USAID-funded Health Finance and Governance (HFG) project published *The Health Systems Technical Efficiency Guide* (HFG 2018). This online resource documents a process to identify and understand technical inefficiencies. It also presents factors that can serve as underlying causes that contribute to technical efficiencies in various parts of the health system, as well as proposed interventions and tools to help address them. The guide identifies several common causes of technical inefficiency across health system functions (Table 1).

Table 1. Causes of technical inefficiency

Building block	Causes
Service delivery	• Poor clinical care • Weak referral systems • Inappropriate investment and use of equipment and technology • Inappropriate utilization of health care services
Health workforce	• Misalignment of health workforce numbers, skills, and distribution with population health needs • Poor performance, low productivity, and inefficient utilization of the health workforce
Pharmaceutical products	• Sub-optimal warehousing, inventory management, and transport • Poor quantification and procurement processes • Weak regulatory systems • Irrational medicine selection and inappropriate use
Financing and governance	• Lack of spending autonomy for local actors • Fragmented risk pool management • Corruption from weak public financial management • Ineffective payment systems

SOURCE: TECHNICAL EFFICIENCY GUIDE (HFG 2018)

While HFG's *Technical Efficiency Guide* and other literature can serve as a starting point for ministries of health and other stakeholders, a significant gap remains in implementing measurable solutions. As countries work to improve efficiency, they need to know which approaches have proven successful at addressing various causes of inefficiency. To add to this effort and complement HFG's guide, the USAID-funded Local Health System Sustainability Project (LHSS) developed this *Catalog of Approaches to Improve Technical Efficiency in Health Systems*. Drawing on peer-reviewed and gray literature, it presents interventions that LMICs have used successfully to address causes of technical inefficiencies in health systems. The Catalog aims to make information about successful attempts to improve technical efficiency easily accessible to country stakeholders.

The Catalog of Approaches is organized around health system functions, mainly mirroring the categories used in the *Technical Efficiency Guide*: Health Workforce, Financing, Governance, Digital Health, Service Delivery, and Pharmaceutical Products and Supply Chains. Within each of these building blocks, specific factors can limit technical efficiency. Maintaining the definition of maximizing outputs for a given set of inputs, the approaches highlighted in this Catalog have measurably improved technical efficiency based on correcting decisions, procedures, and processes to ensure that resources are used optimally. This Catalog, then, will allow practitioners to consider which interventions have more robust evidence bases to support their practical application, such as: enhancing worker and supervisor competencies through training, offering nonfinancial incentives for high performers, practicing task sharing to promote cost savings, implementing digital solutions to expand access to services, and reducing costs of procuring and distributing pharmaceutical products.

Methodology

The LHSS team identified approaches to include in this Catalog of Approaches through a two-step process. In the first step, LHSS conducted a desk-based review of published and gray literature using several databases: PubMed, World Bank, and USAID Development Exchange Clearinghouse. Annex A provides a detailed overview of this literature review process, and Annex B summarizes the terms used in each search. Following this search, the project consulted with technical advisors in each health system area from across the broader LHSS consortium to validate the final list of papers from the search and identify other papers and resources that fit the inclusion criteria.

Evidence limitations

While there is a robust literature on technical efficiency in the health system, development of this Catalog highlighted an important gap in the evidence. Most search results on technical efficiency highlight frameworks to understand it, efforts to measure it, or theoretical discussions of ways to improve it. The search returned very few results that set out to deliberately evaluate interventions to improve technical efficiency using typical measures of technical efficiency. Such indicators of technical efficiency typically focus on the costs of producing a specific output (Cylus, Papanicolas, and Smith 2016). While the literature search returned papers that used these metrics, they focused on documenting the current performance of a health system or health facilities. Almost none of them included approaches to improve technical efficiencies. In addition, most papers that included an intervention to improve or increase outputs did not include enough information to fully measure if and how resource use was being minimized to produce a given mix of goods and services – in line with the WHO's definition (WHO 2010).

Categorization of approaches

To address this literature gap, the review team categorized the emerging evidence into two groups:

- **Proven approaches:** The evidence uses either typical measures of technical efficiency or includes an examination of both inputs and outputs in ways that allow for an understanding of how the approach improves technical efficiency. For example, some papers compared the costs and outcomes of interventions that successfully increased the number or quality of health care services delivered at a facility versus a baseline. The review team determined that this evidence sufficiently demonstrated an ability to improve technical efficiency, even if the research team did not employ typical technical efficiency measures.
- **Promising approaches:** The evidence only includes a measurement of either inputs or outputs, and documents results that indicate potential improvements in technical efficiency. For example, much of the literature only measured changes in outputs – the number or quality of services delivered – without documenting the costs of the associated interventions or comparing them to a baseline. In some cases, the team could reasonably assume that facilities could implement an intervention without raising operating costs – such as by changing how information is shared within a facility. The team documented these approaches in the Catalog, with the caveat that more explicit research is needed to fully measure the impact.

Menu of approaches

At the end of this process, the LHSS team identified several approaches that align with several of the causes of technical inefficiency identified in HFG's *Technical Efficiency Guide.* These papers in total describe 14 approaches. For each approach, we discuss the gaps or challenges

that limit technical efficiency; the overall theory of change of the specific approach that mitigates those gaps; how countries have tailored the general approaches in different ways; and the evidence from the literature that demonstrates the potential impact and other considerations that stakeholders should consider when applying the approach.

- Health workforce
  - Task sharing to reduce costs and match services with needs
  - Increasing health worker motivation
  - Improving provider performance through peer-to-peer on-the-job skills building
  - Improving oversight and accountability for provider performance
- Financing
  - Increasing strategic purchasing
  - Contracting out to non-government providers
  - Changing reimbursement rates of benefit package services to incentivize cost-effective care
- Governance
  - Improving functioning and design of units at subnational levels
  - Capacity development in leadership, management, and governance
- Digital Health
  - Digitizing HMIS to support improved provider performance
  - Digital financial services
- Service Delivery
  - Integrating health services
- Pharmaceutical Products and Supply Chains
  - Streamlining supply chain levels to reduce costs and stock-outs
  - Using performance data to incentivize appropriate dispensing

Health Workforce

A trained, motivated, and well-equipped health workforce that is composed of an appropriate mix of cadres promotes technical efficiency. Technical inefficiencies derived from the health workforce can manifest in multiple ways that result in lower-quality care, limited productivity, or more expensive inputs (e.g., a doctor delivering services that could be offered by a nurse. Poor human resource planning can contribute to misalignments between how health workers are deployed (e.g., geographic coverage, mix of cadres, gender composition) and the needs of the communities they are meant to serve (Sousa et al. 2013, WHO 2006). For example, there is a global mismatch between where people live and where health workers are located. Approximately half of the world's population – but only 38 percent of nurses and one-quarter of doctors – reside in rural areas (Dolea, Storemont, and Braichart 2010). Evidence-informed planning can improve technical efficiency and requires strong management structures and information systems to use data on the available staff, their qualifications, and their deployment (HFG 2018). Donor-funded tools have helped to identify resource gaps and generate a stronger evidence base for health workforce planning (see text box). However, evaluations of these tools have focused on their use and the quality of the information they revealed; there appears to be a gap in the literature evaluating how this evidence has translated into improved health system performance and improved efficiency (Kunjumen et al. 2022).

Beyond these tools, our scan of the literature identified evidence about four approaches to improve technical efficiency within the health workforce: task sharing to reduce costs and match services with needs; increasing health worker motivation; improving provider performance through peer-to-peer on-the-job skills building; and improving oversight and accountability for provider performance.

Tools for optimizing the health workforce

- The Workload Indicators of Staffing Need (WISN) software is a tool that records, analyzes, and reports data related to staff availability and needs at the facility level.
- The HOT4ART, HOT4PHC, and HOT4FP tools help facility-level managers and above site planners optimize HRH for various services through task sharing and differentiated service delivery models.

Approach 1: Task sharing and task shifting to reduce costs and match services with needs (Proven approach)

Failure to have a fit-for-purpose health care team can contribute to technical inefficiencies. It can create an imbalanced health workforce that relies on more expensive labor inputs (e.g., doctors over nurses and midwives). It can also cause people to delay seeking care if shortages in specific cadres limit access, which in turn can necessitate more expensive emergency services

(Brouwer et al. 2015) or limit treatment adherence in ways that create a need for more care (Martin and DiMatteo 2013).

Task sharing is a globally recognized approach to address health workforce shortages (Bhutta, Zulliger, and Rogers 2010; Perry et al. 2014). Task-sharing interventions seek to make better use of the health workforce in ways that reduce costs and make services more accessible to users. Successful approaches either increase coverage and use of priority services without investing in the production of more health workers or reduce the need for more expensive treatments – and thus improve technical efficiency.

Approach overview

This approach is informed by papers that document efforts in four countries to task share various service delivery aspects to lower-level cadres or lay health workers. Their task-sharing and task-shifting efforts typically have focused on expanding access to products and services that reduce the need for more expensive or more frequent procedures or treatments. Examples include expanding the reach of family planning (FP) programs that empower women and couples to better manage their fertility decisions (HIPs 2021; HIPs 2015) and increasing the number of providers capable of offering antiretroviral therapy (ART) to better manage HIV treatment (Mdege, Chindove, and Ali 2012).

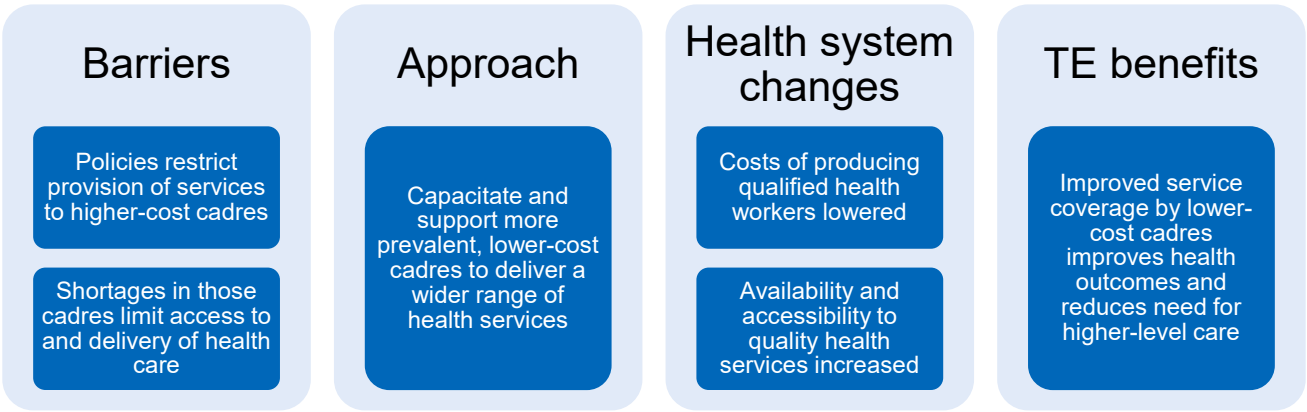
The literature highlights that task-sharing and task-shifting efforts require several critical inputs to be successful:

- Policy changes to expand scopes of practice for lower-level cadres
- Development of new training curricula to cover the expanded scope
- Strengthened supervision to ensure quality of task-shared services delivered by lower-level cadres
- Credible supply chains that can ensure that lower-level cadres (especially community-based staff) have access to the commodities they need to deliver task-shared/task-shifted services

Countries considering this model should consider all these elements before moving forward. For example, a recent global review highlighted the lack of supportive scopes of practice as a key barrier contributing to the existence of untapped opportunities to task share and task shift services for child health (Zhao et al. 2021).

Figure 1 presents a high-level overview of the theory of change for this model.

Figure 1. Improving technical efficiency by through task sharing and task shifting



NOTE: TE=TECHNICAL EFFICIENCY

Global evidence and implementation tips

Much of the literature on task sharing and task shifting focuses on feasibility of models – whether lower-level cadres can be adequately supported to deliver expanded service packages without reduced quality of care. Within this literature, our rapid scan identified a few resources that specifically measured inputs and outputs in ways that highlighted improvements in technical efficiency (Table 2). These papers include operations research conducted as part of the effort to task share FP to community health extension workers (CHEWs) in Northern Nigeria (Charyeva et al. 2015) and a global review of the evidence for task sharing of ART in LMICs (Mdege, Chindove, and Ali 2012).

Table 2. Illustrative evidence of outcomes from adopting task-sharing and task-shifting models*

Study	Intervention model	Study outcomes	TE implications
Charyeva et al. 2015*	Historically, CHEWs focused on short-acting FP methods (e.g., condoms, pills, emergency contraceptives). Due to facility staffing shortages, CHEWs were a primary source of care, resulting in limited options for couples seeking long-acting FP methods. Government trainers delivered clinical training and supportive supervision to build CHEWs' competencies to deliver contraceptive implants, generate demand, and strengthen referrals to facilities staffed by doctors and midwives.	By task sharing implant delivery to CHEWs, the contraceptive method became more available without having to hire more and more expensive health workers. Through the initiative, the percent of facilities with implants available increased from 7% to 91%. Use of implant contraceptives remained low, though, reflecting low overall FP use and highlighting the need for additional demand interventions.	Task sharing helps improve the reach and availability of services without increasing staffing costs. It can also improve technical efficiency by helping clients access more effective services that reduce the need or frequency of facility visits (e.g., adopting a long-acting FP method over a short-acting method). However, in contexts where demand for services is low, it is a necessary – but not sufficient – input to technical efficiency.
Mdege, Chindove, and Ali 2013*	The literature on task sharing for ART includes two models with measurements that revealed technical efficiency gains: • Shifting ART services in rural Uganda and Kenya from facility-based models staffed by health workers to mobile clinics staffed by peer health workers or to home-based care delivered by volunteers • Shifting care responsibility at facilities in South Africa from doctors to nurses	Task-shifting models reduced physician time requirements by 76–83% and cut costs by up to 66% depending on the degree to which tasks were appropriately shared/shifted to lower-level cadres. These savings came without notable changes in treatment adherence.	For experienced people living with HIV (i.e., those already stable on treatment), task-shifting and task-sharing models can help health systems maintain similar levels of outputs at lower costs.

*Outcomes are statistically significant at the 0.05 level.

In the above experiences, providers reported that supportive supervision processes resulted in more useful feedback that made them more confident and motivated as they delivered their expanded scope. In addition, local government staff indicated that revised practices helped generate more useful data to incorporate into annual planning processes.

Key takeaways

1. Task sharing and task shifting are effective approaches to improve technical efficiency but require several critical inputs to optimize outcomes (e.g., policy support, supply chains, supportive supervision).
2. In contexts where priority services are in low demand, task-sharing and task-shifting models may also require additional demand-side investments to optimize outputs.

Learn more

Bhutta ZA, ZS Lassi, G Pariyo, and L Huicho. 2010. *Global experience of community health workers for delivery of health related millennium development goals: a systematic review, country case studies, and recommendations for integration into national health systems*. Geneva: World Health Organization, Global Health Workforce Alliance.

Brouwer, ED, D Watkins, Z Olson, J Goett, R Nugent, and C Levin. 2015. "Provider costs for prevention and treatment of cardiovascular and related conditions in low- and middle-income countries: a systematic review." *BMC Public Health* 15:1183. doi: 10.1186/s12889-015-2538-z.

Charyeva, Z, O Oguntunde, N Orobaton, E Otolorin, F Inuwa, O Alalade, D Abegunde, and S Danladi. 2015. "Task shifting provision of contraceptive implants to community health extension workers: results of operations research in northern Nigeria." *Global Health: Science and Practice*. 3(3): 382–394.

High Impact Practices in Family Planning (HIPs). 2015. *Community Health Workers: Bringing family planning services to where people live and work*. Washington, DC: USAID.

HIPS. 2021. *Pharmacies and Drug Shops: Expanding contraceptive choice and access in the private sector*. Washington, DC: HIPs Partnership.

Martin, LR, and MR DiMatteo. 2013. *The Oxford Handbook of Health Communication, Behavior Change, and Treatment Adherence*. OUP USA.

Mdege, NM, S Chindove, and S Ali. 2013. "The effectiveness and cost implications of task-shifting in the delivery of antiretroviral therapy to HIV-infected patients: a systematic review." *Health Policy and Planning* 28(3): 223–236.

Perry HB, R Zulliger, and MM Rogers. 2014. "Community health workers in low-, middle-, and high-income countries: an overview of their history, recent evolution, and current effectiveness." *Annual Review of Public Health* 35:399–421.

Zhao, Y, C Hagel, R Tweheyo, R. N Sirili, D Gathara, and M English. 2021. "Task-sharing to support paediatric and child health service delivery in low- and middle-income countries: current practice and a scoping review of emerging opportunities." *Hum Resources for Health* 19, 95.

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Approach 2: Increasing health worker motivation (Proven approach)

Health worker motivation is a critical factor that shapes how efficiently health services are delivered. Low levels of motivation are associated with high levels of absenteeism, low productivity, and low retention and high staff turnover (Fritzen 2007). These effects translate into lower technical efficiency in multiple ways. Less-motivated workers deliver fewer or lower-quality services, leading to suboptimal outcomes. Low retention and high staff turnover require countries to continuously invest more resources in training to ensure there are sufficient staffing levels.

The global literature identifies several elements that contribute to a motivated health workforce. These include financial remuneration; opportunities for career development and skills building; environmental factors such as the infrastructure and resources available at their facilities; management and supervision systems; and personal recognition (Willis-Shattuck et al. 2008; Ghimire et al. 2013; Ojakaa, Olango, and Jarvis 2014). While governments and donors have sought to address these factors and improve health worker motivation, many solutions require additive investments that do not necessarily improve technical efficiency. For example, the World Bank has invested in performance-based financing schemes that provide bonus payments to health workers based on the achievement of predetermined metrics. While evaluations of these efforts have demonstrated their potential to increase outputs or improve quality in specific contexts, the interventions require increased resource inputs to achieve those results. However,

the global literature does document several examples where nonfinancial incentives successfully addressed health worker motivation gaps, helping to increase outputs without adding inputs.

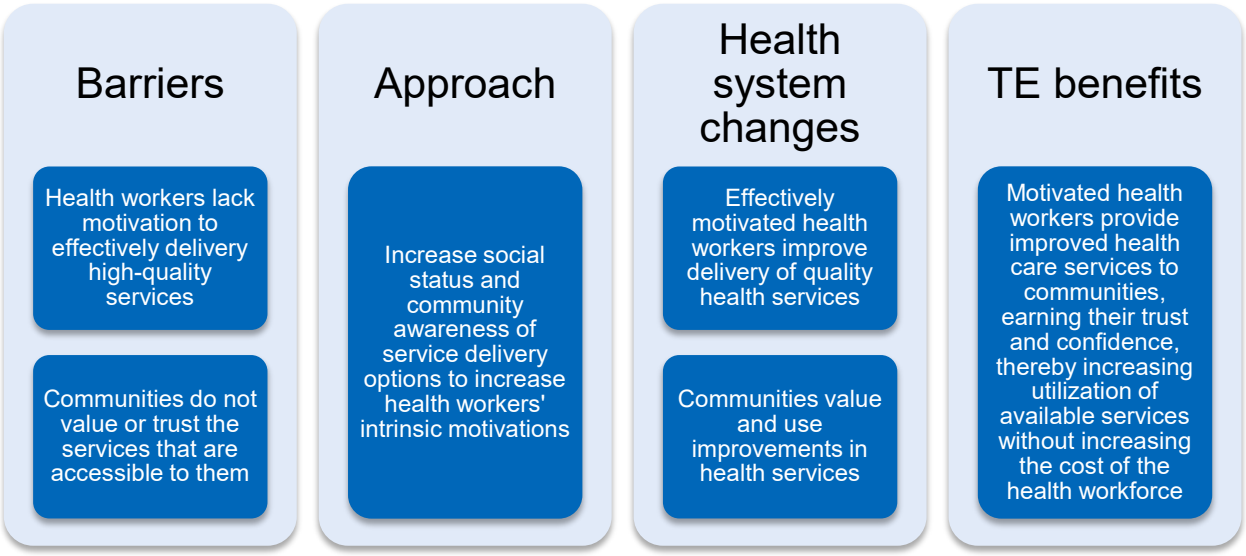
Approach overview

Personal recognition is one area to improve health worker motivation without increasing costs or inputs. A systematic review of the literature on health worker motivation found that 70 percent of studies identified appreciation from managers, colleagues, or the community as an important factor in motivating health workers. In six of the articles this paper reviewed, the authors found that personal recognition was one of the most important motivators (Willis-Shattuck et al. 2008).

This approach typically attempts to increase the perceived importance and value of health workers' efforts among peers and the local community. By doing so, communities gain trust in the health system and increase utilization. At the same time, health workers feel a greater sense of pride and responsibility to deliver quality services. While interventions can target any cadre, the literature scan identified evidence indicating its ability to improve technical efficiency when it is focused on lower-level cadres, especially community health workers (CHWs). Researchers theorize that this type of model works well with CHWs due to their lower status and limited professionalization vis-à-vis other health workers. As a result, they may be particularly underutilized by local communities or respond more to attempts that increase their own sense of value.

Figure 2 presents a high-level overview of the theory of change for this model.

Figure 2. Improving technical efficiency by improving health worker motivation



Global evidence and implementation tips

There is a broad literature that seeks to understand health worker motivation. Within that resource base, our rapid scan identified two papers that illustrate how this approach can increase technical efficiency (Table 3). In one, researchers in Guinea-Bissau evaluated three different approaches to improving the motivation of CHWs – a newly introduced cadre in the country – through a randomized control trial (Fracchia, Molina-Millán, and Vicente 2019). In the second, the authors compiled global evidence on the ability of performance-based incentives of all kinds to motivate CHW improvements (Gadsen et al. 2021).

Table 3. Illustrative evidence of outcomes by improving health worker motivation

Study	Intervention model	Study Outcomes	TE Implications
Fracchia, Molina-Millán, and Vicente 2019*	1,015 CHWs were randomly assigned to a treatment or control: 1. **Treatment 1** recognized CHWs with small honorific awards at public ceremonies 2. **Treatment 2** sent SMS texts to promote the value of CHWs to their communities 3. **Treatment 3** used videos to increase CHWs' perceived value of their work	Treatment 1 was associated with positive and statistically significant improvements in CHW productivity in specific health areas: • Vaccination rates for children under 5 increased by 4 percentage points • Rates of sick children in the last 15 days decreased by 7 percentage points (p<0.01) • Probability of taking a malaria test in cases where malaria symptoms appeared increased by 14 percentage points (p<0.1)	Nonfinancial incentives that raise the social status of CHWs can effectively motivate them to improve their productivity at minimal costs. Recognition awards are especially powerful when they are determined by the recipients and have strong social – if not financial – value recognized by CHWs and the community.
Gadsden et al. 2021*	The authors identified 12 studies that measured impacts of performance-based incentives on CHW performance. Most featured financial rewards that increased inputs and did not address technical efficiency; four included a nonfinancial incentive, such as a household good or office asset, or social recognition.	When CHWs received nonfinancial awards in public ceremonies, their performance improved: • In India, mothers in intervention areas reported a 15% increase in the number of antenatal care visits (p=0.03) • In El Salvador, FP information provided to women increased by 5.8% • In Zambia, CHWs increased their condom sales by 7.5x compared to CHWs receiving financial incentives or in control groups.	

*Unless otherwise noted, all outcomes are statistically significant at the 0.05 level.

Key Takeaways

1. Nonfinancial incentives and public recognition are effective models to improve the performance of CHWs – and contribute to improved technical efficiency – due to their lower status and limited professionalization vis-à-vis other health workers.
2. Efforts to use nonfinancial rewards and public recognition to improve health worker performance should involve these workers in the design and identification of appropriate motivations.

Learn More

Fracchia, M, T Molina-Millán, and PC Vicente. 2019. "Incentivizing community health workers in Guinea-Bissau: experimental evidence on social status and intrinsic motivation." Paper presented at NOVAFRICA Seminar Series 2019–2020. Carcavelos: NOVAFRICA.

Fritzen, SA. 2007. "Strategic management of the health workforce in developing countries: what have we learned?" *Human Resources for Health* 5(4).

Gadsden, T, SA Mabunda, et al. 2021. "Performance-based incentives and community health workers' outputs, a systematic review." *Bulletin of the World Health Organization.* 99 (11): 805–818.

Ghimire, J, RP Gupta, et al. 2013. "Factors associated with the motivation and de-motivation of health workforce in Nepal." *Journal of Nepal Health Research Council* 11(24, May):112–118.

Ojakaa, D, S Olango, and J Jarvis. 2014. "Factors affecting motivation and retention of primary health care workers in three disparate regions in Kenya." *Human Resources for Health.* 12: 33.

Willis-Shattuck, M, P Bidwell, S Thomas, L Wyness, D Blaauw, and P Ditlopo. 2008. "Motivation and retention of health workers in developing countries: a systematic review." *BMC Health Serv Res* 8:247.

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Approach 3: Improving provider performance through peer-to-peer on-the-job skills building (Promising approach)

A knowledgeable and skilled health workforce is a critical input to maximize health outcomes. Interventions to improve provider performance occur either during pre-service education or on the job through in-service training and continuing medical education. The link between pre-service interventions and technical efficiency can be indirect and hard to measure as there are multiple confounding variables. However, there is a rich literature measuring outcomes of in-service skills-building programs. Many of these programs require increased numbers of trainers, supervisors, or other inputs, and thus do not necessarily improve technical efficiency. Others seek to better use existing resources within the facility to better support providers. These programs seek to improve provider performance – and patient outcomes – by changing how health workers engaged and communicated with each other on the job.

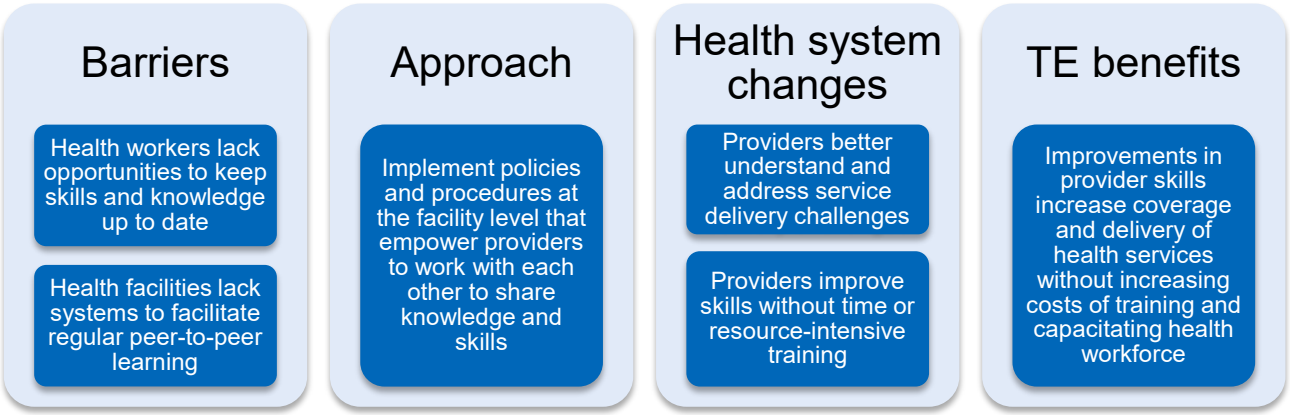
Approach overview

Peer-to-peer on-the-job skills building programs generally focus on improving peer learning and communication practices at the facility level to improve health worker performance (Aboagye et al. 2020; Adamu et al. 2019; Sarin et al. 2017; Shimp et al. 2017). While these efforts vary in the specific communication methods employed and the staff involved, they all seek to help staff identify problems and solutions that will allow them to increase their productivity. Specific communication models included:

- Improving risk communication strategies between facility management and clinical staff (Aboagye et al. 2020) to decrease providers' susceptibility to disease outbreaks, and thus minimize resource loss in emergency situations and enhance patient outcomes.
- Using quarterly staff meetings and routine service data to communicate and understand performance gaps (Shimp et al. 2017) through joint discussions and planning with district- and facility-level management that create a structured opportunity for health workers to identify and adopt their own recommendations for improvements.
- Creating internal quality improvement teams at the facility level to give providers a dedicated avenue for identifying performance issues and testing solutions (Adamu et al. 2019; Sarin et al. 2017). This model has distinguished itself by consciously integrating increased communication into continuous quality improvement processes using rapid plan-do-study-act cycles.

Figure 3 presents a high-level overview of the theory of change for this model.

Figure 3. Improving technical efficiency by using peer-to-peer communication to improve provider performance



Global evidence and implementation tips

Evaluators have measured how structured opportunities for improving peer-to-peer communication practices within health facilities improve outcomes in ways that contribute to improved technical efficiency. Studies include a mixed-methods cross-sectional study of three hospitals that applied a CAUSE (Confidence, Awareness, Understanding, Satisfaction, and Enactment) risk communication model during public health emergencies in Ghana (Aboagye et al. 2020); a retrospective, longitudinal case study to discern the impact of the quarterly review meetings on immunization programs in Ethiopia, Kenya, Tanzania, and Uganda (Shimp et al. 2017); a plausibility evaluation design at five primary health care facilities using integrated continuous quality improvement teams in Kano, Nigeria (Adamu et al. 2019); and a similar effort in India (Sarin et al. 2017). The outcomes of these studies illustrate how peer-to-peer communication and on-the-job learning strategies can improve provider performance (Table 4). They also emphasize the importance of strong local leadership and local government sponsorship of these efforts as key enablers of success.

Table 4. Illustrative evidence of outcomes from peer-to-peer communication and learning models

Study	Intervention model	Study outcomes	TE implications
Aboagye et al. 2020*	Facility management began applying a risk communications model that sought to increase Confidence, Awareness, Understanding, Satisfaction, and Enactment (CAUSE) of nurses responding to infectious disease outbreaks.	1,939 nurses were measured on composite scores of task and contextual performance. Task performance covered technical care, emotional support, and care within teams; contextual performance covered non-clinical aspects of the job. Task performance scores improved by 65% following the intervention, and contextual performance scores by 55%.	Changing how facility management communicates with its staff can improve performance, contributing to increased productivity and improved care for clients.
Shimp et al. 2017	District and facility leaders used routine data, peer reviews, and provider self-assessments to identify challenges in immunization programs. Through quarterly reviews, facility staff iteratively engaged the data and developed, implemented, and adapted performance improvement strategies.	Routine service delivery data from facilities in 100 districts across Ethiopia, Kenya, Tanzania, and Uganda demonstrated improved program performance and health worker capacity. For example, between 2013 and 2015, the number of under-vaccinated children (0–11 months) in three regions in Tanzania declined from approximately 100,000 to 5,000.	Engaging providers to develop improvement strategies can lead to feasible, effective solutions. Incorporating efforts into existing meetings minimizes resource needs and promotes sustainability.
Adamu et al. 2019*	Facilities created internal quality improvement teams to apply rapid plan-do-study-act cycles. Teams identified knowledge and practice gaps that limited uptake of childhood immunizations and adopted tailored interventions that they integrated into existing operations (e.g., improving communications with caregivers).	Daily measurements in key areas (screening of immunization records, immunizations delivered, etc.) showed decreases in missed opportunities for vaccinations. Facilities implementing the model more consistently met or exceeded benchmarks for screening children compared to control facilities.	Intentionally creating opportunities for facility staff to engage in problem and solution identification can, with negligible investments, allow them to address productivity gaps on their own when the causes of those gaps are within their immediate control.
Sarin et al. 2017*	Health facilities in 27 districts across six states in India tested a rapid plan-do-study-act quality improvement model focused on improving maternity-related health outcomes.	Rates of antenatal care counseling increased by 44%; sterile cord care by 24%; and oxytocin delivery within one minute by 50%.	

*Outcomes are statistically significant at the 0.01 level. Other outcome evidence presented in table did not include measures of statistical significance.

Key takeaways

1. Peer-based teams can effectively manage ongoing quality improvement processes within existing facility systems to increase service delivery outputs at minimal additional cost.
2. Engaging health workers in the identification of problems and creation of solutions can lead to more feasible, targeted approaches that improve staff performance.

Learn more

Aboagye, AK, B Dai, and EK Bakpa. 2020. "The effect of risk communication on the nurses' task and contextual performance in disease outbreak control in Ghana: Application of the cause model." *International Journal of Health Planning and Management.* 35(4): 922–938.

Adamu, AA, OA Uthman, MA Gadanya, and CS Wiysonge. 2019. "Implementation and evaluation of a collaborative quality improvement program to improve immunization rate and reduce missed opportunities for vaccination in primary health-care facilities: a time series study in Kano, Nigeria." *Expert Review of Vaccines* 18(9): 969–991.

Chen, Lincoln C. 2010. *Striking the right balance: health workforce retention in remote and rural areas*. Bull World Health Organ 88: 323.

Dolea, Carmen, Laura Stormont, and Jean-Marc Braichet. 2010. "Evaluated strategies to increase attraction and retention of health workers in remote and rural areas." *Bulletin of the World Health Organization.* 88: 379–385.

Kunjumen, T, M Okech, K Diallo, P Mcquide, T Zapata, and J Campbell. 2022. "Global experiences in health workforce policy, planning and management using the Workload Indicators of Staffing Need (WISN) method, and way forward." *Human Resources for Health* 19:152.

Sarin, E, SK Kole, R Patel, A Sooden, S Kharwal, R Singh, M Rahimzai, and N Livesley. 2017. "Evaluation of a quality improvement intervention for obstetric and neonatal care in selected public health facilities across six states of India." *BMC Pregnancy Childbirth* 17(1): 134.

Shimp, L, N Mohammed, N., L Oot, E Mokaya, T Kiyemba, G Ssekitto, and A Alminana. 2017. "Immunization review meetings: "Low Hanging Fruit" for capacity building and data quality improvement?" *The Pan-African Medical Journal.* 27(Suppl 3): 21.

Sousa, A, RM Scheffler, Jennifer Nyoni, and Ties Boerma. 2013. "A comprehensive health labour market framework for universal health coverage." *Bulletin of the World Health Organization* 91: 892–894.

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Approach 4: Improving oversight and accountability for provider performance (Promising approach)

Many opportunities for technical inefficiencies emerge in the interactions between health workers and clients (Nassar et al. 2020). It is therefore essential that health workers be held accountable for their performance. Supportive supervision practices are a recognized approach to monitor and support health workers to optimize their performance and can help overcome other health workforce gaps (HRH2030 2019). These practices provide opportunities to reinforce knowledge gained through pre-service and in-service training, identify areas of correction, and bridge gaps between knowledge and practice. However, implementation of supportive supervision programs is typically constrained by supervisors who have insufficient training and resources to do the job (HRH2030 2019).

Four papers highlighted interventions that sought to improve the ability of supervisors to provide effective oversight and hold health workers accountable for improving their performance.

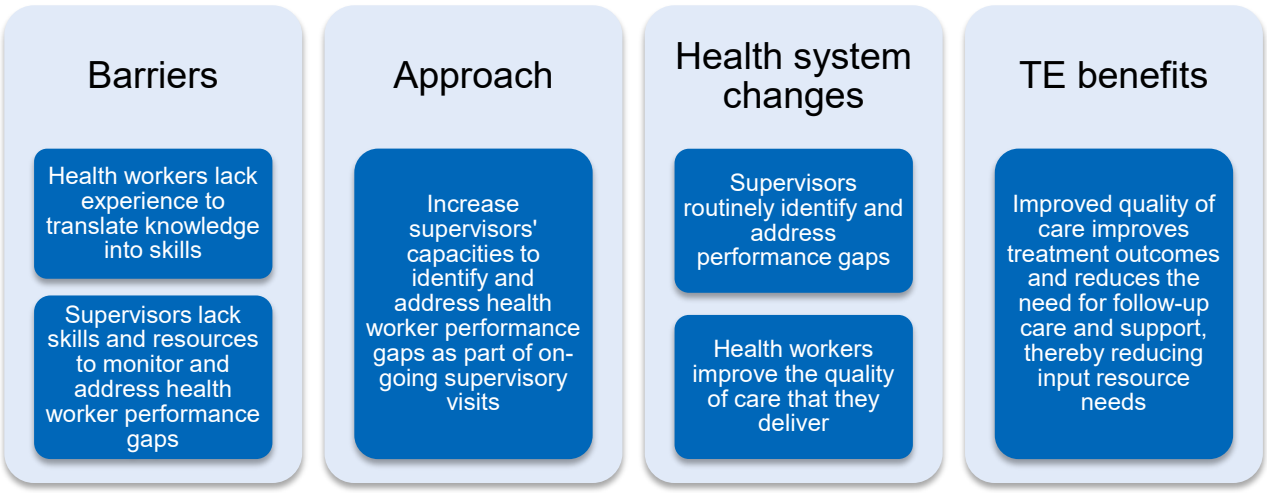
Because these interventions strengthened existing supervision practices with negligible ongoing costs – and because the supervision translated into improved health worker performance – they provide a promising approach for addressing technical inefficiencies. This approach focuses on the health workforce, with additional considerations relevant to service delivery and governance building blocks.

Approach overview

Efforts to strengthen supportive supervision typically sought to develop defined processes and user-friendly tools that enabled supervisors to improve their engagement and oversight of health workers. Interventions identified in the literature all focused on developing service-specific checklists and training existing supervisors to use these tools to identify performance gaps, work with facility staff to develop plans to address them, and monitor and encourage implementation of these plans. These efforts covered maternal and newborn health care in Ethiopia (Ayalew et al. 2017), malaria case management in Nigeria (Bello et al. 2013), use of malaria rapid diagnostic tests in Democratic Republic of the Congo, Ghana, Kenya, Malawi, Mali, Mozambique, Tanzania, and Zambia (Eliades et al. 2019), and primary health care in Tanzania (Renggli et al. 2018).

Figure 4 presents a high-level overview of the theory of change for this model.

Figure 4. Improving technical efficiency through effective supportive supervision



Global evidence and implementation tips

The global literature provides strong evidence that improving supportive supervision can increase health outputs – and thus promises to also improve technical efficiency (Table 5). Studies include a post-evaluation that compared the performance of 11 facilities implementing a standards-based management and recognition model with 11 control facilities in Ethiopia (Ayalew et al. 2017); a mixed-methods approach that examined the cost of supervision practices and qualitative improvements in health worker performance in public facilities using a robust supportive supervision model in Tanzania (Renggli et al. 2018); a pre- and post-intervention evaluation to compare performance changes at facilities adopting supportive supervision practices with control facilities (Bello et al. 2013); and a similar effort supported by the USAID-funded MalariaCares project in eight sub-Saharan African countries (Eliades et al. 2019).

Table 5. Illustrative evidence of outcomes from improving supportive supervision

Study	Intervention model	Study outcomes	TE implications
Ayalew et al. 2017	Ethiopia's Ministry of Health developed a new Standards-Based Management and Recognition model. The model translated national policies and guidelines into performance standards for health centers and hospitals in 10 technical areas (e.g., routine antenatal care, labor, and delivery). Facility managers and providers were trained on these standards and managers led facility teams to identify performance gaps, root causes, and solutions.	These efforts improved provider performance and quality of care for specific services. While there was no statistically significant change in antenatal care, providers at the facilities using the new system improved performance scores for uncomplicated labor and delivery by 18% and immediate postnatal care by 44% (both $p<0.01$).	Improvements occurred when standards and supervision reinforced knowledge gained during pre-service education. Nurses delivered antenatal care but lacked specialized training that could be reinforced. Labor and delivery and postnatal care were delivered by midwives with specialized skills that standards could reinforce.
Renggli 2018*	Local governments in Tanzania rolled out a standardized supportive supervision model for primary care. Supervisors were trained to use a digital checklist that measured facilities on six quality dimensions, identify performance gaps, and develop action plans. Findings were fed into comprehensive council health plans to provide a governance foundation for corrective actions.	The new model, including the digital tool, decreased labor hours needed for supportive supervision visits by 2% in rural areas and 17% in urban areas – making supervisors more efficient and effective at their tasks.	Providers reported that the model resulted in more useful feedback that made them more confident and motivated. Local government staff also indicated that the tool generated more useful data for annual planning.
Bello et al. 2013*	Government supervisors in Jos, Nigeria, adopted new supervisory checklists based on WHO guidelines for malaria and integrated management of childhood illnesses, and trained supervisors to use these tools to identify performance gaps and coach health workers to take corrective actions.	The percent of health workers correctly following guidelines increased from 33 to 71. At the end, 82% of health workers in the treatment group correctly named the main symptoms of malaria, compared with 4% in the control. 60% in the treatment group followed drug dispensing guidelines, while only 2% in the control group did.	Incorporating provider behavior change elements into supportive supervision practices – and ensuring that providers have access to other inputs (medicines, infrastructure, etc.) – are important steps to optimize outcomes from this approach.
Eliades et al. 2019*	The USAID-funded MalariaCare project supported public supervisors in eight countries to adopt a new checklist to support correct use of malaria rapid diagnostic tests.	On average, 91% of facilities correctly used the tests after three visits, up from 85%.	Facility scores improved the most when facilities were staffed by cadres who had already received training that supervisory visits could reinforce.

*Unless otherwise noted, all outcomes are statistically significant at the 0.05 level.

Key takeaways

1. By changing how supervisors oversee and engage with health care workers, supportive supervision practices increase technical efficiency by increasing the outputs from the existing health workforce.
2. Supportive supervision processes improve health worker performance the most when they target practices that providers have existing skills and knowledge in.
3. Integrating supportive supervision with other interventions – government planning, provider behavior change – can reinforce positive impacts.

Learn more

Ayalew, F, G Eyassu, N Seyoum, J van Roosmalen, E Bazant, YM Kim, A Teleberhan, H Gibson, E Daniel, and J Stekelenburg. 2017. *Using a quality improvement model to enhance providers' performance in maternal and newborn health care: a post-only intervention and comparison design*. BMC Pregnancy Childbirth. 17(1): 115.

Bello, DA, ZI Hassan, and TO Ao. 2013. "Supportive supervision: an effective intervention in achieving high quality malaria case management at primary health care level in Jos, Nigeria." *Annals of African Medicine*. 12(4): 243–51.

Deussom, R., D Mwarey, M Bayu, SS Abdullah, and R Marcus. (2022). *Systematic review of performance-enhancing health worker supervision approaches in low- and middle-income countries*. Human Resources for HealthHealth. 20(1): 2.

Eliades, M J, Wun, J, Burnett, SM, Alombah, F Amoo-Sakyi, P Chirambo, G Tesha, KM Davis, and P Hamilton. 2019. "Effect of Supportive Supervision on Performance of Malaria Rapid Diagnostic Tests in Sub-Saharan Africa." *The American Journal of Tropical Medicine and Hygiene*. 100(4): 876–881.

HRH2030. (2019). *Enhanced Supervision Approaches: Landscape Analysis*. Arlington, VA: Chemonics International.

Renggli, S, I Mayumana, D Mboya, C Charles, J Maeda, C Mshana, F Kessy, F Tediosi, C Pfeiffer, A Schulze, A Aerts, and C Lengeler. 2018. "Towards improved health service quality in Tanzania: An approach to increase efficiency and effectiveness of routine supportive supervision." *PLoS One* 13(9): e0202735.

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Financing

Health financing is a key determinant in accelerating progress toward universal health coverage, as it defines the amount of resources available for health and how those resources are used to provide the health services and financial protection that people need. There is potential to improve technical efficiency in each of the three main health financing functions: how resources for health are mobilized (from government revenues, insurance schemes, out-of-pocket payments by households, and international assistance); how resources are pooled to manage risks; and how resources are used to purchase health services that deliver national health priorities (including how health providers are paid) (WHO n.d.). Common causes of technical inefficiency within financing functions include insufficient autonomy for lower-level government health teams and health providers to make spending decisions, fragmentation in how funds are pooled, weak public financial management (leading especially to waste of resources through poor procurement), and provider payment mechanisms that do not align with health priorities and incentivize better performance (HFG 2018). While causes of technical inefficiencies can occur in any of the three financing functions, our literature scan identified three approaches with evidence that demonstrates efficiency improvements, all of which focus on purchasing.

Approach 5: Increasing strategic purchasing (Proven approach)

In the purchasing function, governments make important decisions about how to allocate resources to health care providers: which providers (public or private) will be paid? What services will they be paid to provide? How will they be paid? Many health systems have relied on passive purchasing, where providers are paid a set amount without clear expectations in return. Input-based line-item budgets is an example of passive purchasing, where payments to government-owned facilities are determined and made based on the estimated number of inputs (e.g., staff, medicines, consumables). Governments may opt for this model because it is more administratively straightforward to manage and allows public financing institutions to maintain stricter control of the amount of resources deployed. However, because payments are not tied to outputs, passive purchasing models can incentivize under-provision of care and lower levels of workforce productivity (Cashin et al. 2015; Langenbrunner, Cashin, and O'Dougherty 2009). Moving from passive purchasing to strategic purchasing can increase technical efficiency by reshaping the incentives that providers face to increase their productivity.

Approach overview

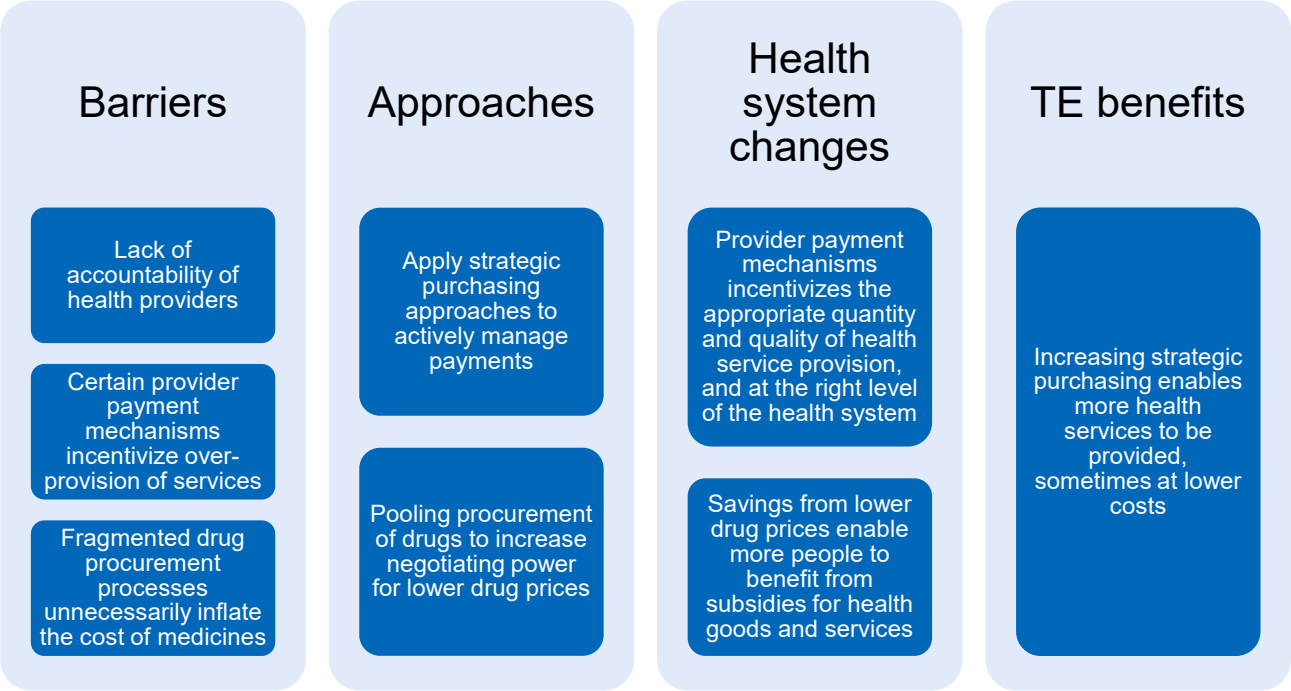
Strategic purchasing models aim to more closely tie payments to providers to the achievements of health system goals (equity, efficiency, quality) (Cashin et al. 2018). These reforms tie provider payments to a pre-agreed level of performance, measured by the amount of services delivered, patient outcomes, or other output-based metrics. In this way, they aim to incentivize providers to increase the amount or quality of services that they deliver. They also seek to ensure that the services purchased respond to population needs and therefore contribute to improving health

outcomes. Strategic purchasing includes a spectrum of provider payment methods, from open-ended methods (such as fee-for-service) to closed methods (such as capped global budgets, capitation payments, and payments based on Diagnostic Related Groups).

Strategic purchasing has also been used to curb expenditure growth. For example, the seminal 2010 World Health Report highlights "higher than necessary prices for medicines" as one of the leading causes of inefficiency, accounting for approximately 10–25 percent of public spending on health (WHO 2010). The WHO estimated that up to 5 percent savings in total health spending could be achieved in LMICs[1] through interventions such as provider purchasing mechanisms that incentivize generic substitution, ensuring transparency in the drug procurement process, and monitoring and publicizing medicine prices.

Figure 5 summarizes the theory of change for how strategic purchasing improves technical efficiency.

Figure 5. Improving technical efficiency by increasing strategic purchasing



Global evidence and implementation tips

Our literature scan identified three papers that measured strategic purchasing interventions in ways that demonstrated their ability to improve technical efficiency (Table 6). These included a randomized experimental study in China to test whether adding a pay-for-performance element to capitation-based payments could curb unnecessary drug spending and reduce irrational drug use without compromising quality (Sun et al. 2016); a longitudinal evaluation of government spending on a program to cover high cost medicines through health insurance mechanisms in Thailand (Sruamsiri et al. 2016); and a mixed method evaluation to compare spending and performance of two health insurance schemes in Thailand (Patcharanarumol et al. 2018). In addition to these resources, previous USAID-funded initiatives have documented lessons and principles that

[1] Derived by multiplying a potential efficiency savings from medicines (10–15%) by the share of total health spending in the different country income groups.

country stakeholders can use to determine the appropriate ways to apply this approach in their health systems (Cashin, Eichler, and Hartel 2017).

Table 6. Illustrative evidence of outcomes by increasing strategic purchasing

Study	Intervention model	Study outcomes	TE implications
Sun et al. 2016*	All township health centers were provided 80% of their capitated global budget. Health centers in control areas received the remaining 20% at the start of the following fiscal year. Health centers subject to a new pay-for-performance model were awarded a proportion of the remaining 20% the following quarter, based on their performance and quality of care.	The pay-for-performance element reduced two out of eight indicators measuring irrational drug prescribing. In addition, since none of the pay-for-performance health centers received their full 20% performance-based payment, the total cost to the government was reduced.	Pay-for-performance models that apply penalties for under-performance have can address incentives that contribute to over-prescription or over-delivery of unnecessary products or services.
Sruamsiri et al. 2016*	In Thailand, the government mandated three health insurance schemes to subsidize select high-cost medicines for eligible members (known as the E2 program). Prior to the E2 program, more than 90% of the Thai population paid out-of-pocket for these expensive medicines. By subsidizing the purchase of these medicines, the government sought to reduce out-of-pocket payments and better pool procurement of these medicines.	The prices of E2 medicines fell significantly. In 2009, the central purchasing mechanism reduced the price of E2 drugs for members by 25%. Quarterly costs per patient were 17.2% lower after 2 years despite serving more members, and annual health expenditures in three hospitals fell by 9.5%. Clinical outcomes also improved; the proportion of patients with clinical improvements increased by 5.4%.	Technical efficiency gains were credited to savings from pooled procurement of E2 drugs, which were passed on to members. Including coverage of certain high-cost products can increase technical efficiency in two ways: 1. Addressing fragmented procurement practices that drive up costs 2. Increasing access to products that improve quality of care and treatment outcomes
Patcharanarumol et al. 2018	Thailand has two health insurance programs that use different strategic purchasing approaches: • The Civil Service Medical Benefit Scheme (CSMBS) uses open-ended fee-for-service payments for outpatient care, has no fixed budget, and does not monitor spending. Each contracted hospital procures its medicines. • The Universal Coverage Scheme (UCS) has an annual budget that it cannot overspend, uses close-ended capitation payments for outpatient care, and closely monitors spending through regular audits. High-cost medicines are procured centrally.	Despite similar benefit packages, the open-ended fee-for-service strategic purchasing used by the CSMBS, combined with lack of expenditure monitoring and gate keeping for primary care, led CSMBS to spend 4x more per member than UCS between 2012 and 2015.	Strategic purchasing models need to be carefully designed and regularly monitored to maximize their contributions to technical efficiency.

*Outcomes are statistically significant at the 0.05 level. Other outcome evidence presented in table did not include measures of statistical significance.

Key takeaways

1. Strategic purchasing models can improve technical efficiency by addressing gaps in provider behavior and procurement that increase costs and reduce patient outcomes.
2. While strategic purchasing is a proven model for improving technical efficiencies, it is not a one-size-fits-all solution. The design and operations of specific approaches need to be tailored to the specific context and challenges in a health system.
3. Existing resources can help country stakeholders determine how to incorporate strategic purchasing models within their health system contexts.

Learn more

Cashin, C, B Ankhbayat, HT Phuong, G Jamsran, O Nanzad, NK Phuong, TTM Oanh, TV Tien, T Tsilaajav. 2015. *Assessing Health Provider Payment Systems: A Practical Guide for Countries Working Toward Universal Health Coverage*. Joint Learning Network for Universal Health Coverage.

Cashin, C, R Eichler, and L Hartel. 2017. *Unleashing the potential of strategic purchasing: beyond provider payment mechanisms to the institutional roles, systems, and capacities required to implement them*. HFG series: Advances in Health Finance and Governance.

Cashin, C, S Nakhimovsky, K Laird, A Cico, S Radakrishnan, T Strizrep, A Cico, S Radakrishnan, A Lauer, C Connor, S O'Dougherty, J White, and K Hammer. 2018. *Strategic health purchasing progress: A framework for policymakers and practitioners*. Bethesda, MD: Health Finance and Governance Project, Abt Associates Inc.

Health Finance and Governance Project. 2018. *Technical Efficiency Guide*.

Langenbrunner, JC, C Cashin, and S O'Dougherty. 2009. *Designing and Implementing Health Care Provider Payment Systems: how-to manuals*. Washington, DC: The World Bank.

Patcharanarumol, W, W Panichkriangkrai, A Sommanuttaweechai, K Hanson, Y Wanwong, and V Tangcharoensathien. 2018. "Strategic purchasing and health system efficiency: A comparison of two financing schemes in Thailand." *PLoS One* 13(4).

Sruamsiri, R, AK Wagner, D Ross-Degnan, CY Lu, T Dhippayom, S Ngorsuraches, and N Chaiyakunapruk. 2016. "Expanding access to high-cost medicines through the E2 access program in Thailand: effects on utilisation, health outcomes and cost using an interrupted time-series analysis." *BMJ Open* 6.

Sun, X, X Liu, Q Sun, W Yip, A Wagstaff, and Q Meng. 2016. "The Impact of a Pay-for-Performance Scheme on Prescription Quality in Rural China." *Health Economics*. 25(6, Jun): 706–22.

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Approach 6: Contracting out with non-government providers (Proven approach)

Contracting is a specific type of strategic purchasing that governments routinely use to pay for services. It may be used to improve the performance of the health system in a range of ways (Abramson 2004):

- To avail health services to underserved sectors of the population or in remote areas
- To provide services that the government does not have the infrastructure or capacity to provide

- To improve the quality of health care
- To control costs and improve the efficiency of public health expenditures
- To improve government's ability to focus on public health planning, financing, and oversight

Approach overview

Government can employ contracting in multiple ways to improve technical efficiency. Government purchasers (e.g., ministries of finance, government-sponsored insurance agencies) can contract within the public sector as part of financing another level of government or directly with public health facilities – often referred to as "contracting in." They can also contract with private agencies to provide services on the government's behalf – typically referred to as "contracting out."

Contracting increases the government's accountability to the public, as the services that the government is purchasing and their price are clearly laid out in legal documents. Because expectations and terms are clearly defined ahead of time, contracting can increase innovation as the party contracted to deliver health services is motivated to overcome challenges to deliver services so that it can be remunerated. Private for-profit and not-for-profit providers may want to contract with the government to expand their services, increase their financial sustainability, and expand their social mission. However, good contracting requires specialist expertise, and there is a risk that governments could spend considerable money on services they did not intend to buy, or sign contracts that create perverse incentives (see text box for more resources).

Resources to support contracting efforts

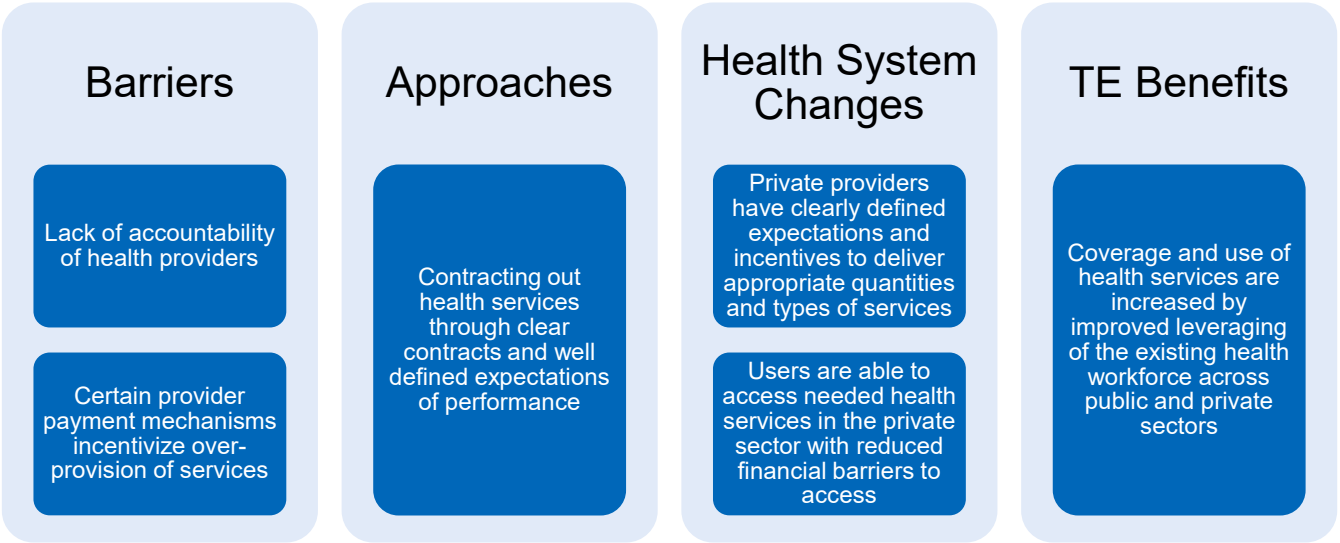
USAID, the World Bank, and other global donors have developed numerous resources to guide public-private contracting in the health system. These include:

- A contracting lifecycle FAQ
- An e-learning course on public-private contracting for FP and reproductive health
- A guide to contracting for health services during the COVID-19 pandemic

See the full set of resources here.

Figure 6 summarizes the general theory of change for how contracting out health service delivery can improve technical efficiency. As a specific form of strategic purchasing, it is intended to produce health system changes and technical efficiency benefits similar to those outlined in Figure 5.

Figure 6. Improving technical efficiency by contracting out health service delivery



Global evidence and implementation tips

The literature scan identified two resources that demonstrate the ability of contracting mechanisms to address technical efficiency gaps (Table 7). These include an evaluation of an effort in Bangladesh in which a local government contracted out urban primary health care to a non-governmental organization (NGO) (Heard, Nath, and Loevinsohn 2013) and a review of two experiences, in Cambodia and Guatemala, that looked at the performance of contracted private facilities against public facilities offering similar services in similar communities (Odendaal et al. 2018).

Table 7. Illustrative evidence of outcomes from contracting out health service delivery*

Study	Intervention model	Study outcomes	TE implications
Heard, Nath, and Loevinsohn 2013*	A local government authority (Chittagong City Corporation (CCC)) contracted with a local NGO, Mamata, to deliver health care services on its behalf. The contracts focused on primary health care services and targeted urban poor populations.	Mamata provided more services at a lower cost than CCC-run facilities: • Mamata-provided services cost 47% less per patient than CCC-managed clinics ($1.02 for Mamata vs. US$1.92 for CCC) • Mamata outperformed CCC across nine health care services by 7.9% • Mamata facilities were twice as likely to have available medicine and functioning equipment compared to CCC facilities • 69% of Mamata staff knew how to make referrals vs. 59% for CCC The services provided by Mamata also benefitted the poor more than those provided by CCC. Mamata increased services to the poor through better-organized outreach services and mapping/registration efforts. 95% of Mamata's services were available in outreach sites vs. 73% of CCC's.	The study indicates that contracting led to better management in the NGO than in CCC, resulting in improved performance. The terms of the contract led Mamata to have a higher frequency of supervision visits, simpler decision-making processes, and greater flexibility in budget reallocations to better meet contract goals.
Odendaal et al. 2018	The authors identified two studies that measure impacts of contracting out services to NGOs on use of clinical services and improvements in health outcomes, equity, costs, cost-effectiveness, and health systems performance: • A cluster randomized trial in Cambodia • A controlled pre-, post-study in Guatemala	The two papers found that contracting efforts did not necessarily increase service delivery outputs. However, they did provide show that contracting mechanisms reduced out-of-pocket costs for users of curative care. Additional evidence summarized in the literature scan indicates that contracting can have beneficial impacts on service utilization, but this depends on the government's ability to manage the contracts and the contexts in which they are deployed.	Contracting out can have indirect benefits for improving technical efficiency. By reducing financial barriers to access, contracting out can increase access to services and support improved outcomes.

*Outcomes are statistically significant at the 0.05 level. Other outcome evidence presented in table did not include measures of statistical significance.

Key takeaways

1. For contracting to increase technical efficiency, the details of the contractual arrangement between the health purchaser and the provider matter. Key contract details include clauses that explicitly focus on equity and reaching the poor; improving the quality of care as an explicit goal; and increasing coverage of prevention and promotion services.
2. Effective use of contracts requires that both purchasers and providers have strong management skills to oversee contract implementation.

Learn more

Abramson, W. 2004. *Contracting for Health Care Service Delivery: A Manual for Policy Makers*. John Snow Inc.

Heard, A, D Nath, and B Loevinsohn. 2013. Contracting urban primary healthcare services in Bangladesh – effect on use, efficiency, equity and quality of care. *Tropical Medicine and International Health*.

Odendaal, WA, K Ward J Uneke, H Uro-Chukwu, D Chitama, Y Balakrishna, and T Kredo. 2018. "Contracting out to improve the use of clinical health services and health outcomes in low- and middle-income countries." *Cochrane Database of Systematic Reviews* 2018(4), Art. No.: CD008133.

Taryn, V, N McIntosh, A Grabowski, EL Nkabane-Nkholongo, and BW Jack. 2015. *Hospital Public–Private Partnerships in Low Resource Settings: Perceptions of How the Lesotho PPP Transformed Management Systems and Performance.* Health Systems & Reform, 1:2, 155-166.

Zaidi et al. 2015. *Can contracted out health facilities improve access, equity and quality of maternal and newborn health services? Evidence from Pakistan*. Health Research Policy and Systems 13(Suppl 1):54.

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Approach 7: Changing reimbursement rates of benefit package services to incentivize use of cost-effective health care (Promising approach)

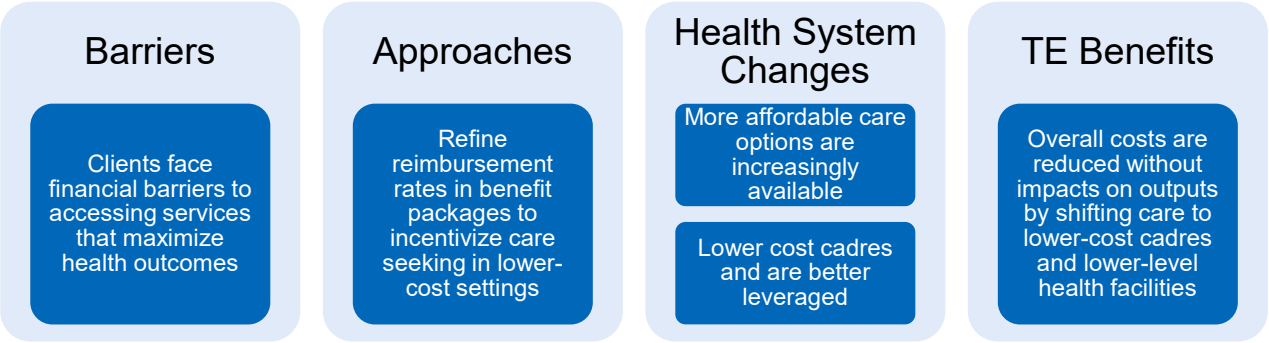
No country can fully finance the provision of all health services to its population due to the scarcity of resources. Choices must be made about the range of services that will be funded from prepaid and pooled resources, the number of people who will be eligible to receive them, and the proportion of the costs that will be covered. These choices dictate who will be required to pay out of pocket and for what services. When these design choices create financial barriers to access, they can cause people to delay seeking care. In turn, this contributes to technical inefficiencies by raising the costs of care and worsening health outcomes when individuals finally do seek health care (Smith and Witter 2004).

Approach overview

Reforming benefit package design can help to increase access and improve health outcomes in ways that improve technical efficiency. In this approach, countries use evidence about the cost and health impact of services to select benefit packages and levels of cost coverage aligned to meet their population's needs. For example, increasing the reimbursement rate for outpatient care or expanding the range of preventive services covered can lead to a decrease in total per capita expenditure, a decrease in out-of-pocket spending by patients, and improvements in health outcomes.

Figure 7 summarizes the general theory of change for how benefit package reforms improve technical efficiency.

Figure 7. Improving technical efficiency by reforming benefit package design



Global evidence and implementation tips

Our literature scan identified one paper that illustrates the potential technical efficiency gains from this approach (Table 8). This paper presents the evaluation of a pilot program from Hubei province in China that sought to reshape incentives for members of the country's social health insurance scheme to access outpatient services at lower-level facilities earlier in their illnesses (Miao et al. 2018). Prior to this initiative, reimbursement rates prioritized inpatient services, which policy makers believed led to delayed care-seeking and contributed to a large increase in hospitalization rates, from an average annual growth rate of 1.9 percent between 1987 and 2001, to 24.1 percent between 2002 and 2016.

Table 8. Illustrative evidence of outcomes by reforming benefit package design

Study	Intervention model	Study Outcomes	TE Implications
Miao et al. 2018*	Reimbursement rates for China's social health insurance program were modified: • Yearly member reimbursements for outpatient services for hypertension increased from zero to 600 Yuan • Inpatient services remained covered at 50% of costs	Outpatient visit frequency increased by 81% to 3.3 visits per capita. The social health insurance's per capita expenditure decreased by 28%. Out-of-pocket spending decreased by 30%, and health outcomes related to hypertension improved.	Shifting spending to lower-cost settings and services can reduce costs while still meeting most health needs of the population.

*Outcomes are statistically significant at the 0.05 level.

Key takeaways

1. Benefit package design contributes to technical efficiencies by incentivizing when and where the population seeks health services, and what services they seek.
2. Benefit package design can result in technical efficiency gains by increasing the provision of more impactful health interventions in lower-cost settings.

Learn more

Miao, Y, J Gu, L Zhang, R He, S Sandeep, and J Wu. 2018. "Improving the performance of social health insurance system through increasing outpatient expenditure reimbursement ratio: a quasi-experimental evaluation study from rural China." *International Journal for Equity in Health* 17: 89.

Smith, PC, and SN Witter. 2004. *Risk Pooling in Health Care Financing: The Implications for Health System Performance*. Washington, DC: The World Bank.

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A note on public financial management

The literature scan did not find articles primarily looking at the impact of public financial management on technical efficiency. However, Tang et al. (2012) alluded to the impact of public financial management on technical efficiency when they studied the impact of de-linking the income generated by a facility from how much a facility was allocated. In a study in three regions in China, Tang et al. found that separating the income generated by health centers and the allocation the health centers received resulted in reduced spending on drugs as a proportion of total health spending by health centers. The authors credit this reduction to a change in incentives – by setting allocations to health providers based on need, and not on historical allocations or revenues, providers would face less pressures to over-prescribe or deliver non-essential care solely to increase income.

Perhaps more important than increasing technical efficiency, sound public financial management practices are an important condition to ensure that efficiency increases translate into greater budgetary space for health. Barroy et al. (2021) highlight three enabling factors for transforming efficiency gains into budgetary space: efficiency interventions are well-defined and generally focus on reducing inputs (rather than increasing outputs); efficiency gains are significant and quantifiable; and public financial management rules allow financial gains from efficiency to be repurposed within the health sector. The authors show how public financial management rules in Ethiopia, Lithuania, and Thailand enabled efficiency gains to be retained within the health sector to increase the health ministry's resource envelope and expand access to higher-quality health services.

LEARN MORE

Barroy, H, J Cylus, W Patcharanarumol, J Novignon, T Evetovits, and S Gupta. 2021. "Do efficiency gains really translate into more budget for health? An assessment framework and country applications." *Health Policy and Planning* 36:1307–1315.

Tang, S, J Tao, and H Bekedam. 2012. "Controlling cost escalation of healthcare: making universal health coverage sustainable in China." *BMC Public Health* 12(Suppl 1): S8.

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Governance

Health governance focuses on the roles, responsibilities, and systems that shape interactions between the state (i.e., politicians and policy makers), health care providers, and users at all levels of the health system – national, sub-national, local, and community (Brinkerhoff and Bossert 2008). Each stakeholder has duties and responsibilities toward the other – and the extent and manner to which they successfully interact to carry out these functions shape how governance occurs. For example, citizens voice their preferences to the state, which in turn designs responsive policies and programs. Increasingly, governance in the health sector has evolved to emphasize thinking and working politically as a way to understand how power dynamics, norms, and incentives affect the institutions and influences in the health system - and thus ensure that program design and implementation account for the root causes of challenges and the intangible factors that make certain reforms succeed or fail (OECD 2015).

Effective governance contributes to technical efficiency in the health system by ensuring that resources are planned, deployed, and managed transparently and accountably. Ineffective governance can create opportunities for waste and fraud or result in misalignment between resource use and population health needs that contribute to technical efficiency gaps (Baldrige et al, 2018). Such practices can include limited authority for local governments to oversee and manage resource use or overly bureaucratic systems that create additional management layers and diffuse oversight responsibilities (HFG 2018). By aligning the objectives of health providers and users of health services, governance also helps to ensure that service delivery meets the needs of the population. Governance helps to steer all stakeholders in the health sector toward a shared vision and can incorporate leadership and management practices that ensure resources are used to achieve those objectives (Shukla 2018).

> **Thinking and working politically to improve governance**
>
> USAID has developed new guidance on how implementing partners can think and work politically through applied political economy analysis. Read the full guide here.

Our literature review identified papers that highlighted the potential of governance reforms at the institutional level, working to improve the functioning and structure of subnational units; and at the individual level, building the skills and capacities of leaders and managers within governing bodies. Because the evidence on these two approaches does not directly measure technical efficiency gains and only highlights improved outputs, both are labeled as promising approaches that are worthy of further research and evaluation.

Approach 8: Improving the design and functioning of units at subnational level that have responsibility for governance (Promising approach)

Decisions about centralized versus decentralized governance systems contain tradeoffs that can contribute to or limit technical efficiency. At their core, these tradeoffs focus on balancing the need to strictly control and oversee resource use to limit opportunities for fraud and abuse with the need to give local actors autonomy to ensure that resource use is directly aligned with their

specific needs. If the right balance is not achieved, then resources may be allocated or used suboptimally (HFG 2018).

Approach overview

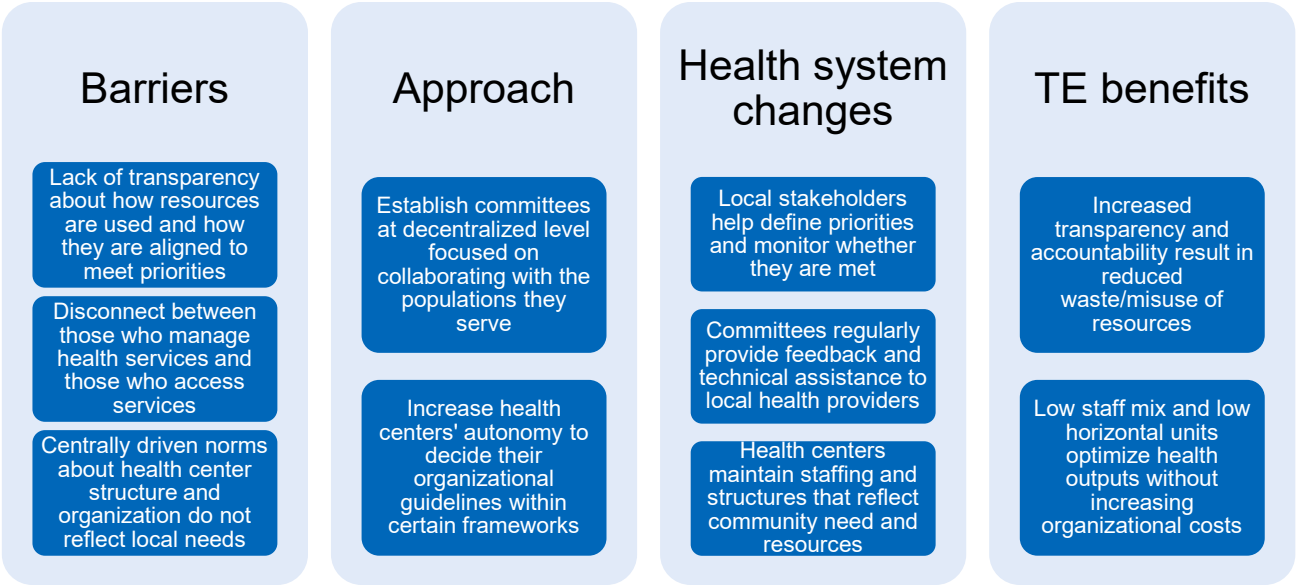
Many health systems have attempted some form of decentralization to make services more responsive to community needs. The underlying assumption behind this approach is that if health managers with knowledge of the local context have more influence over the management of health services, then resources are more likely to be allocated to meet local priorities. In practice, decentralization itself occurs in several forms that involve varying levels of responsibility and authority (World Bank 2001):

- **Deconcentration**, in which decision-making authority and management responsibility is shifted from centralized authorities in the capital to representatives of those central government agencies working in regional, provincial, or district-level offices
- **Delegation**, in which decision-making authority and management responsibility is transferred from centralized authorities to separate public enterprises or agencies (e.g., housing authorities, transportation authorities) that operate outside of the central government's direct control. However, these public enterprises are still ultimately accountable to the central government.
- **Devolution,** in which decision-making authority and management responsibility is transferred from centralized authorities to subnational governments. These subnational governments can independently exercise their authority and manage public resources within their set geographic boundaries with limited involvement from central government.

Within the health system, many countries have worked to set up platforms at the local level to support decentralization reforms. These platforms and their duties vary based on the decentralization form (deconcentration, delegation, devolution). Committees, often called management or coordination committees, are one common form to move health planning and decision-making closer to where health services are delivered. These committees help to reduce the burden of planning from the national level and provide an avenue to engage, understand, and respond to the needs of local stakeholders in planning and oversight.

Figure 8 summarizes the theory of change for how this approach improves technical efficiency.

Figure 8. Improving technical efficiency through decentralized governance



Global evidence and implementation tips

Our literature review identified several papers that measured outcomes of various decentralization reforms in LMIC health systems (Table 9). These include a study that compared the performance of health centers with the functioning of their governance boards in Ethiopia (Argaw and Desta 2020); an analysis that identified, documented, and measured the performance of Provincial Public Health Coordination Committees (PPHCC) in Afghanistan (Shukla 2018); and a study that measured how increased autonomy in determining staffing and organization affected health facility performance in Indonesia (Miharti et al. 2021). While these papers all demonstrated increased outputs or improved outcomes from the decentralization reforms, they did not adequately measure input costs. Therefore, while they have the promise to improve technical efficiency, more research is needed on these models to verify their impact.

Table 9. Illustrative evidence of outcomes through decentralized governance

Study	Intervention model	Study Outcomes	TE Implications
Argaw and Desta 2020	Decentralized health facilities in Ethiopia are managed by facility-level governance boards that vary in structure, performance, and training. To support the facility governance boards, the Government of Ethiopia developed 81 clinical and management standards (the Ethiopian Health Center Reform Implementation Guidelines).	Researchers measured facility performance against the new standards and evaluated this performance against their governance boards': • Structure (number of members, type of remuneration) • Performance of roles and responsibilities (approved annual plans, reimbursed services through community-based health insurance, regularity of meetings) • Opportunities for training and development (programs offered to board members). The study found that boards' performance of defined roles and responsibilities strongly correlated with health center performance.	High-functioning governance boards, supported by strong guidance via performance measurement standards, can help translate health care data into information that guides decisions and action plans, leading to improved health center performance and increased outputs.
Shukla et al. 2018*	PPHCCs implemented different interventions to manage local health systems: • Inviting religious, youth, and women leaders to meetings, • Providing feedback to facilities • Involving communities in facility monitoring by sharing information on resources and performance • Recognizing health workers for outstanding performance • Using data to make decisions within PPHCC's remit	PPHCCs that (i) developed, (ii) implemented, and (iii) evaluated action plans to address performance gaps increased several service delivery outputs: • Outpatient visits (18 percentage points) • Pentavalent 3 immunizations (17 percentage points) • Antenatal visits (14 percentage points) • Postnatal visits (12 percentage points) • Facility delivery (5 percentage points) • TB detection rate (11 percentage points) However, new FP users and community health worker home visits reduced, and there was no impact on tetanus toxoid administration to pregnant mothers.	Strengthened community engagement in local health system governance can promote more effective use of resources. However, if certain services face demand-side obstacles, additional interventions are likely needed to improve health outputs and outcomes.
Miharti et al. 2021	Between 2000 and 2004, decentralization for health increased, giving community health centers more autonomy to decide their organizational function, strategy, and design, including the number of management levels (horizontal units) and departments within the facility.	The study measured technical efficiency by comparing five clinical services with human resource inputs. The different types of staff and the number of units at the same level within a health center impacted technical efficiency. As the number of horizontal units in health centers increased from one to two, so did technical efficiency. This relationship reversed after two. Health centers with lower staff mixes performed better than those with a higher staff mix.	Decentralization reforms can help facilities adopt more flexible, responsive structures that increase technical efficiency – but this is not guaranteed.

*Outcomes are statistically significant at the 0.05 level. Other outcome evidence presented did discuss statistical significance.

Key takeaways

1. Decentralization reforms have the potential to improve technical efficiency, but more explicit measurements of inputs and outputs are needed to better determine feasible impacts.
2. Decentralized actors that are given more decision-making authority over their organizational design must find the optimum point and cannot assume that changing the staff mix or the number of organizational units will automatically increase efficiency.
3. Central governments have an important role to play in setting standards and guidelines to measure the performance of local governance systems and facility governance boards.

Learn more

Argaw, MD, and BF Desta. 2020. "Examining governing board functions and health center performances during health system reform: a cross-sectional study in 4 regional states of Ethiopia." *Int Journal of Health Policy and Management.* 11(7): 928–36.

Brinkerhoff, D, and T Bossert. 2008. *Health Governance: Concepts, Experience, and Programming Options*. Bethesda, MD: Health Systems 20/20 project.

Organization of Economic Cooperation and Development (OECD). 2006. *DAC Guidelines and Reference Series Applying Strategic Environmental Assessment: Good Practice Guidance for Development Co-operation*. Paris: OECD.

Miharti, S, R Wittek, B Los, and L Heyse. 2021. "Community health center efficiency. The impact of organization design and local context: the case of Indonesia." *International Journal Health Policy Management.*

Shukla, M. 2018. "Impact of a Health Governance Intervention on Provincial Health System Performance in Afghanistan: A Quasi-Experimental Study." *Health Systems & Reform* 4(3): 249–266.

Teskey, G. 2019. *Is Governance Indispensable in Development?* Presentation made to Ministry of Foreign Affairs and Trade, Australia.

World Bank. 2001. *Administrative Decentralization*. Accessed September 15, 2022.

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Approach 9: Capacity development in leadership, management, and governance (Promising approach)

Leadership, management, and governance are distinct and complementary skills (MSH 2017). Governance broadly focuses on systems for engagement that create transparency, accountability, and a shared vision. Within those systems, leadership focuses on human elements – mobilizing and deploying staff and stakeholders to achieve that shared vision. Management, on the other hand, emphasizes planning and deployment of all resources to implement activities that achieve that vision. As countries implement decentralization reforms, it is important that local governments have capacities – including systems, tools, and skills – to lead and manage in line with their new authority. When these capacities are missing, normal operations and processes can become more more administratively costly and time consuming – leading to gaps in technical efficiency (HFG 2018).

Approach overview

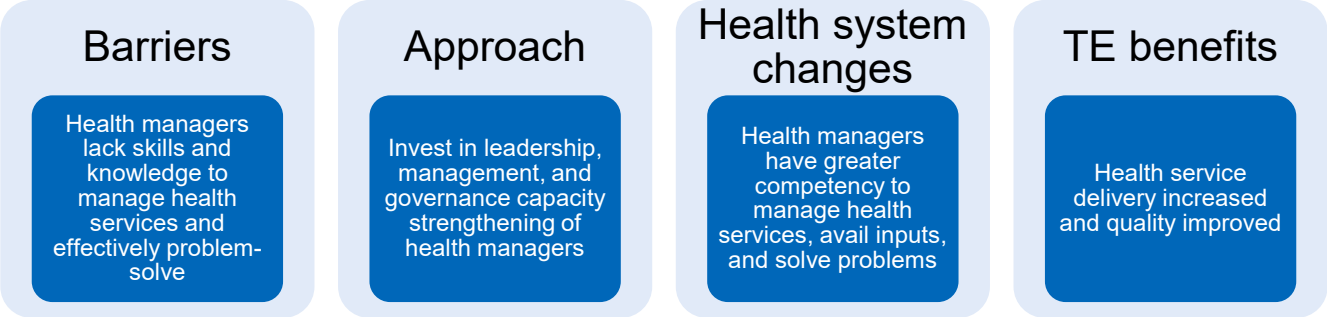
Leading and managing health services is complex and requires a very different skill set compared to clinical service delivery. Just as health workers must undergo significant training, there is consensus that governments need to equally invest in building the capacities of health managers and equipping them with the right tools. These investments help to professionalize the

role of health management and both improve the functioning of local governance structures and increase the efficient operations of health facilities. Country efforts to improve effective health management have sought to ultimately:

- Increase health facility staff commitment and motivation
- Empower health managers to better identify and address problems
- Improve managers' abilities to plan and acquire the resources needed to deliver quality services

Figure 9 summarizes the general theory of change for how this approach improves technical efficiency.

Figure 9. Improving technical efficiency by strengthening individual capacity in leadership, management, and governance



Global evidence and implementation tips

There is a large global literature on leadership, management, and governance – thanks in large part to decades of USAID's investments in these areas. Much of the literature identified in our scan focuses on training frameworks or measuring outcomes specific to these three areas. Within this larger set of resources, we identified two resources that measured how these skills-building efforts resulted in more than just improvements in individual knowledge or skills – they also increased outputs at the facility level (Table 10). Both of these studies featured One study in Ethiopia evaluated whether equipping health managers with leadership, management, and governance training improved the quality of health services and the capacity of district health teams (Desta et al. 2020). A second study – also in Ethiopia – studied the impact of capacitating primary health care facilities in leadership, management, and governance (Argaw et al. 2021). While these efforts highlight the potential impact on health service delivery, neither measured the inputs required to improve these skills, nor the interest of governments to integrate these trainings into regular operations. As a result, we have labeled it as a promising practice for improving technical efficiency, but more research is needed to explicitly compare inputs and outputs for these interventions and to determine the sustainability of the model.

Table 10. Illustrative evidence of outcomes from strengthening individual capacity in leadership, management, and governance

Study	Intervention model	Study outcomes	TE implications
Desta et al. 2020*	The Ethiopia Federal Ministry of Health introduced district-level in-service team-based training on leadership, management, and governance. The training uses an experiential approach to support peer-to-peer learning. Trainees are expected to organize job orientations	The training program led to statistically significant improvements in quality of services. Facilities in trained districts had higher quality scores than facilities in untrained districts (59.9% vs. 54.2%). Trained districts also showed more capacity to coordinate across public and private	Strengthening these capacities improves performance by increasing staff motivation and commitment.

Study	Intervention model	Study outcomes	TE implications
	for their colleagues to share the learning from the training.	sectors to make health workers available (58.7% vs. 52.2% in untrained districts).	
Argaw et al. 2021*	Training to improve health facility leadership and management skills involved 6 days of didactic sessions, performance improvement projects, three to four coaching sessions, and knowledge-sharing events.	Trained facilities scored 6.8% higher on maternal and child health service performance and significantly higher on health system (measuring management, work climate, and responsiveness to challenges) than untrained facilities.	

*Outcomes are statistically significant at the 0.05 level.

Key takeaways

1. Increasing leadership and management skills can effectively increase health worker performance. However, additional research is needed to determine which models are most effective for improving technical efficiency.

Learn more

Argaw, MD, S Abdulkader, WS Abera, and BF Desta. 2021. "Comparison of maternal and child health service performances following a leadership, management, and governance intervention in Ethiopia: a propensity score matched analysis." *BMC Health Services Research* 21:862.

Desta, BF, A Abitew, IA Beshir, MD Argaw, and S Abdlkader. 2020. "Leadership, governance and management for improving district capacity and performance: the case of USAID transform: primary health care." *BMC Family Practice* 21:252.

MSH. 2017. *Leadership, Management, and Governance Evidence Compendium*. Arlington, VA: Leadership, Management, and Governance Project.

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Digital health

As countries progress toward universal health coverage, many are exploring how they can use digital tools to strengthen health system functions, including information and communication technologies (ICTs). These efforts aim to advance the implementation of national digital health strategies, strengthen governance of digital health infrastructure, and advocate for digital-enabled, people-centered health systems (WHO 2021). Digital health tools include a broad range of client-, provider-, manager-, and data services-oriented technologies whose roles span from strengthening health information systems to supporting more effective clinical decision-making and treatment adherence (USAID 2020). Because decisions are made and information generated continuously at all levels of the health system, digital tools have become an integral component of health care systems – especially with regard to strengthening health information systems. Health management information systems (HMIS) are a critical component of efficient and effective health systems. They provide the data needed to develop, implement, and monitor evidence-backed plans and policies and improve resource allocation. In recent years, countries have increasingly turned to digital platforms to address fragmented health information systems that contribute to technical efficiency gaps. For many years, vertical disease-specific programs have each used their own systems to monitor performance. These systems do not always talk to each other, impairing providers' ability to use data to provide the most effective care to their clients. In addition to health area siloes, health information systems have often been fragmented by function, with systems separately tracking financial accounting and health information, requiring providers to input the same data multiple times and increasing administrative costs (HFG 2018).

In recent years, donors have invested substantial resources in developing and testing new digital tools to address some of these inefficiencies. Much of the evidence generated focuses on the feasibility, acceptability, and usability of the tools. Our scan revealed evidence that demonstrated potential efficiency improvements by digitizing HMIS to support improved provider performance and through the use of digital financial services for health.

Approach 10: Digitizing HMIS to support improved provider performance (Promising approach)

Medical records are a critical component of a country's HMIS. They form the basis of evidence that informs patient care, and, when aggregated, help both managers of individual facilities and overall health system stewards better monitor performance and support critical functions. Gaps in technical efficiency can arise when the processes to manage or use these records are administratively burdensome or otherwise not fit for purpose. For example, HMIS in some LMICs reflect global experience (inclusive of contexts with more mature technology information systems) more than the specific country context and may not be feasible to implement (HFG 2018). In other cases, systems focus more on reporting than on data use at the facility level (Galimoto 2007); have developed through siloed vertical programs and do not speak to each other in ways that optimize efficient data use for planning or quality service delivery (HFG 2018);

or impose duplicative or other administratively burdensome processes that take providers away from delivering care (Sodzi-Tettey et al. 2012).

Approach overview

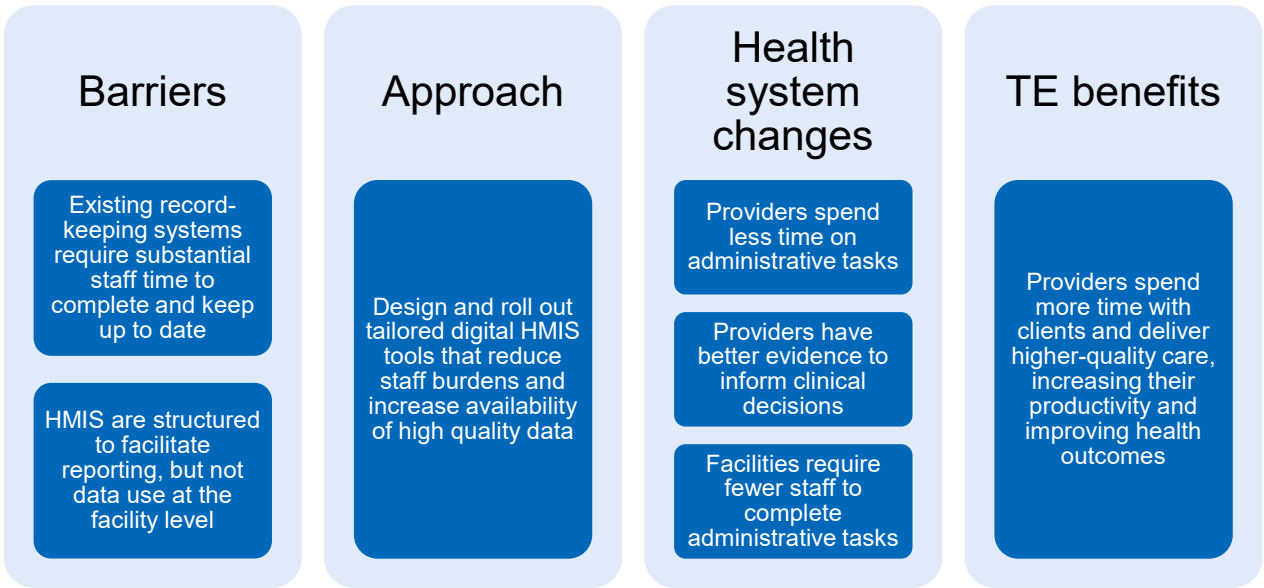
Guides to inform digitizing HMIS

The USAID-funded MEASURE Evaluation project has compiled lessons and guidance from efforts to adopt digital HMIS in LMICs, including the Performance of Routine Information System Management frameworks to effectively integrate these efforts into broader health system reforms.

In recent years, donors and governments across LMICs have invested in electronic systems to improve HMIS functioning, integrate systems, and ease administrative burdens. Because these efforts must be tailored to the needs and resources available in country contexts (see text box), the resulting systems vary in their design and in the technology that they leverage, including SMS-based reporting, MS Access or Excel-based reporting templates, and more complex electronic medical records. In general, these tools are intended to improve the accuracy and reliability of data generated at the facility level – including the precision, completeness, timeliness, integrity, and confidentiality of data systems (Lemma et al. 2020). These digital systems have the potential to improve technical efficiency in two main ways. First, they can integrate duplicative data entry and reporting processes, thereby reducing the amount of time providers spend on these tasks and increasing their availability to see more patients. Second, they can support higher-quality care that improves treatment outcomes and reduces the need for more expensive, follow-up care (Hall et al. 2014).

Figure 10 presents a high-level overview of the theory of change for this model.

Figure 10. Improving technical efficiency by scaling digital HMIS



Global evidence and implementation tips

There is a wealth of evidence evaluating efforts to introduce digital HMIS in LMICs. Most of this of this evidence focuses on the feasibility and acceptability of new systems or on changes in quality of available data (Lemma et al. 2020). In more recent years, researchers have gone beyond these early studies to begin examining how these systems improve quality of care or provider performance (summarized in Table 11). The evidence base includes four systematic reviews of digital health interventions (Lemma et al. 2020; Hall et al. 2014; Jawhari et al. 2016; Kumar and Mostafa 2019). In general, these studies have shown that systems alone are not sufficient to achieve desired outcomes but must be paired with additional investments in training

and behavior change in order to increase health system outputs. Our scan was unable to identify studies that considered both the costs of inputs and the outputs produced in order to measure improvements in technical efficiency. For this reason, this approach is still considered promising – but not yet proven – to address technical efficiency gaps.

Table 11. Illustrative evidence of outcomes by scaling digital HMIS*

Study	Intervention model	Study outcomes	TE implications
Lemma et al. 2020	Summarizes 20 papers on efforts to improve data quality and 16 on efforts to improve data use through various digital and technological interventions.	Papers typically documented interventions that combined multiple technological design and behavioral elements to increase uptake. They typically focused on district-level managers – not health care providers – and documented how they used data to improve health system management.	Digital HMIS tools can be successfully adopted to improve access to quality information, which theoretically contributes to improved technical efficiency. Donors and governments need to invest in more comprehensive evaluations to determine if these theoretical gains materialize in practice, especially given the substantial investments needed to capacitate clinical staff and support effective behavior change.
Hall et al. 2014	Summarizes 17 papers that document digital interventions to improve record keeping and 4 to adopt electronic medical records.	Electronic medical records can be successfully adopted in low- and middle-income contexts to improve record keeping and speed reporting, as evidenced by pilots in India and Rwanda. However, the papers do not provide evidence on if or how these tools change clinical outputs or outcomes.	
Jawhari et al. 2016	Summarizes seven papers (six from Kenya; one from Cameroon) on efforts to adopt electronic medical records to improve HMIS.	The interventions improved clinic productivity when paired with an explicit link to quality improvement and disease surveillance during rollout. Much of this literature comes from 2005–2009 and needs to be revisited to reflect advances in the field.	
Kumar and Mostafa 2019	Summarizes four papers documenting efforts to integrate electronic health records into HMIS in low- and middle-income settings, focusing on examples from Sierra Leone, Malawi, and India.	The literature focuses on the theoretical frameworks for adopting electronic health records and the implementation experience – including challenges and strategies to overcome those challenges. They do not measure changes in care or outcomes.	

*Outcome evidence presented in table did not include measures of statistical significance.

Key takeaways

1. Digital HMIS tools can be successfully tailored and adopted in a variety of contexts to improve availability of high-quality clinical data. More research is needed to evaluate if access to this information translates into efficiency gains in line with theoretical frameworks.

Learn more

Galimoto, M. 2007. *Integration of health information systems: case study from Malawi*. Master's Thesis, University of Oslo.

Hall, CS, E Fottrell, S Wilkinson, and P Byass. 2014. "Assessing the impact of mHealth interventions in low- and middle-income countries – what has been shown to work?" *Global Health Action* 7(1).

Jawhari, B, D Ludwick, L Keenan, D Zakus, and R Hayward. 2016. "Benefits and challenges of EMR implementations in low resource settings: a state-of-the-art review." *BMC Medical Informatics and Decision Making*. 16(1):116.

Kumar, M, and J Mostafa J. 2019. "Research evidence on strategies enabling integration of electronic health records in the health care systems of low- and middle-income countries: A literature review." *International Journal of Health Planning and Management*. 34(2): e1016-e1025.

Lemma, S, A Janson, LA Persson, D Wickremasinghe, and C Källestål C. 2020. "Improving quality and use of routine health information system data in low- and middle-income countries: A scoping review." *PLoS One* 15(10).

Sodzi-Tettey, S, M Aikins, JK Awoonor-Williams, and IA Agyepong. 2012. "Challenges in provider payment under the Ghana national health insurance scheme: a case study of claims management in two districts." *Ghana Medical Journal* 46(4):189–199.

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Approach 11: Utilizing digital financial services for health (Proven approach)

As countries make progress toward universal health coverage, new digital technologies offer opportunities to increase efficiencies in financial transactions. These technologies include a wide range of banking, insurance, and payment services that can be accessed through mobile phones, computers, electronic vouchers and payment cards, and other electronic instruments (Mangone, Riley, and Datari 2021). Many of these technology solutions have the explicit goal of increasing financial protection for low-income populations, addressing financial barriers that limit demand for health care, and otherwise improving health system performance.

Approach overview

Digital financial services can address various causes of technical efficiency gaps, depending on the specific solution and target user. Solutions can address (Mangone, Riley, and Datari 2021; HFG 2018):

- **Provider payments**: Aim to increase transparency and speed of payments for health service delivery. These solutions can improve efficiency by addressing practices that create opportunities for waste or fraud in provider payments. By increasing the reliability and frequency of payments, they can also help to increase provider morale – and thus motivate health workers to increase their productivity.

The global evidence on digital financial services for health

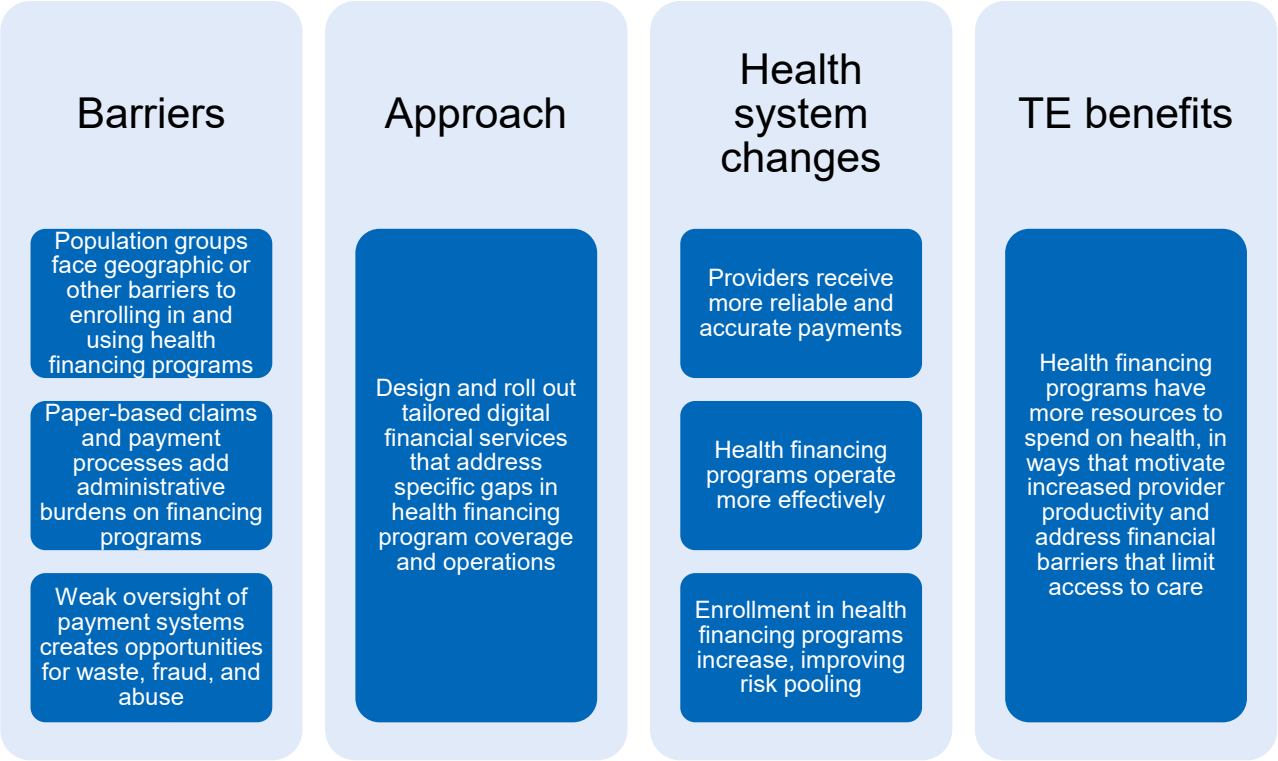
LHSS summarized the global evidence on digital financial services in LMICs. The project brief answers key questions, such as:

- Do digital financial services increase financial protection in low-resource settings?
- Do digital financial services increase demand for or utilization of health services in low-resource settings?
- Do digital financial services impact health system performance in low-resource settings?
- What factors contribute to the success of failure of digital financial services for health?

- **Health insurance operations**: Aim to streamline administrative processes that slow down claims processing or add labor costs. By streamlining these processes, digital solutions can reduce overhead costs for insurance programs and increase the pool of resources available to purchase health care.
- **Geographic and other access barriers**: Aim to increase equity in coverage and use of health financing programs by addressing physical, gender, and social inclusion-related barriers. Addressing these barriers can help reduce fragmentation or strengthen risk pooling of insurance programs, thereby also improving their performance and reducing inefficient financing practices (i.e., out-of-pocket payments).

Figure 11 presents a high-level overview of the theory of change for this model.

Figure 11. Improving technical efficiency by leveraging digital financial services



Global evidence and implementation tips

There is a wealth of evidence evaluating efforts to introduce digital financial services in LMICs, as documented in the LHSS Global Evidence Review. Selected research from this review that demonstrate how these solutions contribute to increased technical efficiency are summarized in Table 12.

Table 12. Illustrative evidence of outcomes by leveraging digital financial services

Study	Intervention model	Study Outcomes	TE Implications
Suri, Jack, and Stoker 2012*	Compared health care saving and expenditures of mobile money users and non-users to evaluate if mobile money tools can smooth health care consumption during external shocks.	Mobile money users increased expenditures by 12% in the face of unexpected illness, while non-users reduced spending by 3%. Mobile money users also increased or maintained spending on priority goods (medicine, food, education), while non-users reduced spending to cover health shocks.	Digital financial solutions successfully address a range of underlying causes that limit technical efficiency in financing, service delivery, and the health workforce.

Study	Intervention model	Study Outcomes	TE Implications
Dalal, Morgan, and Nanda 2019	The International Labour Organization partnered with Ghana's National Health Insurance Authority to digitize the insurance renewal process with a dedicated application for members to use mobile money to pay premiums and renew their membership.	Renewals and enrollment increased following the launch of the digital process. In the 4 months post-launch, 1.44 million mobile renewals were completed. New registrations in the first quarter of 2019 increased by 200,000 year-over-year. Members saved over 11 hours and 4.2 GHS (USD $0.75) annually when they renewed via mobile instead of in person. The insurance agency also increased program income, reduced administrative and transaction costs, and improved claim management – which in total could reduce its annual deficit by up to 25%.	
Bangura 2016	The Government of Sierra Leone and its partners implemented a new system to digitize payments to Ebola response workers.	Digital payments shortened the delivery time compared to cash payments by an average of 3 weeks. This improvement was cited as a key factor in reducing health worker strikes from an average eight per month to zero – increasing the number of health worker days by 800 and contributing to increased outputs.	
Wilson, Haas, Hitimana, Rulisa, and Machichi 2021	Summarizes case studies and evidence from three efforts to introduce digital financial services in Rwanda for community-based health insurance, and Kenya for access to finance and mobile asset financing.	The case studies improved efficiencies in system operations, including reducing staffing requirements to manage health financing programs and speeding financial transactions.	

*Outcomes are statistically significant at the 0.05 level. Other outcome evidence presented in table did not include measures of statistical significance.

Key takeaways

1. There is a strong evidence base that illustrates the various ways in which digital financial services can improve technical efficiency in the health system. Specific solutions need to be tailored to the contexts and available resources within a country's health system to optimize outcomes.
2. Efforts to adopt digital financial solutions need to be carefully considered so that they address – and do not reinforce – existing gaps in digital infrastructure or create new inefficiencies by not promoting interoperability with other digital interventions.

Learn more

Bangura, JA. 2016. *Saving Money, Saving Lives: A Case Study on the Benefits of Digitizing Payments to Ebola Response Workers in Sierra Leone*. Better Than Cash Alliance.

Dalal, A., L Morgan, and S Nanda. 2019. *Case Brief #17: NHIA, Ghana*. International Labour Organization.

Mangone, E, P Riley, and K Datari. 2021. *Digital Financial Services for Health: A Global Evidence Review*. Rockville, MD: USAID Local Health System Sustainability Project, Abt Associates Inc.

Suri, T, W Jack, and TM Stoker. 2012. "Documenting the birth of a financial economy." Proceedings of the National Academy of Sciences of the United States of America 109(26): 10257–10262.

Wilson, D, S Haas, Hitimana, A Rulisa, and A Machichi. 2021. *Digital Financial Services for Health Programmatic Case Studies: Experience from Rwanda and Kenya*. Arlington, VA: Management Sciences for Health.

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Service Delivery

Within a health system, service delivery models most directly translate inputs (health workforce, financing, commodities) into outputs (number of services delivered, number of patients treated, quality of care). Given this role, the processes and structures that are used to deliver health services are especially relevant for maximizing technical efficiency. When these processes and structures do not function optimally, they can contribute to technical efficiencies in four main areas that increase costs without improving outcomes: poor clinical care; weak referral systems that result in suboptimal treatment outcomes; inappropriate investment and use of equipment and technology; and inappropriate utilization of health care services (HFG 2018). Because investments in health system building blocks such as health workforce, financing, and governance directly affect the quality of service delivery, many of the interventions documented in previous sections result in more efficient service delivery. In addition to these interventions, our scan of the literature identified an additional approach that helps to improve technical efficiency by addressing service delivery models: integrating siloed health services.

Approach 12: Integrating health services (Proven approach)

Fragmented service delivery models often result from donor and government investments in vertical disease programs. These programs target resources at addressing a priority health issue – for example, HIV/AIDS, FP, or routine childhood immunizations. While this focus is intended to increase uptake of a prioritized service, it can limit the scope of services available at individual health facilities. For example, public facilities designated as HIV care and treatment centers may offer a limited range of services in order to maximize HIV clinical outcomes. While this emphasis helps to achieve national goals for a specific disease, it can increase input costs (staffing, facility infrastructure) needed to ensure that the full range of health products and services are widely available and easily accessible to local communities. It can also create duplicative governance systems and management processes in the health system (HFG 2018). As part of the drive to accelerate progress toward universal health coverage, policy makers and planners have sought to break down silos between these health areas to increase access and improve efficiencies.

Approach overview

Integrating health services ultimately aims to reshape service delivery practices to use existing resources more efficiently, improve quality of care, and improve access to health services. The approach aims to improve technical efficiency by reducing duplicative human and other resources while simultaneously increasing uptake of different health services. Several briefs and studies capture the range of interventions required to integrate health services, as well as the global evidence on their success (HIPs 2017; HIPs 2021; Maruthappu, Hasan, and Zeltner 2015; Close et al. 2019).

These papers mainly focus on integrating two vertical service delivery programs. For example, USAID and other donors have documented how efforts to integrate FP services with maternal health services and childhood immunization programs can increase uptake of priority services without making duplicative investments (HIPs 2017; HIPs 2021). In addition, researchers in Tanzania and Malawi evaluated efforts to integrate FP and HIV services (Close et al. 2019).

Putting these integrated models into practice requires several interventions across the health system building blocks. These include:

- Reviewing policies, scopes of practice, and service delivery guidelines to ensure they deliberately support integrated service delivery
- Revising health workforce training to reflect integrated service delivery guidelines
- Addressing siloed financing programs for vertical programs that fund facilities, health workers, and supervisors focused on specific health areas (e.g., by integrating funding into government-sponsored insurance programs)
- Integrating vertical HMIS to reduce duplication and support comprehensive planning
- Supporting health workers and supervisors to change behaviors

The literature notes that there is no standard "best practice" for these integrated service delivery models; rather, they must be contextualized to countries' specific financial and regulatory frameworks, health needs, and available resources (Maruthappu, Hasan, and Zeltner 2015). Typical models include (HIPs 2021):

1. **Combined service provision**: Services are co-located within the same health facility.
2. **Combined service provision plus referral**: Individual facilities offer expanded service packages, with strengthened formal referral systems to nearby facilities for those are not available.
3. **Single service plus referral**: Individual facilities and providers offer limited range of services with strengthened formal referral systems across nearby facilities.

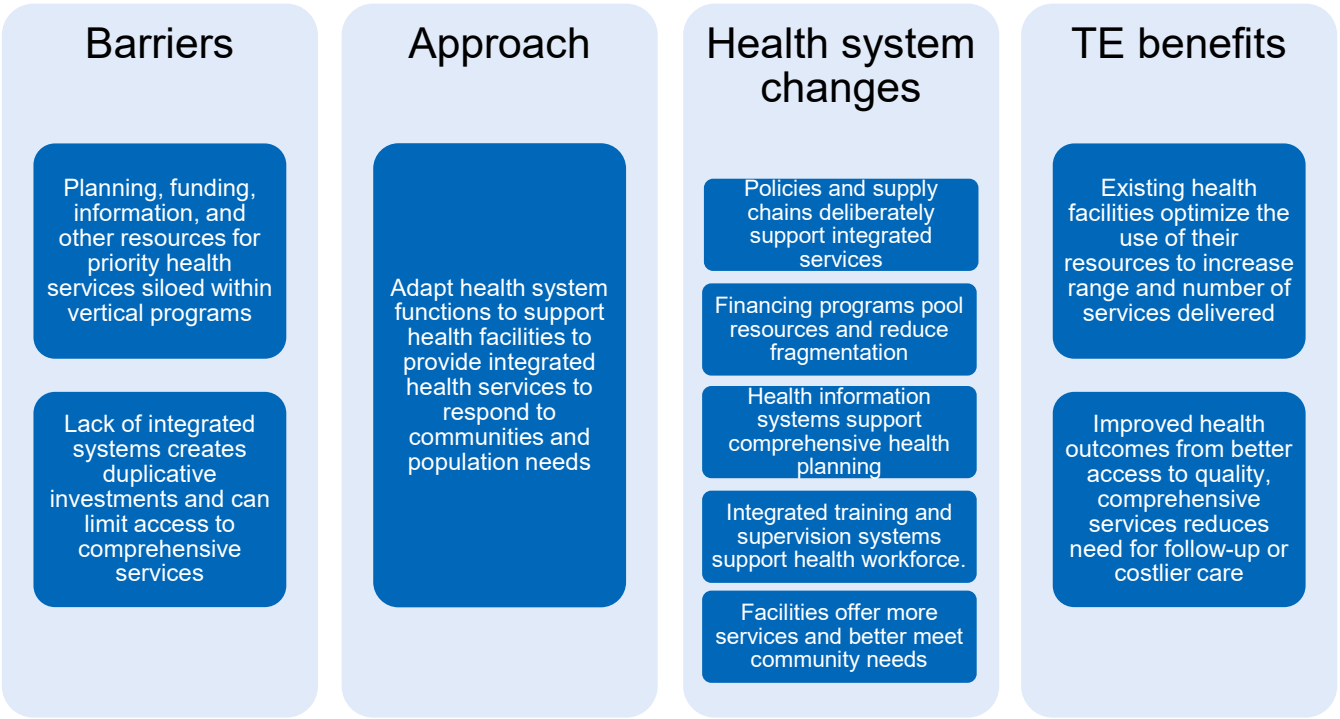
Resources to support integrated health service delivery

As countries work to integrated siloed vertical health programs, the WHO has begun compiling resources to guide these efforts. These resources include:

- A system-wide approach to analyzing efficiency across health programs
- A step-by-step guide to conducting a cross-programmatic efficiency analysis

Figure 12 presents a high-level overview of the theory of change for these efforts.

Figure 12. Improving technical efficiency by integrating health services



Global evidence and implementation tips

Similar to approaches in other building blocks, none of the studies identified in this literature scan measured cost savings or changes in total resource use that resulted from a shift toward integrated care models. The WHO notes that – despite limited evidence due to methodological challenges – "there is good reason to expect efficiency gains to follow efficient resource allocation because of better coordination of available resources, less duplication of procedures and shorter waiting times" (Cash-Gibson 2018). Researchers have evaluated the effects of integrated service delivery models through a variety of studies that demonstrate the approach's success and provide guidance on how to apply it. These studies include a cluster-randomized control trial of a model that integrated FP counseling into routine childhood immunization (Dulli et al. 2016); a pre-, post-analysis of routine service delivery statistics following adoption of a facility-based model for offering integrated FP and childhood immunization services in Malawi (Cooper et al. 2020); and secondary analysis of Service Provision Assessment data comparing outcomes across facilities that did and did not offer integrated FP and HIV services in Tanzania and Malawi (Close et al. 2019). The outcomes of these studies all demonstrated results that illustrate the potential to increase technical efficiency (Table 13).

Table 13. Illustrative evidence of outcomes from integrating service delivery models

Study	Integration model	Study Outcomes	TE Implications
Dulli et al. 2016	Immunization staff at health facilities counsel mothers on FP and refer them to providers within the facility capable of offering specific methods.	FP uptake at integrated facilities increased by 15% (p=.10).	Integration models that capacitate and leverage different cadres within a facility can help make access more convenient for clients, leading to increased facility productivity.
Cooper et al. 2020*	Nurses and health surveillance assistants screen mothers bringing children in for routine immunizations, deliver short-acting methods, and provide referrals for long-acting methods.	The total number of women accessing FP methods increased by 14% year over year, with no decreases in immunization coverage.	Capacitating lower-level cadres to integrate service offerings can increase their total productivity and outputs.
Close et al. 2019*	Staff at health facilities supported to offer the full range of FP methods, alongside HIV care and treatment.	Facilities offering integrated FP-HIV services were more likely to meet or exceed quality metrics in Malawi (218%) and Tanzania (226%) compared to non-integrated facilities.	Integrated service delivery models allow the existing health workforce to offer a fuller range of services without negative impacts on quality.

*Unless otherwise noted, all outcomes are statistically significant at the 0.05 level.

Key takeaways

1. Integrating health service delivery models can make more effective use of existing resources to measurably increase outputs without sacrificing quality.
2. There is no "one-size-fits-all" approach to integrating delivery of health services – multiple models exist and should be shaped by the specific contexts of the health system.
3. Integrating delivery of health services requires interventions across health system building blocks to create a supportive policy and financing platform to sustain the new models.

Learn more

Cash-Gibson, L. 2018. *Technical Series on Primary Health Care: Integrating Health Services*. Geneva: World Health Organization.

Close, MA, J Barden-O'Fallon, and C Mejia. 2019. "Quality of family planning services in HIV integrated and non-integrated health facilities in Malawi and Tanzania." *Reproductive Health*. 16(Suppl 1): 58.

Cooper, CM, J Wille, S Shire, S Makoko, A Tsega, A Schuster, H Hausi, H Gibson, and H Tappis. 2020. "Integrated Family Planning and Immunization Service Delivery at Health Facility and Community Sites in Dowa and Ntchisi Districts of Malawi: A Mixed Methods Process Evaluation." *International Journal of Environmental Research and Public Health*. 17(12, Jun 24): 4530.

Dulli, LS, M Eichleay, K Rademacher, S Sortijas, and T Nsengiyumva. 2016. "Meeting Postpartum Women's Family Planning Needs Through Integrated Family Planning and Immunization Services: Results of a Cluster-Randomized Control Trial in Rwanda." *Global Health: Science and Practice*. 4(1, Mar 25): 73–86.

HIPs. 2017. *Immediate postpartum family planning: A key component of childbirth care*. Washington, DC: USAID.

HIPs. 2021. *Family Planning and Immunization Integration: Reaching postpartum women with family planning services*. Washington, DC: USAID.

Maruthappu, M, A Hasan, and T Zeltner. 2015. "Enablers and Barriers in Implementing Integrated Care." *Health Systems & Reform* 1(4).

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Pharmaceutical Products and Supply Chains

Technical inefficiencies related to pharmaceutical products and supply chains can derive from multiple causes. These include suboptimal warehousing, inventory management, and transport challenges; poor quantification and procurement processes; weak regulatory and oversight systems; and irrational medicines selection and inappropriate use (WHO 2010). In many cases, solutions to these gaps mirror those described in other sections of this Catalog: applying strategic purchasing approaches to outsource transport and distribution; digitizing and strengthening information systems for improved resource tracking, planning, and oversight; and improving supervision practices to reduce opportunities for waste and fraud (HFG 2018).

In addition to these, our scan of the literature identified two additional approaches that helped to improve technical efficiency: streamlining supply chain levels to reduce costs and stock-outs and using performance data to incentivize appropriate dispensing.

Approach 13: Streamlining supply chain levels to reduce costs and stock-outs (Proven approach)

Many LMICs have multitiered supply chains that vary between two and four levels (Yadav, Tata, and Babaley 2011). These levels feature a central medical store and individual health facilities, with potentially additional subnational tiers (regional, district) in between. Roles and responsibilities for planning, procurement, stocking, and distribution are usually split across these levels in ways that seek to minimize opportunities and incentives that contribute to waste and fraud. At the same time, these multilevel systems create additional costs to manage, warehouse, and transport medicines that can limit technical efficiency.

Approach overview

Multilevel supply chains require substantial investments to optimize outcomes. At each level, supply chains require:

- Adequate physical infrastructure and warehouse maintenance systems to securely store medicines
- Clear systems and sufficient human resources for inventory management
- Effective information systems for inventory control and management
- Sufficient infrastructure and systems to transport medicines between levels

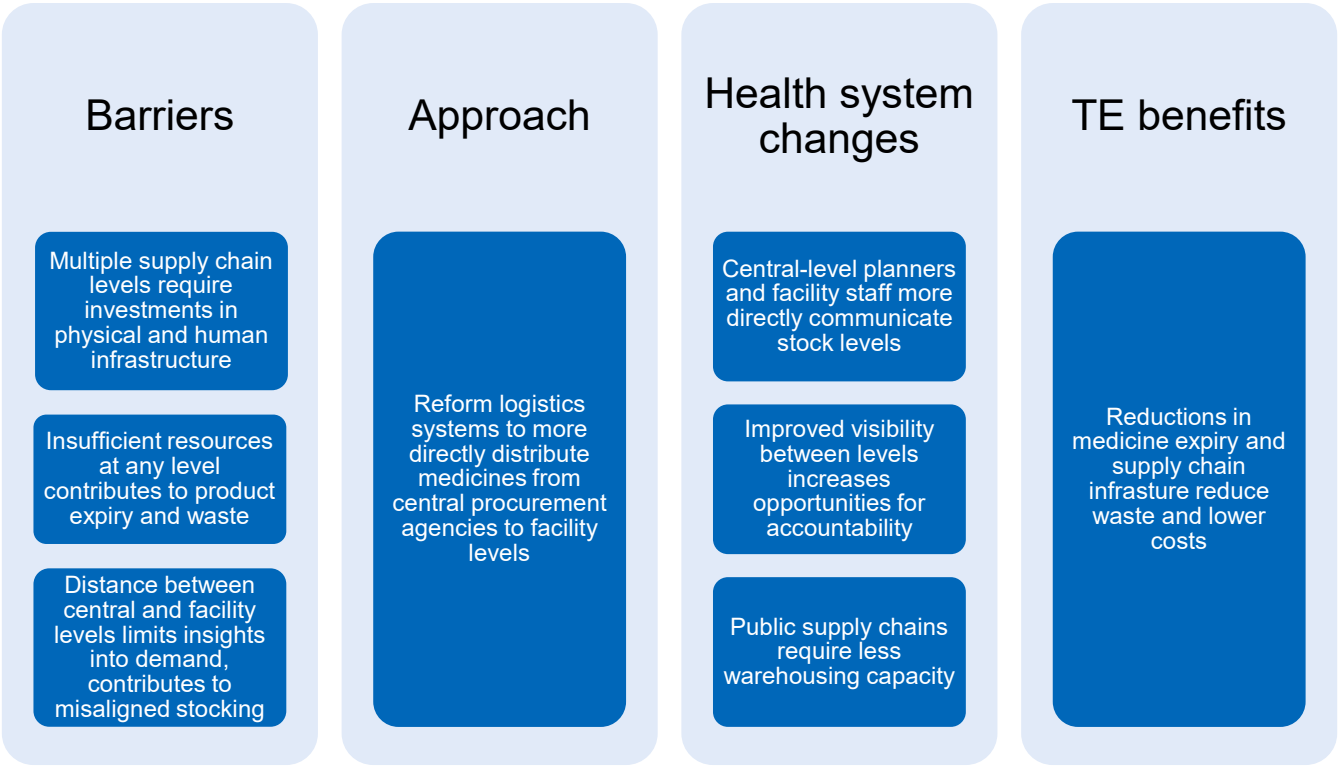
The absence of these inputs can contribute to stock-outs at the facility level, leakage of products from the public supply chain, or expiry of medicines (HFG 2018).

To improve supply chain efficiency, the commercial sector has largely moved to reduce the number of levels products move through and to reduce opportunities for human-induced errors (Fletcher and Wehlage 2008). A typical strategy features “cross-docking” distribution, in which prepackaged shipments are transferred directly from inbound to outbound transports without the need for additional warehousing or repackaging. This strategy enables supply chains to make

frequent deliveries to many distribution points without increasing costs. In Zambia, the Ministry of Health tested whether this approach could increase efficiencies in its pharmaceutical supply chain (Vledder et al. 2019). The existing supply chain featured three levels: a central medical store, 120 district stores, and 1,500 public health facilities. A parastatal agency (Medical Stores Limited) managed distribution between the central and district levels, while district health management teams managed distribution between the district and facility levels. Under the revised "cross-docking" model, the Ministry of Health tested a new two-tier system that used the district health offices solely as a transfer point between the central store and public facilities, without any layaway inventory.

Figure 13 presents a high-level overview of the theory of change for these efforts.

Figure 13. Improving technical efficiency by streamlining supply chain levels



Global evidence and implementation tips

Researchers evaluated the results of this model through a randomized control experiment – the first of its kind (Vledder et al. 2019). Twenty-four districts were randomly assigned into one of three groups. The first group maintained the existing system as a control; the second maintained the existing system paired with the addition of a trained procurement agent at the district level to improve stocking and logistics functions; and the third transformed the district-level to a "cross-docking" station that eliminated the intermediate storage and repackaging functions. The research team measured differences in supply chain performance, defined by stock-outs of medicines at the facility level. The outcomes of this study demonstrated results that illustrate how streamlined supply chains can increase technical efficiency (Table 14).

Table 14. Illustrative evidence of outcomes from streamlining supply chain levels

Study	Intervention model	Study outcomes	TE implications
Vledder et al. 2019*	Intermediate district-level warehouses transformed into cross-docking stations to forward prepackaged shipments from central-level medical store to individual health facilities	The model reduced stock-outs across six tracer drugs and time needed to address stock-outs when they occurred. For example, frequency of first line pediatric malaria medicine stock-outs fell from 47.9% to 13.3% and the number of total stock-outs fell by 82%.	Streamlining supply chain levels helps to reduce resource needs and reshapes incentives in system to incentivize improved performance and reduce opportunities for waste and expiry.

*All outcomes are statistically significant at the 0.05 level.

The results of this study have informed reforms to the Zambian supply chain, including the creation of four larger distribution hubs outside of Lusaka to serve as cross-docking stations, and a shift toward larger numbers of smaller prepackaged shipments for individual health facilities. While this model was successful, the authors note that replicating it will require significant advocacy and overcoming entrenched interests in existing practices. In Zambia, a favorable political economy and the leadership of the Ministry of Health were critical factors that enabled the approach's success.

Key takeaways

1. Commercial supply chain strategies can improve efficiencies in public sector supply chains by both reducing costs and shifting incentives to improve performance.
2. Adopting major public supply chain reforms to improve efficiencies requires solutions that address both structural and political economy factors.

Learn more

Fletcher, C, and CJ Wehlage. 2008 *Multi-Tier distribution channels: moving from three tier to two tier*. Boston, MA. AMR Technical report.

Vledder, M, J Friedman, M Sjöblom, T Brown, and P Yadav. 2019. "Improving Supply Chain for Essential Drugs in Low-Income Countries: Results from a Large-Scale Randomized Experiment in Zambia." *Health Systems & Reform* 5(2): 158–177.

2010. *The World Health Report 2010 Health Systems Financing the Path to Universal Coverage*. Geneva: WHO.

Yadav, P, H Tata, and M Babaley. 2011. *The World Medicines Situation (2011): Storage and supply chain management*. Geneva: WHO.

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Approach 14: Using performance data to incentivize appropriate dispensing (Promising approach)

Responsible use of medicines consists of ensuring that patients have the right medicines at the right time to achieve optimal clinical outcomes (WHO 2012). Inappropriate use of medicines can include overuse of medicines when they are not effective or required for the condition in question; underuse when they are given in insufficient doses; incorrect use when the wrong ones are used; and unnecessary use when more expensive options are used over available lower-cost options (Wirtz et al. 2017). These practices negatively affect technical efficiency by wasting resources, limiting health outcomes both for the individual and the community (as in the case of antimicrobial resistance), or otherwise increasing costs. There are multiple factors that contribute

to inappropriate use of medicines: lack of prescriber knowledge, patient preferences and demands, financial incentives created by payment schemes, and more (HFG 2018). Governments and global health organizations have sought to address these factors by improving training, separating prescribing and dispensing functions, strengthening regulations, and increasing awareness of appropriate dispensing practices among both health workers and the broader public (MSH 2012; WHO 2012). On top of these efforts, policy makers have also begun testing how they can incentivize appropriate prescribing and dispensing practices.

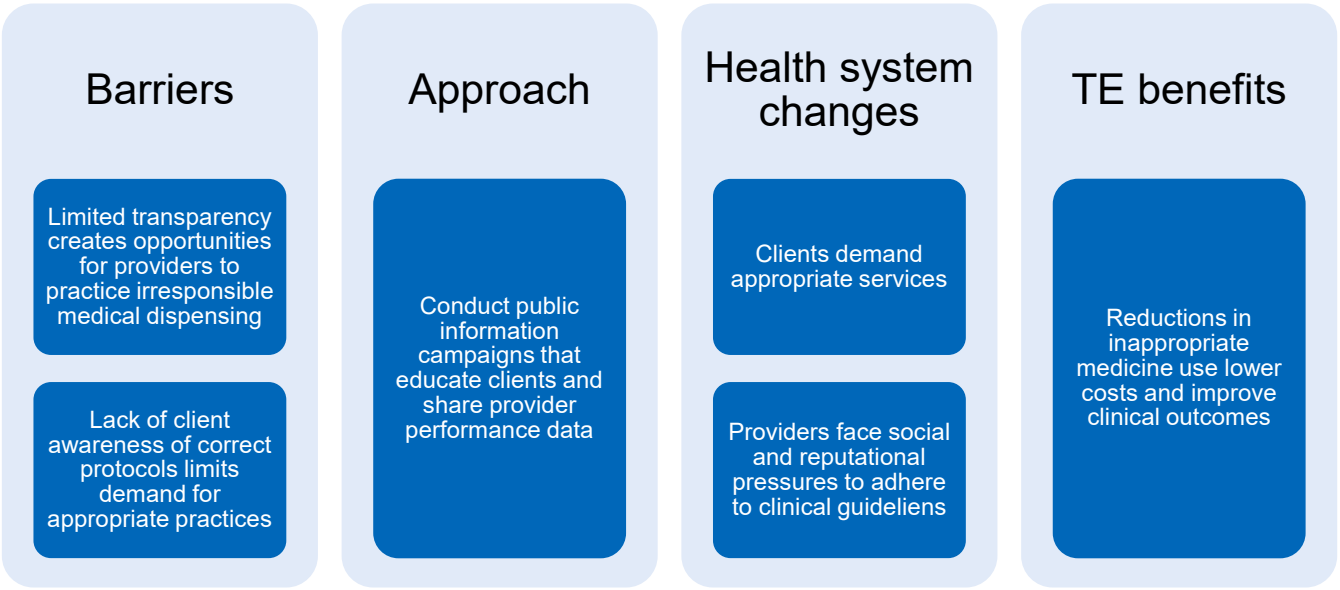
Approach overview

Health care workers have multiple incentives to inappropriately use medicines – both providers to prescribe and pharmacists to dispense. These incentives exist even when clinical guidelines are up to date and they are aware of correct practices. Patient preferences and expectations around which medicines are the most effective often drive prescribing behaviors, especially in the private sector where providers have a business incentive to keep clients satisfied (Pearson et al. 2018; Rosapep and Sanders 2015). In addition, various health system structures and practices influence prescribing and dispensing behavior. Health insurance benefits package design – both service coverage and reimbursement terms – create financial incentives that may not be aligned with optimal health outcomes. For example, failure to include preventive services, such as FP, in benefits packages can disincentivize their delivery and increase the need for costlier care later on (Holtz and Sarker 2018).

To help overcome these forces, researchers and local health officials in China tested whether increased sharing of performance data could motivate providers to improve adherence to appropriate medicine use (Wang et al. 2014). This intervention specifically targeted overuse of expensive medical injections by tracking and publicly sharing injection prescribing rates. Using routine service delivery data and electronic prescription records, the researchers monitored physicians' performance and – on a monthly basis – distributed updated public information materials (e.g., brochures, bulletin boards) that ranked individual providers and facilities on their performance. These rankings were paired with educational materials that explained the relevance of injection prescribing rates and the importance of rational medicine use. No other incentives to change behavior – financial or nonfinancial – were provided, other than this public information sharing.

Figure 14 presents a high-level overview of the theory of change for these efforts.

Figure 14. Improving technical efficiency by incentivizing appropriate dispensing



Global evidence and implementation tips

Researchers evaluated the results of this model through a quasi-experimental study (Wang et al. 2014). Twenty participating facilities were matched based on their similarities on factors related to service population, number of beds, and number of physicians. Within each pair, one facility was randomly assigned to a treatment group and one to a control group. The research team measured injection prescribing rates before and after the intervention and conducted difference-in-difference and regression analysis to estimate the impact. The outcomes of this study illustrate the potential to increase technical efficiency (Table 15).

Table 15. Illustrative evidence of outcomes from incentivizing appropriate dispensing

Study	Intervention model	Study Outcomes	TE Implications
Wang et al. 2014*	Physician injection prescribing rates were monitored, ranked, and publicly disseminated to incentivize adherence to correct protocols	Public reporting led to a 4% reduction in the injection prescribing rate over a 4-month period.	Publicly sharing data on medicine dispensing can incentivize modest improvements that help reduce costs and improve adherence to clinical guidelines

*Outcomes are statistically significant at the 0.05 level.

Key takeaways

1. Public sharing of health worker performance can lead to modest improvements in technical efficiency, but additional research is needed to confirm the relevance and impact in different contexts.
2. Efforts to publicize health worker performance should be accompanied by communication efforts that raise patients' awareness of correct practices to incentivize behavior change.

LEARN MORE

Holtz, J, and I Sarker. 2018. *Integrating Family Planning into Universal Health Coverage Efforts*. Brief. Bethesda, MD: Sustaining Health Outcomes through the Private Sector Plus Project, Abt Associates.

Management Sciences for Health (MSH). 2012. *MDS-3: Managing Access to Medicines and Health Technologies*. Arlington, VA: MSH.

Pearson, M, A Doble, R Glogowski, S Ibezim, T Lazenby, A Haile-Redai, and N Shaik. 2018. *Antibiotic Prescribing and Resistance: Views from LMIC Prescribing and Dispensing Professionals. Report to World Health Organisation.* Geneva: WHO AMR Secretariat.

Rosapep, L, and E Sanders. 2015. *Diarrhea Management and the Medicine Seller-Customer Transaction*. Bethesda, MD: Strengthening Health Outcomes through the Private Sector Project, Abt Associates.

Wang, X, Y Tang, X Zhang, X Yin, X Du, and X Zhang. 2014. "Effect of publicly reporting performance data of medicine use on injection use: a quasi-experimental study." *PLoS One* 9(10): e109594.

Wirtz, VJ, HV Hogerzeil, AL Gray, M Bigdeli, CP de Joncheere, MA Ewen, M Gyansa-Lutterodt, S Jing, VL Luiza, RM Mbindyo, H Moller, C Moucheraud, B Pecoul, L Rago, A Rashidian, D-Ross-Degnan, PN Stephens, Y Teerawattananon, EFM Hoen, AK Wagner, P Yadav, and MR Reich. 2017. "Essential Medicines for Universal Health Coverage." *The Lancet* 389(10067): 403-476.

WHO. 2012. *The Pursuit of Responsible Use of Medicines: Sharing and Learning from Country Experiences. Technical Report Prepared for the Ministers Summit on the Benefits of Responsible Use of Medicines: Setting Policies for Better and Cost-Effective Health Care*. Geneva: WHO.

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ANNEX A: METHODOLOGY

Literature scan

To identify approaches that have been tested and proven effective, we searched databases of both published and peer-reviewed literature, as well as a gray literature found on key global institution's websites.

Published literature

The primary site used to identify relevant published literature was the PubMed database (https://pubmed.ncbi.nlm.nih.gov/). LHSS conducted its search on February 16, 2022, to identify articles published over the past 10 years (January 1, 2012, through the search date). In consultation with USAID, LHSS identified several synonymous terms related to both health and efficiency in order to capture papers that might not use the specific phrase "technical efficiency" yet still spoke to the topic. Examples include performance, productivity, waste, and maximize (See Annex B for the full search terms). These terms were included, in addition to options specific to each building block. Finally, the full search was restricted to articles describing interventions in LMICs and in English, French, or Spanish.

Once the titles were identified, there were two main factors that determined their inclusion in the analysis:

- The article contains a detailed description of an effort to improve technical efficiency. Papers had to contain enough information about an improvement effort that people in another setting could reasonably understand and adopt a similar approach.
- The article contains quantitative or qualitative information on the observed results of that intervention or effort. This excludes study protocols, theoretical frameworks, modeled results, or hypothetical studies.

In addition, papers were excluded based on the following reasons:

1. The article was not a journal article, technical report, or a similar study.
2. The paper did not focus on human health (e.g., several articles dealt with waste management practices but did not discuss impacts on health).
3. The paper did not focus on technical efficiency as a topic (e.g., several papers focused on allocative efficiency or discussed other interventions and outcomes in ways that did not allow the authors to identify improvements in technical efficiency).
4. The paper focused on identifying technical inefficiencies; it did not measure interventions to address them.
5. The paper discussed a cost-effectiveness study that did not address issues related to technical efficiency.

The search results were uploaded to EndNote 16, a reference management software for bibliographies, to help facilitate the process. Based on the inclusion/exclusion criteria, the review team conducted an initial scan of the paper's titles and removed any document not deemed relevant based on the titles. For the unclear ones, team members read the abstract to make further judgments.

Gray literature

The process of identifying gray literature included an initial search of databases from global intergovernmental organizations (e.g., World Bank, WHO) and papers from the USAID HFG Project (2013–2018). Other searches included the background paper for the 2017 Annual UHC Financing Forum and the background papers for the World Health Report 2010.

Expert consultation

Finally, the LHSS team consulted with subject matter experts on each of the health system building blocks from across the LHSS consortium. The team used these discussions to validate the results of the literature search and identify additional potentially relevant papers to include in its review and analysis.

Data extraction and analysis

The team developed and populated a Microsoft Excel workbook to extract data from the full-text papers remaining following the PubMed search and the gray literature review. The specific data extraction fields included:

- Citation (including the authors, title, and year)
- Whether or not the paper is relevant based on the inclusion/exclusion criteria; if inclusion or exclusion was unclear, the team member flagged it for further review
- Additional column to provide a reason for exclusion
- The primary health system strengthening building block the paper is associated with
- Column for additional building block if applicable
- Country/countries where the intervention took place
- The approach to improve technical efficiency as highlighted in the paper
- A summary of the design study
- A summary of the intervention
- Results and implications from the intervention
- The measures/metrics used to demonstrate change in technical efficiency
- Option to flag tools/methods around technical efficiency
- List of specific tools to improve technical efficiency

The assigned person reviewed all the papers and populated the Microsoft Excel sheet with the relevant information. For some of the sections, the reviewer would ‘copy and paste’ portions of the documents to retain the author’s language and intentions.

Synthesis of information

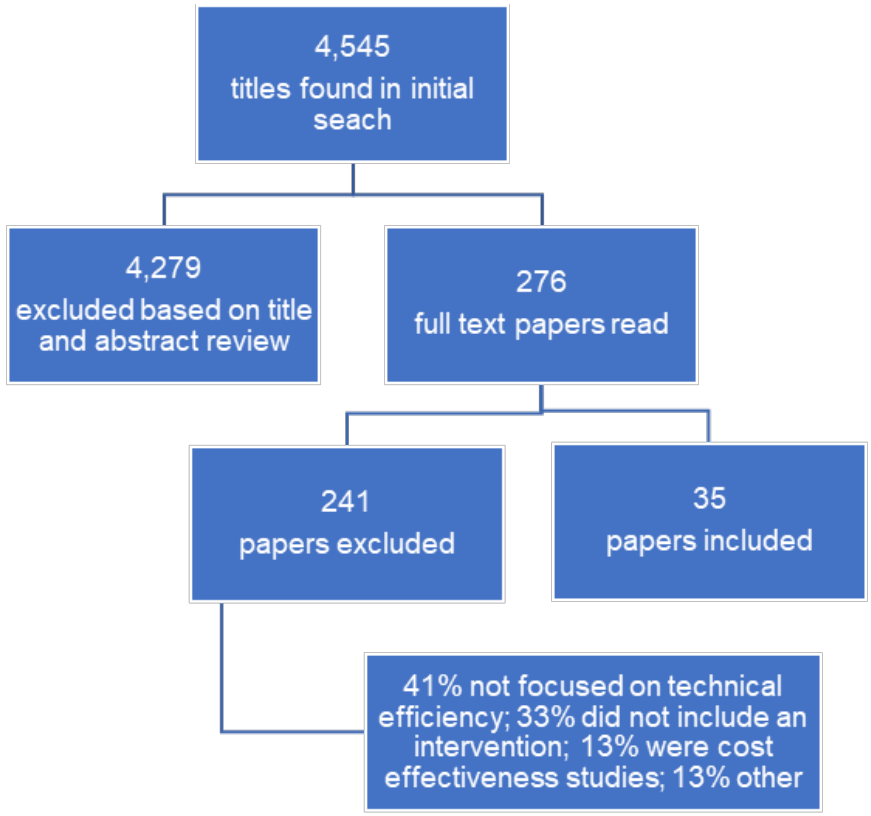
Once all data were extracted into Microsoft Excel by the team, one team member reviewed the entries to assess the accuracy of extraction and code articles to standardize descriptions of health system building blocks, specific approaches, interventions, and results. During this process, the reviewer also conducted an additional review of articles whose relevancy had been flagged by data extractors. To aid in the presentation of the results, interventions were grouped into a standard list of approaches, based first on the words the articles themselves used to name the intervention, and then based on the reviewers’ reading of the description of the intervention. This process helped to identify cross-cutting approaches. For example, one article on task sharing could focus on the service delivery model, while another on the same approach could focus on the health workforce implications.

After completing this step, the team reviewed all papers that had been categorized as having similar approaches. The interventions in each paper were analyzed to identify commonalities and develop a high-level description and theory of change for how that approach improves technical efficiency. Each paper was then reviewed to draw out the evidence that documented either the successes or limitations of each approach. The team synthesized this information to develop a summary of the global evidence and implementation tips for each approach.

Results of the literature search

The PubMed and gray literature search yielded 4,545 papers. During the initial review of titles and abstracts, 4,279 papers were excluded. The review team read 276 full text papers to assess their relevance for the catalog. Ultimately, 35 met the inclusion criteria. Forty-one percent were excluded because they focused on topics that did not explicitly relate to technical efficiency – for example, they measured changes in knowledge, attitudes, and practice, or evaluated the feasibility of new interventions. Thirty-three percent were excluded because they did not include an explicit intervention – these papers largely included theoretical frameworks, modeled outcomes, or research protocols. Thirteen percent were excluded because they only measured the cost effectiveness of a specific product or service. And the remaining the 13 percent were excluded because they did not align with our other inclusion criteria.

Figure A1. Literature search process results



ANNEX B: SEARCH TERMS USED

Terms used for PubMed database

General Restrictions

Published on or after January 01, 2012

"2012/01/01"[Date - Publication] : "3000"[Date - Publication]

Journal article, technical report, or similar type of study

Comparative Study[Filter] OR Journal Article[Filter] OR Observational Study[Filter] OR Review[Filter] OR Technical Report[Filter] OR Validation Study[Filter]

Language: English, French, or Spanish

English[Language] OR French[Language] OR Spanish[Language]

Low- or middle-income country

“Afghanistan” OR “Albania” OR “Algeria” OR “Angola” OR “Antigua and Barbuda” OR “Armenia” OR “Azerbaijan” OR “Bahamas” OR “Bahrain” OR “Bangladesh” OR “Barbados” OR “Belarus” OR “Belize” OR “Benin” OR “Bhutan” OR “Bolivia” OR “Bosnia and Herzegovina” OR “Botswana” OR “Brazil” OR “Burkina Faso” OR “Burundi” OR “Côte d'Ivoire” OR “Cape Verde” OR “Cambodia” OR “Cameroon” OR “Central African Republic” OR “Chad” OR “Chile” OR “China” OR “Colombia” OR “Comoros” OR “Congo” OR “Costa Rica” OR “Croatia” OR “Cuba” OR “Democratic Republic of the Congo” OR “Djibouti” OR “Dominica” OR “Dominican Republic” OR “Egypt” OR “El Salvador” OR “Equatorial Guinea” OR “Eritrea” OR “Eswatini” OR “Swaziland” OR “Ethiopia” OR “Fiji” OR “Gabon” OR “Gambia” OR “Georgia” OR “Ghana” OR “Grenada” OR “Guatemala” OR “Guinea” OR “Guinea-Bissau” OR “Guyana” OR “Haiti” OR “Honduras” OR “India” OR “Indonesia” OR “Iran” OR “Iraq” OR “Jamaica” OR “Jordan” OR “Kazakhstan” OR “Kenya” OR “Kiribati” OR “Kyrgyzstan” OR “Laos” OR “Lebanon” OR “Lesotho” OR “Liberia” OR “Libya” OR “Madagascar” OR “Malawi” OR “Malaysia” OR “Maldives” OR “Mali” OR “Marshall Islands” OR “Mauritania” OR “Mauritius” OR “Mexico” OR “Micronesia” OR “Moldova” OR “Mongolia” OR “Montenegro” OR “Morocco” OR “Mozambique” OR “Myanmar” OR “Burma” OR “Namibia” OR “Nauru” OR “Nepal” OR “Nicaragua” OR “Niger” OR “Nigeria” OR “North Korea” OR “Oman” OR “Pakistan” OR “Palau” OR “Papua New Guinea” OR “Paraguay” OR “Peru” OR “Philippines” OR “Rwanda” OR “Saint Kitts and Nevis” OR “Saint Lucia” OR “Saint Vincent and the Grenadines” OR “Samoa” OR “Sao Tome and Principe” OR “Senegal” OR “Seychelles” OR “Sierra Leone” OR “Solomon Islands” OR “Somalia” OR “South Africa” OR “South Sudan” OR “Sri Lanka” OR “Sudan” OR “Suriname” OR “Syria” OR “Tajikistan” OR “Tanzania” OR “Thailand” OR “Timor-Leste” OR “Togo” OR “Tonga” OR “Trinidad and Tobago” OR “Tunisia” OR “Turkey” OR “Turkmenistan” OR “Tuvalu” OR “Uganda” OR “Ukraine” OR “Uruguay” OR “Uzbekistan” OR “Vanuatu” OR “Venezuela” OR “Vietnam” OR “Yemen” OR “Zambia” OR “Zimbabwe”

Search terms

Search 1: Some form of efficiency-related word in the title:

“efficien*”[Title] OR “cost*”[Title] OR “save*”[Title] OR “corrupt*”[Title] OR “fraud*”[Title] OR “waste*”[Title] OR “perform*”[Title] OR “quality”[Title] OR “productivity”[Title] OR “maximiz*”[Title]

Combined with General Restrictions: 160,863 records in PubMed

AND

Search 2: Making sure the paper is health-related:

“health”[Title/Abstract]

Combined with General Restrictions and Search 1: 28,540 records in PubMed

AND

Search 3: Service Delivery

“service delivery”[Title/Abstract] OR “health services”[Title/Abstract] OR "medical care"[Title/Abstract]

à1,702 records in PubMed

OR

Search 4: Digital Health

"eHealth"[Title/Abstract] OR "e-Health"[Title/Abstract] OR "mHealth"[Title/Abstract] OR "mobile health"[Title/Abstract] OR "information technology"[Title/Abstract] OR "digital health"[Title/Abstract]

à266 records in PubMed

OR

Search 5: Health Workforce

“workforce”[Title/Abstract] AND “human resources”[Title/Abstract] OR “workers”[Title/Abstract] OR “labor”[Title/Abstract] OR “personnel”[Title/Abstract]

à2,182 records in PubMed

OR

Search 6: Pharmaceutical Products

"pharma*"[Title/Abstract] AND (“supply plan”[Title/Abstract] OR “supply management”[Title/Abstract] OR “procure*”[Title/Abstract] OR “warehous*”[Title/Abstract] OR “forecast*”[Title/Abstract] OR “inventory”[Title/Abstract] OR “contract*”[Title/Abstract])

à53 records in PubMed

OR

Search 7: Finance and Governance

“financ*”[Title/Abstract] AND “budget*”[Title/Abstract] OR “health insurance”[Title/Abstract] OR “tax”[Title/Abstract] OR “revenue”[Title/Abstract] OR “governance”[Title/Abstract] OR “steward*”[Title/Abstract]

à906 records in PubMed

Note: when this full search is run in PubMed, we get **4,465 results in total**, suggesting that some papers were captured in multiple building blocks.

Terms used for the gray literature search

USAID DEC search 1:

Searched everywhere for '(Documents.Document_Title:(efficien*)) AND (Documents.Class=("Higher education" OR "Health research" OR "Health professional education" OR "Health policy" OR "Health occupations" OR "Health insurance" OR "Health finance" OR "Health facilities" OR "Health education" OR "Health delivery" OR "Health care

education" OR "Health care case management" OR "Health care administration" OR "Health care" OR "Health (General)")) AND (Documents.Language_of_Text=("French" OR "Spanish" OR "English"))'. ***45 matches were found***.

USAID DEC search 2:

Searched everywhere for '(Documents.Document_Title:(productivity)) AND (Documents.File:(productivity)) AND (Documents.Class=("Health research" OR "Health professional education" OR "Health policy" OR "Health occupations" OR "Health insurance" OR "Health finance" OR "Health facilities" OR "Health education" OR "Health delivery" OR "Health care education" OR "Health care case management" OR "Health care administration" OR "Health care" OR "Health (General)")) AND (Documents.Language_of_Text=("English" OR "Spanish" OR "French"))'. ***10 matches were found***.

World Bank Open Knowledge Repository:

Health and Efficien*

Health and Efficien* and Technical Efficiency. ***22 matches were found***.

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